

**International Energy Agency  
Demand Side Management Implementing  
Agreement Task 9**

**Municipalities and Energy Efficiency  
in a Liberalised System**

**Case studies of Good Practice in Rising  
to the Challenge of Liberalisation**



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# Introduction

The DSM Implementing Agreement of the International Energy Agency promotes cooperation between countries in undertaking studies and research on issues related to energy efficiency and demand side management. A series of Tasks have been carried out and are continuing to be carried out by the participating countries. Task 9 relates to the role of municipalities in promoting energy efficiency in the context of liberalisation. The Task partners are the participating countries, in this case France (as Operating Agent – i.e. coordinator), Austria, Spain, Sweden and The Netherlands which are represented by experts on the Task committee. The experts in the current project have come from Energie-Cites (France), Graz Energy Agency (Austria), EcoServeis (Spain), Svekorn (Sweden) and Ambit b.v. (The Netherlands). Funding has come from Ademe (France), the Austrian Government, ICAEN (Spain), STEM (Sweden) and Novem (The Netherlands), this last organisation also sending an expert to the Task committee and actively participating in it.

Local authorities have a key role in promoting energy efficiency. This applies in particular to their own stock of buildings and equipment which provides approximately 24% of energy demand, depending on the country. Certain activities have a significant demand and at the same time provide major opportunities for improved efficiency.

Energy efficiency activity has been identified as one of the main potential casualties of market liberalisation and this is felt to be a key problem by local authorities and others. There is a tendency for energy producers, traders and distributors to concentrate into large conglomerates which compete with traditional local authority utilities. While profitable energy efficiency activity is integrated into the services offered, there is a retreat from promoting energy efficiency to the small consumer which is less profitable in the short term. This makes the public service roles, including energy efficiency activity, more difficult to maintain.

The Task's main role is to investigate energy efficiency activity by local authorities in markets affected by liberalisation to:

- Discover how those impacts of liberalisation discouraging energy efficiency activity can be circumvented,
- Recommend how the action of local authorities in this field can be made more effective and
- Disseminate this information to local authorities and those arms of government responsible for supervising municipal activity in this field.

The project has already prepared two reports looking at the roles of local authorities in the energy sphere and the impact of the liberalisation of energy markets on them. This third report is a survey of the key examples of best practice identified by the partners, both in their own countries and in others. In this latter context study visits were made to the UK and California to investigate the impact in countries highly committed (at least at the beginning) to an intense process of liberalisation. A number of examples are drawn from this experience.

The examples presented here are also the basis for a series of guidelines for local authorities to respond to the process of liberalisation. These will appear as report 4 shortly following the current report.

The case studies presented here are presented by country. They can also be found on the MEELS website ([www.energie-cites.org/meels](http://www.energie-cites.org/meels)) where the case studies can be more closely linked to the key strategies available to local authorities for responding to liberalisation.



# Austria

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# Thermoprofit: Marketing Performance Contracting

## Graz (AT)

### GENERAL ASPECTS

Graz, the capital city of the Austrian province of Styria (Steiermark), is Austria's second largest city with 250,000 inhabitants and a vibrant cultural and social life. The tightly built up mediaeval core in the Old Town was designated a World Cultural Heritage Site by UNESCO in 1999. The city has an air of affluence with areas of large individual houses in turn of the century suburbia.



### BACKGROUND

Obstacles standing in the way of rational energy utilisation can be overcome with the help of energy services that include financing schemes. At present, however, these innovative models are still largely unknown and their potential is far from being fully utilised.



A study by the Technical University of Vienna analysed the economic effects of increasing the energy performance of buildings in the city of Graz via promoting energy services. Over the next 15 years between 600 and 1250 million Euro of investment could be undertaken and up to 700 jobs could be created.

Confidence in the functioning of TPF models needs to be enhanced and the Thermoprofit programme has been devised to do this. This uses innovative approaches and solutions which should develop from their current status as model projects into established modes of practice in this field.

Thermoprofit was first conceived as part of the Graz Municipal Energy Plan (Kommunales Energiekonzept KEK Graz). It was developed in collaboration with representatives from utilities, local authorities, companies, NGOs, etc. The aim of this promotional programme is to disseminate energy services such as Energy Performance Contracting or Third Party Financing. This will lead to a saving in energy costs, a reduction in energy consumption and environmental pollution, and a stimulation of the regional economy.

The essential characteristics of Thermoprofit projects are:

- A reduction in the energy used in buildings,
- Economic advantages for the owners and users of buildings,
- A direct or indirect reduction in pollutants and CO<sub>2</sub> emissions,
- Planning and implementation carried out by a Thermoprofit partner,
- Thermoprofit guarantees that energy costs will stay below a defined limit.

## ACTION UNDERTAKEN

The Thermoprofit Programme contains the key elements of Third Party Financing and Energy Performance Contracting, while being organised in a more flexible way.

The development and penetration of the market for total service packages is being achieved via four main strategies:

- Creation of a Thermoprofit network of competent suppliers,
- Developing and establishing quality standards,
- Independent support provided by the Graz Energy Agency and other partner agencies,
- An information and marketing initiative.

Thermoprofit is focused less on advance financing by the contractor. It also includes models in which the ESCO optimises energy use on the basis of either an energy savings guarantee or a performance-based fee, while the owner of the building remains in charge of the financing himself.

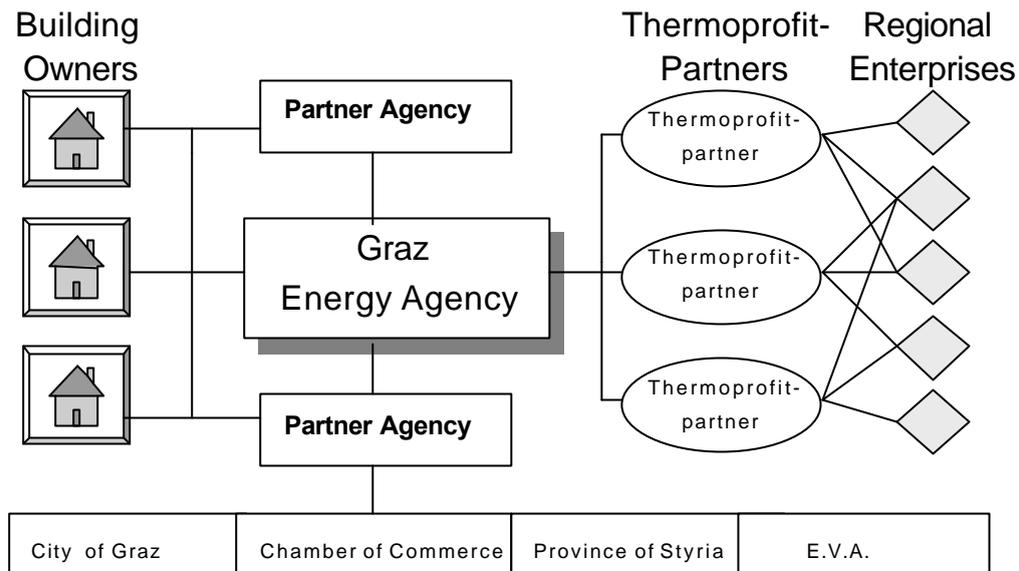
While Thermoprofit projects are primarily designed for the renovation of existing buildings, they can also be applied to the construction of new buildings. The complete range of possible economic measures is examined in every case in order to find the optimal solution.

Thermoprofit constitutes a **quality label** linked to a series of standards to be met by enterprises and their projects. The owners and/or users of buildings are guaranteed reliable high quality proposals. The Thermoprofit label may be used exclusively by Thermoprofit partners who are assessed by Graz Energy Agency and an independent commission at regular intervals to confirm that they are observing Thermoprofit standards. The Thermoprofit model was primarily developed for the owners of larger buildings. The model is profitable for all types of public building, for residential property owners and developers, banks, insurance companies and trade and industry.

The Thermoprofit Network consists of suppliers of total service packages – so-called Thermoprofit partners. First of all Thermoprofit partners are prime contractors. They co-operate with regional enterprises in the execution of projects and thus contribute to stimulating the economy of the respective region. Their special characteristic is that they offer a Thermoprofit guarantee of undisturbed operation, the observance of comfort parameters, guaranteed energy and cost savings, etc. In providing the energy services required, they not only take on comprehensive tasks on behalf of the user of the building, but also the technical and economic risks.

The specific goals of this networking are as follows:

- Reaching high quality in Thermoprofit proposals and working with competent enterprises,
- Providing rational and cost-effective project handling,
- Successfully implementing a number of Thermoprofit projects,
- Finding qualified enterprises as partners for Thermoprofit.



The **Graz Energy Agency** co-ordinates the network and acts as a forum for Thermoprofit issues. It is responsible for project management and is in charge of implementing and supporting the required networking and marketing activities.

The Graz Energy Agency is also in charge of the assessment and certification of enterprises as Thermoprofit partners. This certification takes place every two years. In order for an enterprise to be certified as a Thermoprofit partner, or to keep its certification, it must fulfil certain conditions and observe certain quality standards in project management. In the end, an independent committee decides whether the enterprise in question is admitted to the network and is certified as a Thermoprofit partner. Certified enterprises are entitled to use the quality label.

Several public bodies, in particular the city of Graz and the Styrian Chamber of Commerce (Wirtschaftskammer Steiermark) are involved in the development and dissemination of Thermoprofit. A close co-operation takes place with a number of further partners at institutional and expert level as well as with authorities on the regional and municipal level. This helps to establish framework conditions for the smooth implementation of Thermoprofit projects.

Three local Austrian energy agencies participate in the network as partner agencies. A kind of "franchising system" was worked out to form a network of "partner agencies" and to promote Thermoprofit as a joint initiative. Professional support during the implementation of a Thermoprofit project are provided to these partner agencies.

## The programme

The main activities of the promotional programme started during 1998. The following outputs have been obtained so far:

### Networking Activities

The Thermoprofit network was first presented to ESCOs in June 1999 with the objective of informing them about the network and awakening the interest of energy services contractors.

The first certification of companies took place in October 1999 and 6 big companies were certified as Thermoprofit partners. Further companies showed an interest in participating.

A panel of companies undertaking ecological construction and renovation projects was set up as part of the Thermoprofit Plus LIFE-project funded by the EU. The panel's objective is to establish quality criteria for ecological renovation, to offer professional training for the companies and to carry out joint marketing activities. To date 17 companies have joined the panel.

### Information and Marketing activities

The reputation of Thermoprofit has been considerably enhanced in recent years. Promotional materials like the Thermoprofit folder and animated Powerpoint presentations were prepared to draw attention to the

programme. Thermoprofit was introduced to the public through press liaison and presentations at conferences and events.

An Internet web site ([www.thermoprofit.at](http://www.thermoprofit.at)) was developed with information about Thermoprofit. The web site contains a database where Thermoprofit partners can present their company. A database with success stories about Thermoprofit projects is available. Moreover, interactive tools give the opportunity to find partners for a project and to exchange information.

Discussions and meetings with public authorities and institutions are regularly organised to promote co-operation and encourage dissemination of the programme. Information is regularly exchanged with the City of Graz and through networks such as the Association of Towns and Municipalities, the Management of the Steiermark Region, Climate Alliance and many other institutions.

Great recognition of the work already done was given when the Minister for Environment and the Austrian Society for Environment and Technology (ÖGUT) awarded Graz Energy Agency, representing the Thermoprofit partners, with the "Contracting" and "Marketing ideas and concepts" prizes in the "Energy Profi Competition 2001". The Graz Energy Agency also won the "Energy Profi competition 2003".

### **Dissemination in other regions**

Three Austrian energy agencies participate in the network as partner agencies. A franchising system was worked out to form a network of "partner agencies" and to promote Thermoprofit as a joint initiative. A manual and marketing materials for the agencies were worked out and a training session was held.

### **Support for building owners**

The Graz Energy Agency supports building owners during the implementation of actual projects. Services include data collection and preliminary analysis, project development, bidding procedures, contract negotiations, documentation and control.

## **P**ROJECTS

Thermoprofit projects have been implemented in a wide range of buildings. These include:

- Municipal buildings including pools of 5 buildings in the City of Salzburg, 9 in Kirchbach, and the City Hall and administration block in Graz itself,
- Improving the energy performance of schools (e.g. Europa-Allee school),
- High environmental quality restoration (Vinzenc-Muchitsch-Straße and 70 residential buildings at Denggenhofsiedlung),
- Comprehensive renovation of buildings,
- Solar heat supply (BUWOG and Schillerheim student hall of residence),
- Improving street lighting (Kirchbach, given an award by the "Energy Profi Competition 2003"),
- Installing biomass heating (Herberstein zoo).
- Thermal renovation and optimising energy use (Joanneum Research, given an award by the "Energy Profi Competition 2003")

## **L**ESSONS LEARNED

The increased responsibility for municipalities in liberalised markets makes it important for them to find new ways to promote energy efficiency and reduce costs. Because budgets are always tight in the public sector, public authorities have to find new ways of financing investments and Third Party Financing could be one of the solutions. Thermoprofit is a promotional programme to disseminate service packages like Energy Performance Contracting or Third Party Financing and will lead to a saving of energy costs, a reduction in energy consumption and environmental pollution and a stimulation of the regional economy.

Additionally increased competition in liberalised markets leads to an increased need for ESCOs to find new ways to be competitive. They have to develop new markets. Thermoprofit represents a quality label linked to a series of standards to be met by enterprises and their projects, therefore this quality level can be a competitive advantage.

The key issue raised however is to what degree should a local authority be responsible for promoting private sector solutions from which the private sector will make a profit. Third Party Financing schemes seem to

flourish best when given external support at national or regional level. (see case study Sustainable Peterborough). Graz Energy Agency has set itself up as a competitive company in a competitive market, financed by the city and the municipal utility. Thermoprofit is one of its key business lines, promoted for political as much as business reasons.

However liberalisation has had an impact and the utility sponsor has been reconsidering its position. It is active in the energy service contracting market itself with the intention of tying clients to buying energy from their company and this may cause people to question the Energy Agency's freedom of action in this regard. Graz Energy Agency has so far maintained its independence, but there is clearly a threat since in a competitive market, the heavily capitalised energy supply companies can, should they so desire, outbid independent operators in order to get market share. Nevertheless the envious regard of the utility is a measure of Thermoprofit's success in achieving market take-off.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

Promotion of ESCOs needs action at local level and a strong public sector market. Intermediate organisations like energy agencies play a vital role in developing the market. All good examples demonstrate this need for a strong local structure and the promotion of the public sector market – for instance Waltham Forest in London, Berlin Energy Agency, Sustainable Peterborough and Toronto Better Buildings Campaign in Canada and Rebuild Colorado in the US.

Government can help this. It can underpin such structures with grant aid, it can promote the use of performance contracting and TPF in their sector of control, it can adjust tax rates so that energy investment is not penalised through the VAT system, it can encourage local government to invest in such structures, it can set them targets. But again it needs a long term will and commitment, and a willingness to maintain policy over a reasonable length of time.

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Case study prepared by Graz Energy Agency as part of Task 9 of the International Energy Agency DSM implementing agreement, Municipalities and Energy Efficiency in a Liberalised System.





# District heating fuelled by Wood Biomass

## Lienz (AT)

### GENERAL ASPECTS

Lienz, the regional capital of East Tyrol, lies at the foot of the Dolomites between the Isel and Drau rivers.

The town's population of 13000 works in local industry dominated by tourism, refrigeration appliance manufacturing and services. The colourful fronts, street cafes and cornershops give a relaxed southern atmosphere.



### BACKGROUND

The environment department of the municipality developed the "Lienz Energy Project" in 1993 in cooperation with a voluntary committee, the Lienz Energy Council. The aim of this project was to reduce air pollution in the Lienz district. Lienz lies in a basin which suffers from temperature inversions in winter, so air quality was poor. Different actions have been undertaken to reduce emissions. The Lienz Energy Plan was prepared based on a survey of 2500 households carried out in 1996 and which led to a 500 roof installation programme and a boiler replacement campaign. A five year solar installation campaign was launched with grants of €73 euro/ m<sup>2</sup> plus public awareness raising campaigns. Biomass is the major source of energy in Tyrol, second only to hydro power and it has a major potential for expansion. The Tyrol Land Administration supports the extension of the use of biomass in its development policies. Therefore the policy was continued through the construction of the largest, and most impressive, biomass-fired power plant in Austria.

### ACTION UNDERTAKEN

A sub group in the Energy Council was set up in 1998 to promote the district heating scheme and prepare a call for tenders.



In April 2000 Lienz set up a joint venture company, Stadtwärme Lienz Produktions- und Vertriebs-GmbH, to provide district heating to households and companies in the city in a joint venture with the City (4% share), TIWAG, the regional provider of electricity (48%) and Steirische Gas-Wärme GmbH, the Styrian gas and district heating utility (48%), as partners. Steirische Gas-Wärme, a subsidiary of ESTAG (Energy Styria inc), works in cooperation with Stadtwärme Lienz. It is the biggest provider of heat in Styria (70%) and Slovakia. It also operates in Slovenia, Hungary and the Czech Republic. The companies strategy for many years has been to promote their extensive know-how in the field of biomass.

By using renewable energy sources and the introduction the latest flue gas cleaning technology, it has been possible to reach

the regional objective of a lasting reduction in air pollution and to make a considerable contribution to the overall reduction of emissions.

A considerable public relations programme involving 120 events was undertaken to encourage citizens to connect to the network, and the municipality agreed to connect its 250 dwellings to the network. Construction started once a threshold of 10MW of agreed contracts had been obtained.

About 100 000 m<sup>3</sup> of timber is used each year obtained from sawmill residues, forestry waste and bark with an input of 10 000 m<sup>3</sup> from local farmers. There is a biomass store adjacent to the plant and the sawmills operate just-in-time delivery schedules.

### **The thermal power station**

A search was undertaken for the optimal solution from the technical, economic and environmental point of view. This should provide Lienz with heat and electricity from renewable sources throughout the year. The final design incorporated two biomass boiler systems, an ORC (Organic Rankine Cycle) processor, a solar system, an oil boiler and a flue gas cleaning system with heat recovery. The two biomass heating systems, a high temperature boiler of 7.000 kW and a thermal-oil boiler with 6.000 kW output, are the core of the system. The thermal boiler produces the input for the ORC processor with an electrical output of 1.000 kW of "green electricity" fed into the TIWAG network. The waste heat from the ORC processor is supplied to the district heating. The principle of electricity generation by an ORC-process is similar to the conventional water-steam-process with the important difference that instead of water, an organic carrier with especially chosen properties is used. The ORC processor operates off the thermal oil boiler.

A direct solar thermal system with a collector surface of 640 m<sup>2</sup> provides an additional source to the indirect use of the solar energy stored in the biomass. Because of the high insolation in Lienz, the collectors can feed about 250 MWh/a into the district heating network.

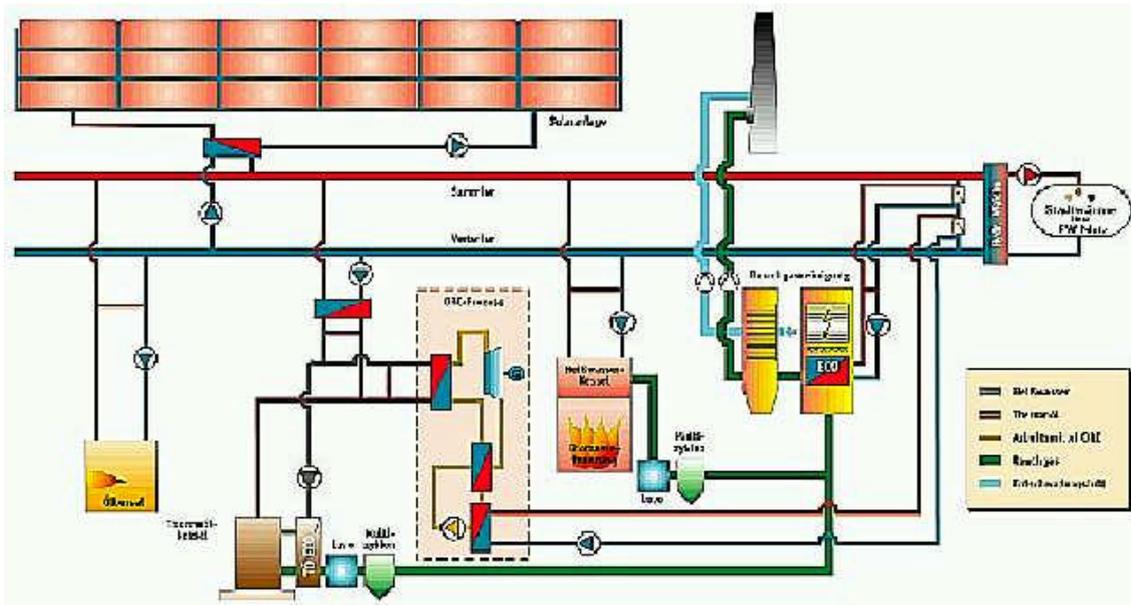
An 11MW oil boiler operating on light heating oil serves to cover the peak load and as a reserve source in case of breakdowns. Overall the oil boiler produces just 4 % of the total thermal energy consumed. Because of this minor input of fossil fuel it is possible to construct a biomass heating plant that is 40 % smaller because it does not have to cover the peak load. In addition a Fuzzy Logic Regulation system is planned in the thermal power station. The advantage of this innovative regulation system is that it improves the utilisation of the system over the year and reduces emissions by providing for steady combustion. Flue gas purification consists of initial dust extraction, an economiser and wet-electric filtration. The economiser recovers residual heat after which the flue gas cools down to 90 ° C and goes to wet-electric filtration. There it is cleaned to a dust content of 10mg/Nm<sup>3</sup> and is led to the LUVO which dries the flue gas and mixes it with external air, so avoiding a vapour plume down to an outdoor temperature of -5 C.

### **The district heating network**

The district heating network is constructed of prefabricated insulated pipe sections with leak detectors. Online data transfer from the district heating customers to the thermal power station enables settings to be changed at the heat exchanger following the needs of the customer and automatic transfer of energy consumption readings.

The district heating network started operation in November 2001 and the proposed network was completed by Stadtwärme Lienz in 2003 with a total forecast heat output of 60 000 MWh and a CO<sub>2</sub> saving of 25 000 tons per year. The design included three stages: firstly the construction of the three main supply pipes and the thermal power station so that nearly all bulk buyers can be provided with heat, secondly the progressive expansion of the district heating network and thirdly the developing of dense local networks.

Several thermal insulation and demand side improvements were implemented in customers' premises during the installation of the district heating network, so improving comfort and increasing energy saving. Overall a network of about 37,5 km has been laid and about 900 buildings and 3500 customers can be provided with heat from biomass and solar energy throughout the year. About 60 GWh of heat is sold annually.



## Funding

The project's total cost was 23.1 M euro and received funding from Tyrol Land, the Austrian Government and the European Union. The project is Austria's largest biomass project and has won many awards, for instance the Energy Globe Austria Award 2002 and the Environment Award 2002 of Tyrol Land.

## LESSONS LEARNED

This demonstrates that with sufficient political will and public support, an innovative investment can be promoted even under a liberalised regime although liberalisation did not directly have an impact on the project. There were other motors helping to develop this project – in particular the major environmental benefits in terms of air pollution. In the context of the new liberalised market there is great interest in utilities in new business directions and when the municipality organised a “competition” for proposals evaluated by members of the University of Graz, many utilities participated.

In liberalised markets the municipalities have more responsibility for regulation and so energy planning and long term strategies become more and more important. The adoption of a private sector mentality – a secondary impact of liberalisation, meant that extensive marketing activities and the co-operation with the inhabitants were promoted and this was one of the main reasons for success.

However it should be noted that here a local utility is carrying out monopoly functions – district heating. There is some advantage in having a “secure” monopoly business in a competitive market and so this must represent a market opportunity for municipalities wishing to promote local energy policies. The electricity output is relatively small and really provides “the icing on the cake” but, due to the feed in tariffs for green electricity, contributes considerably to the economic return.

# IMPLICATIONS FOR PUBLIC POLICY MAKERS

This project received heavy grant aid funding from all levels of government – regional, national and European. The introduction of liberalisation doesn't get round the need to support desirable forms of activity both for energy saving and sustainable supply options. High demand for biomass will eventually produce a price increase in the biomass fuel and if general energy prices fall, this form of financial support may even need to increase. However it is obvious that such options will work better as part of a rational energy policy prepared at municipal level as in this case study. Liberalisation strengthens the case for preparing such policies – one needs a framework against which to regulate.

## FURTHER INFORMATION

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Case study prepared by Graz Energy Agency as part of Task 9 of the International Energy Agency DSM implementing agreement, Municipalities and Energy Efficiency in a Liberalised System. The cooperation of Stadtwärme Lienz is gratefully acknowledged.



# Sustainable Utopia

# Linz (AT)

## GENERAL ASPECTS

Linz, a city in northern Austria and capital of the province of Upper Austria, has a population of 185.000 inhabitants.

Linz is a green city that has the largest port on the Austrian Danube. Historically the world's premier market for trading salt, today it is better known as a centre for trade, industry and education.



## BACKGROUND

The idea for the solarCity Linz project arose in 1990 following the decision of the City of Linz to put low energy construction methods into practice in the field of public housing. About 12,000 people were looking for a home in the central Linz area. At the same time the construction and operation of buildings involved a high consumption of fossil energy which was a major contributor to the greenhouse effect. Both factors were decisive arguments in favour of a plan for a sustainable ecological urban district and so the idea for building a "solarCity" was born.



The district of Pichling to the south of the city was the only possible area available for potential expansion. The area is characterised by existing estates of single-family houses, smaller bathing lakes and, in the immediate proximity, lies the Traun-Danube riverside meadows, the largest continuous natural biotope structure in central Upper Austria.

These conditions required a planning brief that would permit the sensitive insertion of a future residential area within the existing structures.

## ACTION UNDERTAKEN

### Preparing the plan for the new neighbourhood

In 1992, the renowned Austrian urban planner, Prof. Roland Rainer, was commissioned to prepare a comprehensive regional urban development plan, the master plan for the Linz-Pichling residential district. This master plan provides for a settlement potential of between 5,000 and 6,000 homes together with the entire infrastructure in this area.

One year later, in 1993, the Linz City Council commissioned an energy study for the homes in Pichling to serve as an example for the third millennium.





In 1994, the City of Linz, together with four of the most important non-profit-making housing associations in Linz confirmed their willingness to finance the planning and development of a model estate of 630 low energy homes in the district of Pichling.

Furthermore eight non-profit-making building promoters joined in 1995, with the result that a total of 1,317 homes are to be built on an area of around 32 hectares. The homes are subsidised by the Province of Upper Austria. Construction of the housing commenced in 2001 and completion is expected in 2005.

For the planning of the first 630 homes, the City of Linz succeeded in rousing the enthusiasm and obtaining the assistance of the world-class architects Norman Foster, and Richard Rogers from England and Thomas Herzog from Germany for the project. Together with the famous German energy

technology planner Norbert Kaiser, these architects formed a working party under the name of the READ group - Renewable Energies in Architecture and Design - whose aim is to promote the breakthrough of low-energy construction methods at the international level. The EU General Directorate XII for Research and Development subsidised the planning work with a contribution of euro 600,000.

The City of Linz held an architectural competition in 1996 for the design of more homes. The winner of this competition, the Viennese architect Martin Treberspurg, a solar architecture specialist with experience in public residential construction, is now preparing the plans for the second stage. The planned school, kindergarten and community commercial centre are models of resource-saving solar architecture, with special provision for bio-climatic design to reduce expensive air conditioning.

### Eco-solar construction

The name "solarCity" stands for the all-encompassing use of the energy of the sun.

This concept ranges from the direct use of the sun to improve individual comfort and plant growth to the use of the sun as a source of energy. A compact construction method largely oriented towards the south, highly insulated facades, natural ventilation and lighting and the optimum storage of heat are characteristics of this solar construction.

The buildings are built in a low-energy construction method (see artist's impression below). The heating energy requirements are limited by energy values laid down in the land purchase agreements. Solar collectors to heat water save fossil energy.

A catalogue of construction elements has been prepared according to construction biology and construction ecology criteria, and is used by all the builders on the basis of agreements.

This ensures that the building materials used minimise both the harm to the environment and the noxious effects on the persons living in the buildings.



### Energy supply

The settlement is designed so that energy supply takes account of the principles of efficiency and should as far as possible be renewable. From a number of alternatives, the Düsseldorf engineering consultancy Kaiser Consult-, Bau- und Umweltpartnerschaft proposed the following solution:

Electricity and heat will be generated by a multiple-fuel-fired CHP station. This can be operated in cogeneration mode using biogas and/or vegetable oil. However it has not been possible to proceed with this project to date due to the high price for rape seed oil and the low prices for fossil energy. Hot water will be generated by thermal solar collectors (covering at least 34% of requirements). The remaining heating requirements will be covered by district heating (CHP using fossil fuels).

### Waste disposal

In order to achieve an environmentally-friendly residential development, waste disposal has been included in the overall considerations:

Within the framework of a pilot project entitled a "waste-water free estate", 106 homes and the school are to be fitted with urine separation with special toilets operated in the conventional manner. The urine is rich of nutrients and supplied as agricultural fertiliser. The solids are composted.

Grey water, i.e. the water from showers, dishwashers and washing machines, is cleaned locally in a sand bed filter with vegetation and fed into the nearest stream.

A rainwater management system with hollows, gullies and reservoirs ensures that rainwater soaks into the ground locally.

A closed-cycle system is to be installed, relieving the load on the environment to an extent far beyond the mere exploitation of regenerative (solar) energy, thereby increasing the extent of the ecological value of the overall energy concept.



### **Social engineering, landscape and the virtual community**

In 1996, Wohnbund Salzburg was commissioned to prepare an overall socio-structural plan for the solarCity to ensure a viable social structure for the community. The final report recommended a balanced mix of legal forms of tenure (rent, purchase, purchase on mortgage etc.) and uses to encourage communities mixed in age and activities. It foresaw the integration of family needs in the design of new homes by the involvement of future users, including locating family groups in proximity, and provision of housing for immigrants. It proposed that neighbourhoods should be of manageable size, and should leave space for further development. In order to aid the process, The Ars Electronica Centre (AEC), Linz, the "museum of the future", has developed a computer programme to allow people to visualise the community in order to interactively involve all interested parties in the planning and implementation process.

The City of Linz negotiated with each of the 12 development companies to prepare quality agreements to ensure that the reality accorded with the plan.

A landscape plan for the area was prepared by Studio Dreiseitl following a competition in 1997. It considers existing and new elements of vegetation and water. The objective is the introduction of a multi-functional range of leisure activities, whilst creating and maintaining a variety of natural landscapes and habitats. The small lake "Weikerlsee" is to be expanded, brooks are to be revitalised and the Traun-Danube marshes are to be listed as a nature reserve.

### **Project organisation**

An interdisciplinary project group was established as the central co-ordinating body for the whole process. The project group works according to systemic principles formulating the objectives and is the driving force in implementing the project. They work with a project advisory board with leading representatives from politics, administration, associations and enterprises. Detailed responsibilities of these structures, the tasks, rules, standards and values, are defined in a project contract.

A separate corporate identity for the project has been identified to provide co-ordinated marketing. Communications and administration is carried out online. A wide ranging manual of results from the project is being prepared and will be published.

In Linz, which adopted the title "Sustainable City" in 1995, the local Agenda 21 forms a foundation for all decisions relating to the project. The project has enable Linz to obtain a Certificate of Distinction for 1997 in a competition held by DGXII and CEMR and to be included in the 100 Best Practices granted an International Award for Best Practice in improving the living environment in 1998 in Dubai.

## **LESSONS LEARNED**

The project is under construction. All the intermediate objectives have been accomplished according to plan. The local development plan is largely complete and the details of the finished neighbourhoods have been negotiated.

The project represents an enormous planning and communications exercise and international response has been very positive. The project has altered the attitudes of those involved to energy supply and town development, waste disposal and social engineering. Things are viewed and understood in perspective, leading to a step-by-step awareness of the project's good prospects.

Where there is scope for new development clearly there is also scope to design it in a manner that reduces energy use. This is even more important in a liberalised world since the pressures to consider energy are reduced. But too much attention on attention grabbing new settlements could result in the demands of

existing buildings, whose demand is responsible for the vast majority of energy use and where reductions in energy use are more difficult to introduce, being sidelined. In a sense, the conditions on new development which represents a net increase in energy consumption, need to be more stringent than on existing development if targets to reduce total overall consumption are ever to be met. This is because this increase in consumption has to be balanced by a stronger reduction in the consumption of existing development to meet overall targets for reduction of energy consumption. So in a sense even solarCity is extravagant!

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

In liberalised markets municipalities have a major influence on energy consumption in new build areas and can act sustainably providing that a suitable brief is given to those developing new build areas. It also needs commitment at the regulatory level from town planners and Government. However environmental communities will become more successful if all the partners have been actively involved from an early stage of planning, as in solarCity. Liberalised markets in fact imply more regulation if governments are to meet political targets, not less.

However the transferability of utopian cities like solarCity is very culturally determined. This settlement gives the impression of being a very "socially organised" one and while well adapted to Northern Europe, may not suit a more individualistic society. Every one of the 1317 homes in this community is an apartment with no individual houses. So despite the objective of establishing a mixed community, the area risks suffering social segregation and may have limited transferability to other countries during an era dominated by the market when sprawling development of individual houses is the norm.

The neighbourhood intended to develop its own energy distribution network and power sources using renewables. In practice the competition from fossil fuel has made this impossible to justify economically and the competitive nature of an open market makes this difficult to overcome. The ability to invest in energy and emission saving technology is dependent on capital cost and ease of management. If central government really wishes to maintain momentum in improving energy efficiency in the residential sector, they will have to consider heavily subsidising the capital element in energy service systems using energy efficient or renewable technologies from public goods charges on energy supply.

## FURTHER INFORMATION

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# Belgium

Wallonia

27



# Regulation at a regional scale

# Wallonia (BE)

## GENERAL ASPECTS

Belgium is a federal State, composed of three Regions: Flanders, Brussels-Capital and Wallonia. Constitutionally, each Region has legislative and executive power.

Although this situation clearly has its disadvantages, it makes it possible to set up regulation systems which are closer to citizens and are without doubt better suited to local needs. Moreover, it allows innovations which would be more difficult to introduce at a national level. Wallonia has 3.3 million inhabitants.



## BACKGROUND

Energy responsibilities in Belgium are roughly distributed as follows: **the Federal State** is in charge of the supply-side whereas **the Regions** are in charge of the demand-side as well as renewable energy sources. For electrical energy, the separation is also made according to the levels of current involved: Federal level for currents above 70 kilovolts, Regional level for those below. One main result of this is that the Belgian law governing the implementation of the Electricity and Gas Directive allows for 4 regulators in Belgium - the national regulator and one per region – a situation which has led to the setting up of the Walloon Energy Commission (CWaPE). In addition, each region has developed its own support policy for promoting energy efficiency and decentralised renewable energy sources. In the case of Wallonia, a region with a tradition of coal production, this involves some sort of energy redeployment.

Despite appearances, the powers and responsibilities of **Walloon municipalities** in the field of electricity are limited. Whilst in several countries oil crises have triggered active energy management policies, it has been the exception rather than the rule here. This is not unusual in energy producing regions and countries. Coal has even been poised to take over from oil! The (few) district heating networks which exist have not always been the most efficient and some municipalities have therefore decided to disconnect their public buildings from them. However, municipalities as well as *intercommunales* (intermunicipal companies) are responsible for electricity and gas distribution. There are 12 *intercommunales* in Wallonia: 8 “mixed” - in other words, *intercommunales* established by municipalities but which include the participation of Electrabel<sup>1</sup>, and 4 “pure”. There is also a local government corporation (*régie communale*). They all have the status of “Distribution Network Administrator” (*Gestionnaire du Réseau de Distribution – GRD*) in their respective zones. Real power? Imaginary power? This is a never-ending debate in Belgium. In *Flanders*, municipalities have resigned from their distribution function in favour of Electrabel, thus acknowledging the fact that the responsibility, and therefore the power, lies with Electrabel. In Wallonia, this does not seem to be the path being taken: the *intercommunales* are both a source of finance for municipalities and an issue of local power. This situation is not without its contradictions: a mayor who is president of an *intercommunale* (a “distributor” mayor) needs the consumption of the energy he distribute to be maximised, as this will generate income for the member municipalities, his included. As a “consumer mayor”, he may rather reduce his energy

<sup>1</sup> Electrabel, a private company, had the monopoly in Belgium (until the market was opened up). It is a subsidiary of Tractabel, itself controlled by the Suez group.

consumption to reduce expenditure, but this means a conflict of interest with the intermunicipal company. As a promoter of sustainable development, the same contradiction applies...

This assessment is not purely anecdotal: it has a profound impact on the way the energy issue is handled at local level in Wallonia. What will happen when transmission costs are progressively regulated so as to avoid the distorting income and cross financing mechanisms that have been observed in all the countries which have opened up their markets?

Considering the (high) electricity costs that currently apply in Belgium, particularly for transmission and distribution activities, it is a safe bet that a revolution is under way. The Belgian government has already taken steps to bring prices for captive customers into line with those in neighbouring countries.

This clearly shows the pivotal role that the regional level can play in providing the Walloon system with a legal framework and helping it evolve towards a sustainable policy. For the same reason, the present case study will mainly focus on regional initiatives.

## ACTION UNDERTAKEN

After a long period of information-gathering, consultation and negotiation, the Walloon Parliament unanimously adopted the decree of 12<sup>th</sup> April 2001 concerning the organisation of the regional electricity market. Only those aspects which have a connection with the subject of this case study are considered below.

### The role of municipalities

The role of intermunicipal companies (*intercommunales*) as electricity distribution stakeholders is confirmed, provided that municipalities and provinces have a majority stake in the company's capital.

The decree stipulates that the **municipalities and provinces** will have a majority holding in **the capital of the Distribution Network Administrator**. The Distribution Network Administrator is indeed a monopolistic body, which is responsible for a multitude of public service obligations that will be better accounted for if the municipalities take responsibility for them.

Thanks to their majority holding in the capital of the Distribution Network Administrator, municipalities will continue to collect dividends (based on the value of the network) even when customers have become eligible and even if they decide to get their supplies from another supplier (in this event, the latter will continue to use the same network and will therefore contribute to its financing). As regards mixed *intercommunales* in which the private partner Electrabel currently has a majority interest, an agreement has been reached so as to allow municipalities to become majority shareholders and continue to collect dividends in the future, without having to resort to borrowing.

As part of this agreement, the *municipalities will obtain 60 % of the shares* as soon as all customers have become eligible.

Furthermore, the decree makes provision for the distribution network administrator to pay an *annual charge to municipalities as a compensation for using the public domain*. This will constitute an additional income for municipalities which will compensate, at least partially, for the expected loss of dividends collected by the intermunicipal companies when all customers have become eligible.

**Electricity – 36.8 million EUR for Walloon municipalities in compensation for using the public domain**  
*“To prevent the deregulation of electricity markets from leading to a loss of income for Walloon municipalities, the Walloon Region adopted on 28<sup>th</sup> November 2002 an order fixing a network user charge of 2 EUR/MWh. This will be shared between all the municipalities according to the amount of electricity transmitted and the length of lines installed on their territory. This charge represents a budget of 36.8 million EUR.”*

However, one may wonder if the charge, based as it is on an amount of energy and not, for example, on a number of clients, will not perpetuate the contradiction referred to above (see 'Context').

### **Charleroi attempts to break out of the vicious circle**

In anticipation of market deregulation, municipalities are beginning to think about their own consumption and that of public corporations for whose operating costs they have financial responsibility. For example, in Charleroi, the deputy burgomaster in charge of energy has asked for the 2003 energy budget to be reduced by 20%, thus setting a target for purchasing negotiations. He is also planning to set up a local government corporation, separate from the municipal administration, which would act as a buyer-negotiator for the previously-mentioned customers, including the municipality. For more than 15 years Charleroi has been implementing an ongoing consumption control strategy, partially based on third-party financing. Who will finally get the better of the deal: The intercommunale as seller or the Municipality as buyer?

According to the decree referred to above, *Electrabel* - the private partner in mixed *intercommunales*, is allowed to continue its industrial activity in order to be able to manage and develop the network. However, to ensure non-discriminatory access to the distribution network, Electrabel loses its right of veto in any matter likely to implicate the independence of the distribution network administrator in its dealings with producers and suppliers as well as the non-discriminatory access of decentralised producers to the network.

### **Local economic development and employment**

Traditionally, sectors which “deregulate” try by all means to reduce costs, which has a negative impact on employment. When defining regional responsibilities, the decree stipulates that the network administrator retains its monopoly (for transmission), is held predominantly by public representatives and has binding obligations as regards quality of service. In this way, a maximum of effective and useful jobs can be preserved.

Other measures are aimed at promoting the creation of new jobs. These include the appointment of *intercommunales* staff for strategic tasks as well as for electrical system control and regulation. Even more important, a number of activities are being developed including services, consultancy, expert advice, installation of heating and insulating systems designed to promote a more rational use of energy or the design, manufacture, installation and running of co-generation plant (simultaneous production of heat and electricity) or plant generating electricity from renewable energy sources.

### **Protecting the underprivileged**

From now on, low-income domestic consumers will be better protected. There will be no more disconnections for a missed payment. Consumers who do not pay their bills, after formal notice, will be put on a budget (or pre-payment) meter which they will simply have to feed with money in order to receive electricity. In addition, the previous debt will be re-negotiated without the existing supply being unduly affected.

If the consumer belongs to a protected category, the budget meter will be complemented by a guaranteed minimum supply, which will mean that they will be able to have access to electricity even if no money is fed into the meter. For protected customers, the cost of installing the budget meter is met by the distribution network administrator.

### **New public service obligations imposed on Walloon electricity market operators**

As part of the deregulation of the electricity market, the Walloon government adopted on 28/11/2002 a draft decree concerning public service obligations. It sets out the obligations incumbent on both distribution network administrators and electricity suppliers:

- Social guarantees ensuring connection and supply for people experiencing payment difficulties,
- Measures to ensure the readability of bills and dissemination of information on renewable energy sources or ways of rationalising electricity use.

The measures recommended will allow speedier intervention in cases of difficulty with payment – avoiding an insurmountable build-up of electricity debt – by the installation of a budget meter and a guaranteed minimum electricity supply of 1,300 Watts.

For all domestic customers, specific guidelines will be imposed on suppliers in order to *avoid tapering rates*, which disadvantage the consumer who uses little electricity.

## Energy sector consultation and regulation

The Walloon Energy Commission (CwaPE - [www.cwape.be](http://www.cwape.be)) is the keystone to the smooth functioning of the regional electricity market. The fact that electricity producers will be actively present, for historical reasons, in the administration of both the transmission and distribution networks makes its role even more important.

The decree also created an energy committee responsible for issuing recommendations on the policies to be adopted regarding the regional electricity market, seeking to ensure that it serves the general interest, is compatible with sustainable development and enables fulfil public service obligations to be fulfilled. This committee is made up of 25 members, who represent all facets of society, civil, social and economic.

## Environment and sustainable development

In anticipation of market opening, various measures have been introduced in order to:

- Use the electricity produced more efficiently,
- Encourage the use of electricity produced from renewable energy sources,
- Encourage the use of efficient co-generation plant (simultaneous production of heat and electricity).

These measures are part of the Plan for Sustainable Energy Management in Wallonia which has been adopted by the Region for the period up to 2010. Its target is to reduce gross domestic consumption as well as final consumption by 2% between 2000 and 2010. It has been drawn up in conjunction with the Walloon Climate Plan and the draft Walloon Air Quality Plan.

## Efficient energy use

An Energy Fund, financed in part from an electricity network connection charge and managed by the Walloon Region, will be set up to finance measures (information, training, audits, incentives) aimed at promoting a more rational use of energy.

The new structure of supply tariffs will also encourage rational energy use. It will be simple, readable, easily comparable and will include, for domestic consumers, a low or zero fixed basic rate (charge), so as to avoid the inconvenience of tapering rates. However, it will also include a proportional rate that may vary according to the time of day and year in order to encourage an optimal use of networks and power stations.

## Each municipality can develop its own organisational structure in order to gradually meet its targets by introducing an active energy management policy.

By active energy management policy, we understand measures and methods used to monitor and improve the energy performance of a building stock. This may mean:

- Establishing an energy snapshot of the building stock,
- Setting up an energy accounting system,
- Appointing an energy manager,
- Carrying out audits or particular investments,
- Introducing specific clauses in construction/renovation contracts,
- Improving energy management in buildings,
- Informing or increasing occupants' awareness,
- Setting aside a budget specifically for energy,
- Or any other active management measure which leads to an improvement in the energy performance of a building stock.

Municipalities, having implemented an active energy management policy, will soon be entitled to an additional subsidy granted under the new "energy" investment aid mechanism applicable to public legal entities.

Extract from the Walloon Region web site (<http://energie.wallonie.be>), which presents support measures for municipalities.

## Promoting green electricity

The decree defines green electricity as electricity produced from *renewable energy sources* or by efficient *co-generation plant*. Several mechanisms are envisaged to develop green electricity production units in the Walloon region.

The use of renewable energy and co-generation is encouraged by assuring immediate *eligibility* of final clients who wish to deal with suppliers that purchase 50% of their supplies from green electricity producers. Similarly, green electricity producers are eligible for the amount of complementary and back-up electricity required.

A "green certificate" procedure has been put into place. It consists of issuing green electricity producers with green certificates, suppliers being under the obligation to acquire a minimum quota of green certificates, calculated on their total electricity sales. This percentage will increase annually to reach 7% in 2007. In 2005, the Government will determine subsequent quotas in order to ensure the financial viability of the green certificate market.

Green certificates are issued on the basis of CO<sub>2</sub> savings (one certificate for 450 kg of CO<sub>2</sub> avoided). Calculation methods differ according to whether or not the production site is fuelled by natural gas. This makes it possible to take account of real situations and not the theoretical situation where gas would be the universal basis. This is clearly another advantage of a local approach. In addition, this system favours co-generation from biomass, since this method is said to generate no emissions.

The certificate has a market value since, if the quota is not reached, the supplier pays a 100 € penalty per missing certificate (75 € during the first semester). This penalty is paid into the "Energy fund" which supports sustainable energy initiatives. The value of the certificate therefore constitutes extra revenue for the producer (it comes in addition to the sale of electricity at market price).

There are also plans to encourage production in Wallonia by means of a production support that would vary according to the technology and renewable energy source used. Such aid will be guaranteed for the length of the equipment's amortization period, to a maximum of 10 years.

### A free service for co-generation projects

On 15/01/2003, the Walloon Region decided to introduce a new free service for anyone wishing to install co-generation equipment. What size should it be? Which technology should they choose? Which operator should they work with? How can one negotiate with third-party investors? What financial aid is available? An independent opinion is available on a feasibility study or conditions of contract?

When the green certificate mechanism is operational, the producer will be able to make a choice, which can be reversed, between the system of production support and the green certificate process. Production support amounts to approximately the minimum guaranteed value of green certificates, until the end of the equipment's amortisation period.

## LESSONS LEARNED

Results can, of course, only be measured over a period of time. However, it must be said that tremendous efforts have been applied to organising the debate, carrying out the consultation process, achieving a political decision and translating the choices made into legislation, all in a fairly short period of time.

The size of the region and the possibility of formulating legislation so close to practice on the ground, whilst at the same time being part of a larger European movement, are considerable advantages.

The framework devised by the Region may therefore have a positive impact on municipalities not only in their role as energy consumers, but also as energy distributors and producers. In particular it is accompanied by a series of support measures aimed at promoting initiatives (Local Energy Management Action Programme - PALME, Energy survey, etc.) that contribute to increasing municipal expertise.

If this is confirmed, the combined action of deregulation on the one hand and acceptance of political responsibility on the other will have proved fully effective.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The Walloon experience shows that there is real scope for regional authorities to regulate energy issues using the municipality as a means of implementing policy on the ground. There is an advantage in having a regional regulator in that the power base is close to the ground. However there is a potential problem inherent in this system in that the municipality will benefit financially from any increase in the volume of energy transmitted. A system based on the number of consumers would be preferable and would also support action to maintain supplies to poor consumers.

Open access to energy efficiency funds is also desirable – a point also reiterated in California. The use of a regional regulator rather than a utility with different interests in place is a better solution.

Finally, it is interesting that Wallonia is ensuring the continued existence of locally controlled distributors, returning all *intercommunales* to the public sector, whereas the opposite approach has been adopted in Flanders. It remains to be seen which is most effective on energy efficiency issues, but logic would suggest that the former approach would be more independent.

### FURTHER INFORMATION

A large part of the above information has been obtained from a publication of the Walloon Region entitled: ***Ouverture des marchés de l'électricité et du gaz en Région wallonne*** published in September 2002. It can be obtained at the address below or on the web site indicated.

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# Canada

Peterborough Ontario

35



## A programme of Energy Performance Contracting designed to upgrade a whole town

## Peterborough Ontario (CA)

### GENERAL ASPECTS

Peterborough is a town of 70 000 inhabitants, (wider region 130 000) situated between Toronto and Ottawa in the Kawartha Lakes tourist region. It is an industrial and service centre.



### BACKGROUND

The concept of Sustainable Peterborough goes back to a Conference of the Federation of Canadian Municipalities held in Regina, Saskatchewan in July 1998. Following a presentation on energy performance contracting by Ian Jarvis, then CEO of the Rose Technology Group ESCO, a discussion took place with a manager of the national Green Communities Association concerning the possibility of applying similar principles to upgrading the building stock of an entire city. Following discussions with a local environmental organisation, Peterborough Green-Up, this encounter led to a joint presentation to the mayor and senior staff of the City of Peterborough.

The project envisaged the upgrading of every building in the City - public buildings, commercial and industrial facilities, apartments and private homes. The prime motivation for the City was the idea that such a programme would contribute employment (approx.1500 person years) and investment as part of the City's economic development programme. The substantial contributions it would make to a cleaner and healthier environment, and reduction of greenhouse gas emissions, estimated at 120 000 tonnes p.a., were a bonus. The process was then set in motion to upgrade the energy performance of the whole community.

The objectives of the programme are:

- To increase uptake of improvements by raising awareness and creating a "buzz" around the programme,
- To achieve economies of scale in purchasing the required products and services, and
- To develop local expertise and capacity in improving energy efficiency in order to develop local enterprise and employment.

A great emphasis was to be placed on the impact of the programme on local small businesses which would be of a scale to be able to tackle the work involved.

## ACTION UNDERTAKEN

With City Council approval, an initial steering committee was set up to guide the development of the project. This comprised the City, Peterborough Green-Up, Sir Sandford Fleming College, the local utility companies, and Rose (which was bought by VESTAR in December 1999). Seed funding of \$10 000 each was provided by the City, the utility and Rose. Trent University and Sir Sandford Fleming College saw their campuses as potential microcosms of the broader sustainable community and also saw the possibility of developing educational activities linked with the programme. They were actively involved in order to benefit from improvements to their own building stock, both economic and environmental and from opportunities in areas such as contractor training, student employment and research, and enriched academic programmes in several disciplines. A feasibility study and business plan were prepared.

In 1998 the owners and tenants of Peterborough spent an estimated \$91.5M for energy use in buildings, or \$1300 per person. It was estimated that \$15M of this could be saved by cost-effective energy efficiency improvements, requiring an associated capital investment of \$110M. The economics of the project would be enhanced by the economies of scale resulting from careful planning of very large purchases of equipment and labour. It was anticipated that government and utility funding would also be available, but the project was to be crafted to avoid dependence on this uncertain source of money.

The feasibility study validated the economic potential for the overall project. A top down approach looked at the overall energy expenditure, and the proportion related to buildings. Energy use was broken down by sector, and typical percentage savings and target paybacks were applied to estimate the potential investment, cost savings and greenhouse gas emissions reduction. The study also took a bottom up approach, analyzing the building demographics by type, size and age to estimate the potential investment and savings attributable to typical measures. These analyses were cross referenced, and served to validate the overall economic potential for the project, as well as identifying the likely makeup of the capital investment (high efficiency boilers, lighting, appliances, automation systems, windows etc). The models developed will be updated over time as more experience is gained.

A business plan and budget have also been prepared for the anticipated five-year term of the project. The public sector members of the steering committee undertook a joint request for proposals, in order to select a prime contractor for the institutional, commercial and industrial sectors. Individual building owners are not obliged to go through the prime contractor and may use other contractors or do the work themselves. The advantage of the prime contractor is that it can offer a complete off the shelf service, manage the flow of work to maximize economies of scale, help guide the process and also help fund the central office by offering a commission on its sales. In addition building owners pay a small percentage of the first two years' savings if they manage their project via the Sustainable Peterborough office.

The service needed to be credible, reliable, and easy to buy. To achieve this, Sustainable Peterborough is governed by Peterborough Green-Up, an established, non-profit community environmental organisation. The service provided through the project is fully integrated. Audit, design, construction, financing and ongoing service and monitoring, are all managed under a single responsible manager. In effect, the energy performance contracting model, which has been successful in the public sector buildings market in Canada, is being adapted to the needs of the commercial, industrial and residential sectors. Recognizing that many building owners like to do things themselves, the project also provides support for those choosing this option. The overriding objective was to get as many building owners as possible to undertake comprehensive renewal of their properties.

A further \$40 000 each was provided by the funding partners to establish the project and a call for proposals for the project was made. Rose (Vestar) was selected as Prime Contractor for the business and institutional sector in late 1999. A general manager and marketing manager were appointed and a comprehensive project for municipal buildings was examined. In late 2000 the initial funding ran out and the staff were made redundant. However the local authority maintained faith with the project and announced its own project with an investment value of \$1.5M in February 2001 and announced a loan programme for its own employees to do work in their homes. Following a year of searching , funding was found from the Trillium Foundation for the period starting Nov. 2001.

Raising awareness depends on building on existing strengths in the community. The existing community plans demonstrate a keen interest in promoting employment, economic development and the environmental image of the municipality with a moderate interest in reducing greenhouse gas emissions and promoting

environmental action generally. There was less interest in benefits to community cooperation and the use of the energy infrastructure.

A number of sources of finance were identified. Apart from normal performance contracting sources plus national grant programmes, there are financial incentives from Enbridge Consumers Gas for energy efficiency investments (with on-bill payment) and \$1500 loans from the City Council to its own employees for improvements to their own homes.

The project has started with projects with large business and institutional sector since there is an established industry to take such projects forward. However it is planned that the project will extend to the residential sector and small business sector in the near future and a separate prime contractor would be appointed for this sector. The intention is to create a "one-stop" shop for organizing projects in this sector. By early 2002 the project was underway and a public relations campaign had started, with banners on participating buildings, regular media coverage and presentations to employers, employees, schools and colleges.

Sustainable Peterborough is an excellent model of a large-scale community approach to sustainability, with active involvement by post-secondary institutions.

## LESSONS LEARNED

As is usually the case, such projects can only really work if they have a reasonably short term pay-back which is why the anticipated savings are 15% and not 30% or more. There is need for long term commitment from the partners to enable the project to develop good relations with owners and the community. This is investment up-front before the returns come in. Commitment from community leaders is a key element in convincing other members of the community that the programme will really work. This could have been a fatal stumbling block in Peterborough and makes it even more vital to have enthusiastic and qualified staff. It is therefore a source of strength that Peterborough set up a community based, ngo type project because this involves, by its very nature, the development of community partnerships.

It is vital to get such a project moving quickly. Peterborough has found that going directly to building owners and decision-makers with real life, costed examples helps the sponsoring local authority to demonstrate early success.

Vestar was also awarded the project in Perth, Ontario - Eco-Perth - and has developed expertise in the "sustainable community" model which brings the whole building stock of a community up to today's operational and energy efficiency standards. A considerable interest has arisen in developing the capacity of local businesses to really maximise the economic benefits to the town, while creating employment, and having the greatest environmental impact. In addition this opens the door to considering other issues such as transportation and waste management, so promoting a wider "environmental" view of the town.

## IMPLICATIONS FOR GOVERNMENT POLICY MAKERS

The Peterborough model is still really getting off the ground and this demonstrates the lead in time for such a project. It is greatly helped if there is a basic stock of public buildings participating in the programme from the beginning, indeed the success of energy performance contracting in Canada depends on the public sector buildings which have contributed up to 85% of the candidates for early programmes. However the commitment to this programme is exemplary and the real interest is that the argument that convinced the politicians is economic development.

This may represent a political/psychological lesson. It is much easier to get politicians to commit funds for economic development than straight environmental issues. When people's livelihoods are at stake, politicians will pay to distribute employment and these types of service are very employment intensive for local small business, so the economic spin-off is significant.

Central Government funding for the kick-off phases to get such a project off the ground would be of immeasurable use – it is only the persistence of the town and partners that has kept this project going. The programme has the advantage however that it is self financing once up and running, Although the overhead costs of the central office are not really likely to be profitable in themselves, they are likely to be self financing for at least a period of several years. In addition, further public support might be needed in the long

term to run a small continuation programme after the main programme has been completed. This would enable the town to further up-date property. But the multiplier in terms of carbon saving for the government money invested in launching such programmes is likely to be very large indeed. It appears a real “best buy” for government.

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# Finland

Jyväskylä

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# Managing Public Lighting

## Jyväskylä (FI)

### GENERAL ASPECTS

Jyväskylä is the principal commercial and Administrative centre of central Finland. It lies at the Northern end of Lake Pajanne and is a centre for environmental industries and education. The city is known for its ultra clean environment.



### BACKGROUND

Jyväskylä, like most Finnish local authorities, has its own energy company owned 100% by the municipality. Founded in 1902 as the City Energy Works, it managed the lighting as part of its role in electricity generation. It was natural that the electricity specialists took control of the lighting. There were no contracts and the City's technical department reimbursed the Works for their costs. But the system proved bureaucratic and there were a number of problems since the priorities of the energy works were not the same as those of the city:

- The responsibility was in the wrong place (especially when considering issues like traffic safety)
- The payer had no control of prices,
- There were difficulties in programming, for instance there were cases where people lived two years in a new street without lighting,
- Little energy efficiency work was carried out and that which was done was mostly „supply side”.

### ACTION UNDERTAKEN

#### Restructuring the service

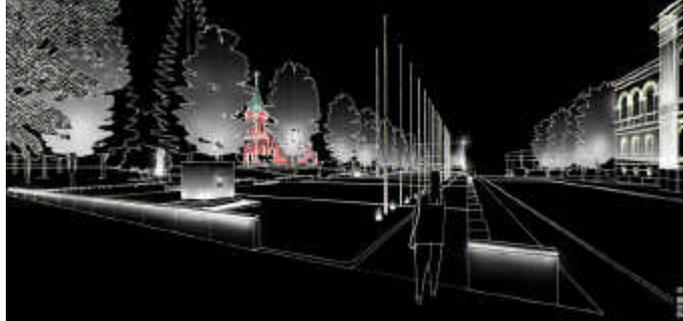
With the onset of liberalisation in 1996, the ownership of the system was transferred to the municipality prior to a restructuring of the municipal energy service into a separate company. The municipality's Technical Service Centre, TEKPA, is now responsible for management control but all maintenance, planning and improvement work is currently sub-contracted to the municipal energy company within guidelines set out and approved by the municipality.

The relationships between the company and the municipality are particularly good, there is an extremely competent technical expertise, and there is close co-operation and trust in carrying out work on the lighting system.

Since 2001 all lighting services have been put out to competitive tender. The municipal energy company has won a three year contract for maintenance of the system and has won contracts for about 20% of the new investment undertaken.

## Lighting Plans

The city's special skills are in the general planning and design of the system which is very sophisticated and provides a high standard of lighting adapted to conditions. The lighting system follows the luminance standards agreed by the Illuminating Engineering Society of Finland and published in their book "Stationary Traffic Lighting" and new design uses their TIE design programme. The town has produced three levels of lighting plan: A general plan, area plans and local construction plans.



The City's General Lighting Plan was produced in 1991 and later reviewed. It covers the development and improvement of the city's lighting and is also intended to take account of the principle of restricting lighting levels to the minimum necessary. The General Plan identified equipment to be renewed (mainly the large stock of relatively inefficient mercury vapour lamps), redefined lighting categories and the principles for the selection of lighting types and struck a balance between lighting standards and economic considerations. It was drawn up in partnership between Jyväskylä Energia and Jyväskylä Technical Service Centre in early 1997, and the National Roads Agency's Central Finland office was consulted. It was planned that all the street network should be lit with energy efficient high pressure sodium lamps by the year 2010. The plan does not look at lighting requirements of low traffic roads, footpaths and cycleways.

The plan has two main elements. Firstly there is a summary of the current situation on the principal road network, identifying the renewal needs and costs to be anticipated during the plan period. Secondly the principal road network has been assigned lighting categories and a target for lamp types has been identified for 2010.

Area lighting plans and local lighting construction plans are also prepared when needed and they will need to conform to the general plan. An annual lighting maintenance plan covers the management of the existing network and specifies maintenance policy and pricing. Regular 5-year reviews of the general plan will enable the parties to it to keep abreast of changes in lighting technology.

To ensure value for money the authority carried out a benchmarking study. They compared the costs of lighting services in a group of 8 cities to learn from the experience of those cities that had achieved reductions. Through the comparison Jyväskylä hoped to:

- Check that the general lighting and maintenance plans were effective,
- Find new construction methods to counter specific problems, e.g. tilting columns caused by frost heave and,
- Reduce energy consumption.

The benchmarking points useful for comparison were identified with the help of a computer programme (VERTTI) which compares performance data for 90-100 Finnish cities. They looked at all the factors to identify those that had a significant impact on costs. The cities calculated the prospects for making savings based on the cheapest costs found in the survey, however this should only be considered a target since costs (e.g. maintenance levels) are affected by the standards desired.

## Supply side energy saving

Before the privatisation of the energy company, it had developed a number of tools to control the energy use of the system through the power supply:

### Power Misers

Jyväskylä has installed 15 power misers. These devices reduce the voltage of the mains supply and are installed in transformer stations within the network. At present, power misers are switched on directly after the lighting network is switched on, but in the future the aim is to control the power miser to activate during light traffic and to ensure that lamps with twin arms remain lit. Power misers save a total load of 138 kW

### Telemangement

The City uses the MELKO load management system to provide a central control of the whole lighting network and also to automatically read all the lighting meters and manage the load on the system. Terminal control units are found in 130 of the 205 street light groups, the rest have control cabling. The lights are turned on by two central photocells on the Energy company's offices, one at 5 lux for roads and one at 30 lux for pedestrian areas.

### Summer shut down

Jyväskylä lies at a latitude of 63°N and there is sufficient daylight in summer to turn off the whole system from 15th May to 31st July representing a significant energy saving.

## **Energy efficient lamps**

The ownership of the lighting stock by the municipal energy company had not been conducive to great investment in energy saving street lamps. On privatisation in 1996 approximately 80% of the 16 000 street lights were still the relatively inefficient mercury vapour lamps. The plan proposed that these be replaced progressively over a 12 year period to 2010. However following the transfer of management control to the city council and the preparation of the new lighting plan, the city obtained a grant in 1998 from the Ministry of the Environment which concentrated the whole process into a four year programme to replace all the mercury vapour street lamps with eco-arc lamps - high pressure sodium bulbs that fit in the mercury vapour fittings. This has generated about 1000MWh per year in savings.



### Special Lighting

The city has also experimented with a number of new technical solutions. They constructed a large indirect lighting system on a busy roundabout in the town which was a major traffic hazard. This replaces all the columns needed previously with one unit on the roundabout that provides effective and even light. The city also designed special street lights for the town centre which are a work of art and feature of interest in themselves. These consist of vertical blue columns with a parabola which reflects vertically projected light onto the street giving a very even distribution. Optic fibre cables along the columns change colour continuously. The effect is quite dramatic and makes a very fine feature in the town centre.

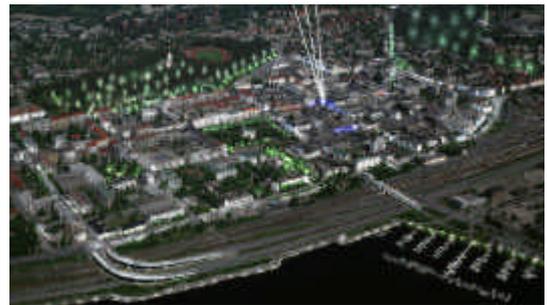
## **City of Light**

The City has promoted its image with a special lighting plan for the central area designed by Roope Siirinen which will create a special night time atmosphere by a range of lighting effects. In a town not far from the arctic circle, winter nights are very long and the lighting environment has a great impact. In September and October 2003 they held a month long lighting festival in the town for professionals. A workshop of the European Lighting Designers Association prepared lighting schemes for six locations in the city.

## LESSONS LEARNED

Many local authorities used to pass over management of street lighting to their energy company. This left the company as the supplier of electricity and the organisation which determined the investment policy to save that electricity. Naturally there was a clash of interests – even though the municipality is owner of the energy company. The answer is to reorganise the management arrangement and take the control of the management of lighting in house, as was done here. However with the privatisation of energy companies, the monopoly provision of service can be a difficulty. The lighting equipment is a valuable asset to the energy company and the price demanded by the company to sell the equipment back to the local authority may be too high for them to contemplate.

In general there are real advantages of scale in the management of street lighting and those local authorities who now have to pay for the lighting service need to think whether there might not be advantages in cooperating on a regional scale to purchase lighting services. Street lighting is an ideal candidate for computerisation with a large number of similar units. The development of a database is an essential first step to any improvement programme and any programme of effective management. At the same time it is a specialist subject requiring specialist attention, not simply a minor responsibility of a junior member of the municipal engineer's department as it so often is in smaller authorities. So an essential message for local authorities is "Get together and obtain a specialist service".



The nature of the contract for the provision of lighting services has a key impact on the interest of the supplier in providing energy efficiency services. If it is an annual contract to reimburse expenses incurred for maintenance and energy, the incentive is nil. If there is a long term maintenance and management contract in which a contractor has the duty to provide a certain standard of lighting, the incentive could be very great.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

Curiously Central Government has shown very little interest generally in street lighting. Yet this is a very public demonstration of municipal action, and a simple way of saving a great deal of electricity. Liberalisation will present the stark reality of the problems created by those governments and municipalities who have entrusted the management and ownership of lighting to utilities and the paying of the bills to municipalities. It is a recipe for inaction on the energy efficiency front and for sky high electricity bills for municipalities.

In general a good management system for local authorities is one that:

- Places the responsibility for deciding on energy saving investment on the organisation that pays the bills – usually the municipality,
- Provides a dedicated and specialist lighting management service which is also responsible for paying the energy bills (not always the case in municipalities),
- Has an effective database for use in the management of investment, maintenance and for estimating energy consumption,
- Has a clear plan of the quality of lighting it wishes to attain,
- Is of a sufficient scale to benefit from the undoubted economies of scale in street lighting. Many elements (e.g. call centres) can be adequately handled at a national level. Street lighting is an ideal service to provide by dedicated units run by consortia of local authorities. Why do so few consider devolving this responsibility in this manner?

Central Government can aid this process by taking an interest in this, one of the most basic of public services and something of a Cinderella. Clear guidance to local authorities could promote such a well managed service. Furthermore the opportunity created by liberalisation could provide exactly the opportunity to reorganise and improve this basic service, saving an enormous number of MWh in the process.

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# France

Montpellier 49

SIGEIF 55



# Electricity demand side management

# Montpellier (FR)

## GENERAL ASPECTS

Montpellier is a city with 229,000 inhabitants. The city has earned the reputation of being a dynamic city and is now a centre for research and state-of-the-art technology. A number of ambitious planning projects were launched in Montpellier, including the Antigone district. Montpellier is twinned with Heidelberg.

In France, the threshold for eligibility is 7 GWh (16 GWh before February 2003), this limit being set for one site and not for the whole consumption of the municipality. The present case study provides an overview of the policy that Montpellier has been conducting for several years and will examine a few points in order to try to determine whether such a policy is likely to be stimulated or discouraged by the liberalisation process.



## BACKGROUND

Early in the 1980s, the Municipality of Montpellier set up an internal organisational structure responsible for co-ordinating action on energy conservation. This included appointing an elected member to take charge of energy conservation issues and creating an Energy Department. An internal debate on the overall organisation of the energy system was initiated and measures were adopted in the different areas in which the municipality has responsibilities: municipal buildings, production and distribution, town planning, involvement of energy stakeholders.

In Montpellier, there is a strong commitment towards finding a new equilibrium for the city by bringing closer the areas where people live to those where they work. The Antigone and Port Marianne districts, both designed by Ricardo Bofill and located close to the town centre are good examples of this.

A number of demand-side management projects aimed at reducing the consumption of electricity and energy have been implemented in areas where the municipality can have a direct impact or influence the decision-making process and they have produced significant results in existing and new buildings.

## ACTION UNDERTAKEN

### Electricity demand-side management

The Municipality of Montpellier has 1100 points to which electricity is delivered and handles more than 5000 bills for street lighting, traffic lights and municipal buildings every year. Appropriate tools geared to the complexity of the problems to be tackled are therefore needed to manage all these data, detect abnormalities and optimise tariffs.

In 1987, a first study was carried out to take stock of the situation. The conclusions were that nearly two-thirds of total energy expenses in municipal buildings were linked to electricity consumption (61 %, representing around 1.4 Mil. EURO), while street lighting and traffic lights cost a further 1.6 Mil. EURO. With a total bill of 3 Mil. EURO, electricity accounts for 69% of the local authority's total energy costs.

Given the weight of electricity in the energy bill, it was decided to introduce measures aimed at reducing electricity consumption. These measures include:

- Recruiting a person responsible for electricity conservation,
- Centralised management of all electricity bills at the Energy Department which is responsible for controlling and monitoring them using computerised systems,
- Tariff optimisation for all the contracts,
- Progressive installation of energy efficient lamps in all the buildings, taking care to comply with regulatory illumination levels, and suppression of incandescent lamps in all new buildings,
- Progressive upgrading of existing pumps and fans, especially in old buildings where over-ratings of 100% are frequent,
- Progressive replacement of all electric heating systems by gas-fuelled hot water central heating systems, less expensive to operate,
- Minimisation of cooling requirements in new buildings by using passive solar design principles: wall inertia, insulation and efficient utilisation of direct solar gains to provide optimum comfort in summer.

Between 1987 and 2000, the municipality achieved the following results:

- 5.1% decrease in subscribed demand levels,
- Electricity savings of 2.1%
- 10.8% savings on expenses.

It is to be noted that in the meanwhile, the stock of municipal buildings had increased by 26% and electricity prices, after much fluctuation, had come back to their 1987 levels in the year 2000.

In a context of growing energy consumption in a country where the concept of energy conservation is still something new, such a performance has much to recommend it.

### **A political commitment fully backed by the administration**

Actions involving municipal buildings were basically initiated as a means to curtail budget expenses. They are the result of the political vision defended by the Deputy and Mayor, Georges FRECHE, which led in particular to the appointment of a Deputy Mayor in charge of Energy.

To improve energy management, the City Council's General Secretary signed two memoranda:

The first one was addressed to the directors, heads of departments and managers of municipal companies. These were asked to reduce energy expenses for heating purposes and energy consumption in municipal buildings, in compliance with the guidelines defined by the Mayor. The memorandum reads as follows:

- *"Electricity consumption accounts for 2/3 of total energy costs in municipal buildings", it is therefore necessary to "be vigilant, in particular as regards lighting, by making sure that all the lights are off when the building is not occupied" and "the energy department will progressively replace all the incandescent and halogen lamps by compact fluorescent bulbs that consume five times less energy,*
- *"Maximum regulatory heating temperatures are the following: gymnasium: 14° - schools, offices: 19° - day nurseries: 21° (+ 1°c would mean a 20% increase in heating costs for gymnasiums and a 10% increase for schools and offices)",*
- *"No back-up electric heaters will be authorised in buildings fitted with a hot water central heating system".*
- *"A fact sheet describing all the regulations that must be complied with when building or retrofitting a municipal building is available at the Energy Department (low energy buildings)",*
- *"Given the amount of money spent on energy - around 14 247 000 francs (2.17 Mil. EURO) in 2001 for municipal buildings alone - and in particular on electricity, I thank you in advance for your help in fighting wasteful behaviour".*

The second "low energy" memorandum is addressed to all stakeholders, whether internal or external, involved in the building or retrofitting of municipal buildings. Recommendations concern a wide range of subjects from thermal insulation, heating, building orientation, wall design, ventilation, lighting through to domestic hot water. Such an approach involves taking account of not only construction costs but also all operating costs necessary to cover the building's energy requirements during its entire life. Implementing

such recommendations in a new school building for example may result in savings of up to 41%. Since 1995, all municipal departments have received this memorandum. It is also distributed to target groups (architects, consultancy firms, etc.) together with explanatory documents each time a kick-off meeting for a new construction or retrofitting project is planned.

The Energy Department of the municipality of Montpellier is responsible for seeing to the good administration of these memoranda via the specifications attached to the invitations to tender and/or by monitoring designers' work. The Department is in contact with all the Municipality's project managers to discuss issues relevant to heating and air conditioning in municipal buildings as well as specific uses of electricity. The emphasis is laid in particular on the performance of new equipment.

### **An example : the Antigone public library ...**

In 1996, Société d'Équipement de la Région de Montpellier (SERM) and the Energy Department of the municipality launched a competition for the design of a library-archives complex to be located in the Antigone district opposite the new Olympic swimming pool. Attached specifications included extremely precise energy performance requirements in winter and in summer. The competitors were then perfectly aware that "energy conservation" would be a critical factor in selecting the offers.



Energy choices were defined as soon as the design phase and it was a prerequisite that the new building be connected to the city's district heating and cooling network already supplying the Antigone district.

A first selection narrowed down the choice to 4 proposals out of 85. The thermal behaviour of these four projects was assessed by a specialist consultancy firm. Specialised software analysed all the data provided by the architects over a period of several days in order to predict the behaviour of each building over a one year period, zone by zone and hour by hour.

Once the successful tender was chosen, the same consultancy firm was again called to assist the architects. This time all the planned technical options (type of glazing or shading systems, ventilation, etc.) were simulated in order to optimise the energy consumption of the building. The various partners in the project - SERM, the Energy Department of the Municipality and the architects – met together regularly over a period of several months. Compared with the initial proposal, power requirements were reduced by 30-40% and yearly expenses for air conditioning and space heating were reduced by half.

Commissioned in 2000, the new library gives complete satisfaction to the users and to energy managers.

### **... and other projects**

#### Cogeneration

Montpellier pioneered research in this field and is the only city in France to have developed a heating and cooling network. This network was created in the Antigone district. In 1996, a CHP unit fuelled with natural gas and capable of producing 3.7 MW of electricity and 4.5 MW of heat was installed. A tri-generation plant composed of two CHP engines with an output of 6.3 MWe and 6,4 MWth respectively and a 1.44 MW hot water absorption chiller was put into service at the end of the year 2000.

#### Anticipation of the liberalisation process

The energy policy of Montpellier is a long term undertaking that is still being developed. The municipality of Montpellier intends to play an active role in the new liberalised energy market.

## LESSONS LEARNED

Over the years, Montpellier has fully demonstrated its capacity to resist the dominant trends in the energy field, especially when the Mayor estimated that the interests of the municipality were not given appropriate consideration. By way of example, Montpellier is one of the two French cities that still have no concession contract with EDF for the distribution of electricity, the last contract dating back to 1965. At the beginning of the 1990's, when EDF realised that there was a gap in the law and started to worry about this deficiency, the public utility company suggested that local authorities sign up new concession contracts. Most local authorities agreed to do so. In 2003, however, Montpellier is continuing to refuse to follow suit, arguing that electricity distribution could be placed under direct local government control since the electricity networks are the property of the municipality. However, the Electricity Nationalisation Act voted in 1946 stipulates that once a municipality has abandoned this option it cannot claim it back.

Montpellier has also earned the reputation of being extremely strict in managing its working budgets. This is one of the main reasons that prompted elected representatives and municipal officers to initiate an energy management policy. Obviously, any legal instrument that becomes available when municipalities are declared eligible will be used to curtail expenses. However, as few French stakeholders believe that the liberalisation process will be accompanied by price reductions on the ground that most supply companies will have already squeezed their profit margins in the competition to win large companies' accounts, it is unlikely that prices will have an influence on Montpellier's strict discipline of management.

As far as relations with suppliers are concerned, Montpellier, via the Association des Ingénieurs Territoriaux de France (Association of French Local Government Engineers), has proved that it can co-operate with them. For instance it has developed monitoring and management software with Gaz de France (Territoria) or required suppliers to develop a computerised data transmission system that is compatible with the energy measurement systems used by the municipalities.

For all these reasons, the opening up to competition is not perceived as something that municipalities have to be afraid of and it should have no influence on municipal policy towards sustainable development. On the contrary, it is expected as a positive development as regards transparency, innovation and contractual relations. However the experience from Montpellier demonstrates yet again that results come to those who take a firm and committed policy line to energy saving and relations with the local utility. A liberalised market usually rewards those willing to haggle and stand their ground!

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

In a free market, the rewards are given to those who stand out for what they want. This is true at all levels of negotiation – a modern market is about doing just that – for instance in negotiating the concession. Governments need to give local authorities the freedom to act as they see appropriate.

Therefore liberalisation is not about abandoning energy policy and leaving it to the market. On the contrary if one is to act with resolve in a free market, one needs clear policies that can be justified. A clear energy policy carried forward over a period of years will deliver the goods. Governments should push local authorities to deliver and administer this. Equivocating only gives power to the supplier.

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## An inter-municipal energy service

## SIGEIF, Ile-de-France (FR)

### GENERAL ASPECTS

French municipalities outside large cities have set up inter-municipal organisations to fulfil their gas and electricity distribution obligations. **Syndicat Intercommunal pour le Gaz et l'Electricité en Ile-de-France (SIGEIF)** is one of them. It represents 166 communes of the Ile-de-France region and has the authority to grant concessions for the distribution of electricity and gas on their territories. Its networks supply around 5 million inhabitants and represent a turnover of more than 1 billion euros for Electricité de France and Gaz de France.



### BACKGROUND

French municipalities are responsible for distributing electricity, gas and heat. Electricity and gas distribution is carried out through concession contracts which, apart from a few municipal utilities dating from before nationalisation, are obligatorily placed with EDF for electricity and Gaz de France for gas. French municipalities have the choice of managing directly or putting out to concession for heat, but the offer is very narrow.

In anticipation of the liberalisation of energy markets in Europe, the public service role of concession-granting authorities (municipalities and inter-municipal organisations) was reasserted in the Electricity Act of 10<sup>th</sup> February 2000<sup>2</sup>. Article 1 thereof even clarified the notion of “public service”:

«As part of energy policy, (the public service of electricity contributes to the following: independence and security of the supply, improved air quality and reduced greenhouse gas emissions, optimum management and development of national resources, energy demand-side management, economic competitiveness, development of expertise in technologies for the future, as well as rational use of energy.

In this context, the President, the elected representatives and the General Management of SIGEIF decided to propose a new common service for member municipalities and an energy manager was recruited to devise, set up and run an inter-municipal energy department.

Energy being at the same time a local and global issue, the objective of the department is to assist municipalities in an ever-changing environment set against a background of the liberalisation of energy markets.

The first measures taken in medium-sized municipalities (population of around 25,000 inhabitants) were favourably received: these municipalities were indeed too small to take on an energy manager but had a large enough municipal property to justify the implementation of energy management measures.

At the beginning of 2003, this type of action carried out by an inter-municipal energy department is still an exception, the action of inter-municipal structures being primarily focussed on distribution and not on demand-side management. Over the last few years, however, the new inter-municipal structures created in the wake of the new legislation and known as “Communautés d'agglomération” (urban area community) and

<sup>2</sup> Law on the modernisation and development of the public service of electricity, also known as the “transposition” law.

“Communautés de Communes” (Association of municipalities) have been developing similar initiatives under the name of “Conseil d’Energie Partagée” (shared energy service). The objective of the present case study is to give municipalities and elected representatives an insight into the liberalisation process and try to prepare them for the upcoming changes.

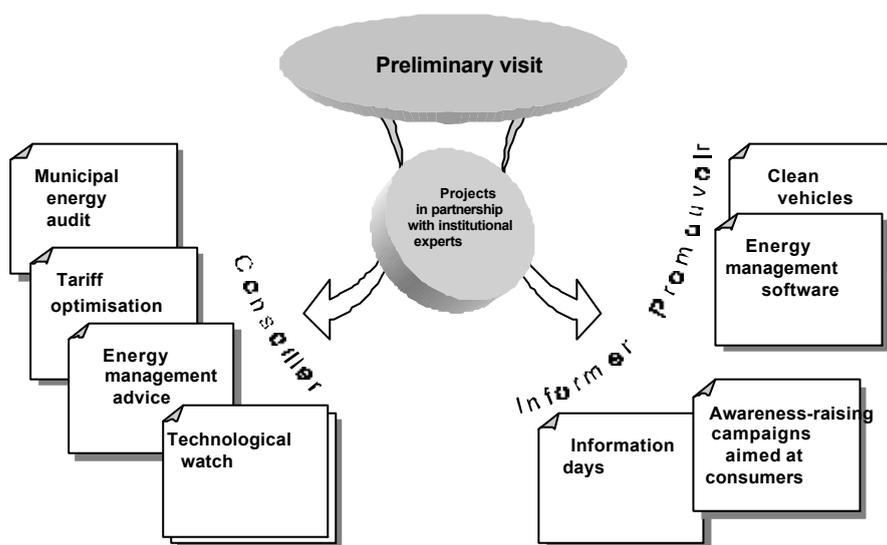
## ACTION UNDERTAKEN

### A full range of “energy” services

In a number of fields concerned with inter-municipal co-operation, the sharing of responsibilities between the different levels involved, municipal and inter-municipal, is a sensitive issue: the creation of this energy advice department aims at ensuring a territorial continuity between the players involved (municipalities, associations of municipalities, Ile-de-France Region, local energy management agencies) in order to reinforce co-operation and increase the number of initiatives taken without having to increase the necessary resources.

Given the extreme variety in the features of the member municipalities of SIGEIF (in terms of population, size of building stock, presence or not of an energy manager etc.) it was decided that the new department would provide a range of services that fall into three categories: provision of advice, awareness-raising and promotion.

Its modular approach makes it possible to implement all or part of the services proposed depending on the specific situation of the municipality concerned.



The *preliminary visit* provides an opportunity to meet with the municipal team and assess the situation as well as local expectations in terms of energy management, while creating a network of contact persons between the technical services of the municipality and the intermunicipal organisation. Depending on the outcome of the preliminary visit, it may be decided that one or several services will be proposed.

### Provision of advice

The *municipal energy audit* consists of:

- Assessing the energy situation of the municipality (for all forms of energy and uses and for all types of municipal property: buildings, public lighting, vehicles),
- Carrying-out a qualitative and quantitative audit of the current situation, including future prospects, for example by providing indicators that will enable the municipality to compare itself to other municipalities at national level,
- Suggesting recommendations.

Tariff optimisation consists of checking whether the electricity and gas contracts are appropriate to building use. The objective is, for each contract, to look at the following three factors {subscribed demand, tariff option and type of tariff} and optimise them so as to minimise the energy bill. If necessary, modifications based on simulations are proposed.

### Information and awareness-raising

The energy information sessions are information half-days organised on energy-related subjects and intended for personnel from the technical services and elected representatives. During the preliminary visit, possible topics for future sessions are proposed to the municipal team who can then express its level of interest in each of the proposed subjects.

As far as awareness-raising is concerned, a general public communication leaflet has also been designed for the information of consumers / users. This leaflet describes the energy management measures that can be taken in every-day life, both "in the home" and "at the office".

### Promotion

Pursuant to the Air Law of 30 December 1996, SIGEIF helps member municipalities improve the quality of the air within their respective areas by supporting the purchase of **clean vehicles**. Its financial support schemes concern the studies carried out to evaluate the municipal fleet of vehicles as well as the acquisition of electric and NVG vehicles.

Within the promotion range, a new service has been introduced in the form of a grant for the acquisition of **energy management software**.

### Being active in projects in partnership with institutional stakeholders

The objective is to provide municipal energy managers, who often feel isolated, with the possibility to benefit from the expertise and results of projects carried out by working parties at national level, with the support of networks of institutional experts and associations: ADEME<sup>3</sup>, AMORCE<sup>4</sup>, Groupe Energie de l'AITF<sup>5</sup>, CSTB<sup>6</sup>, Energie-Cités, Electricité de France, Gaz de France.

SIGEIF is currently member of the steering committee of two projects, via the Energy Group of AITF :

- A national survey concerning the use of remote monitoring in local authorities,
- A national survey of energy consumption and expenditure in municipalities.

SIGEIF is also part of:the "electricity purchase" working group led by AMORCE with the support of the French Environment and Energy Management Agency (ADEME)

## LESSONS LEARNED

Although the liberalisation process does not yet directly concern municipalities, which will only become eligible in July 2004, the ongoing debates raised by this issue contribute to raising awareness of the necessity to change behavioural patterns.

The present example shows how an intermunicipal organisation – and more precisely an association of municipalities created for distribution purposes - can avail itself of the law implementing the EU Directive to initiate demand-side management activity aimed at reducing energy consumption in municipalities. An idea which may also appeal to Belgian intermunicipal organisations (see case study on Wallonia).

The prevailing idea, especially in France where "public services" are a sensitive issue, is that the opening up to competition will inevitably lead to reduced municipal prerogatives. The argument that it is necessary to take counter-action to defend the general interest may sound attractive to many local authorities as a consequence of this.

<sup>3</sup> ADEME : Agence de l'Environnement et de la Maîtrise de l'Energie / French Environment and Energy Management Agency.

<sup>4</sup> AMORCE : An association of local authorities involved in district heating and waste management.

<sup>5</sup> AITF : Association des Ingénieurs Territoriaux de France, (formerly: AIVF, Association des Ingénieurs des Villes de France) / Association of French local authority engineers).

<sup>6</sup> CSTB : Centre Scientifique et Technique du Bâtiment / Standards organisation for building materials.

Inter-municipal co-operation on energy is still in its infancy in France (although such cooperation is well established in many other areas). The notion of common services shared by several municipalities and that of solidarity between the most experienced municipalities and those which are less experienced can contribute towards further developing such processes on a larger scale.

Other associations of municipalities in the field of energy have also started to modernise their traditional activities. For example, SIPPAREC (Syndicat Intercommunal de la Périphérie de Paris pour l'Electricité et les Réseaux de Communication – Associations of municipalities in the outskirts of Paris for Electricity and Communication Networks) which is responsible for supplying 3 million inhabitants and has similar responsibilities to that of SIGEIF, conducted a survey of its member municipalities at the end of 2002, with a view to setting up a bulk-buying organisation for the purchase of electricity once municipalities are declared eligible. SIPPAREC also organises conferences and seminars aimed at raising awareness of elected representatives and developed an impressive legal and economic support to this end.

Nevertheless, when considering that the population of 8 million users served by these two structures of the Paris Conurbation (which exclude the inner-city) is much larger than the total population of Switzerland (see case study on SwissPower), one can only be struck by the gap in resources and therefore ambitions. Herein lies the difference between what is possible or not, depending on whether one lives in a centralised or decentralised country.

Article 2 of the 8<sup>th</sup> April 1946 law on the nationalisation of electricity and gas which established the electrical system in France provides for the following:

*"The management of electricity distribution is entrusted with public utility companies denominated "EDF.Service de distribution" followed by the relevant geographic name."*

*"Up to the effective implementation of distribution services, the responsibility and operation of this public service shall be met by the national service."*

More than 60 years later, France is still in its transitional period.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The development of energy efficiency and energy promotion services by intermunicipal organisations is an idea that could have wide application. It is an idea which should appeal to Belgian intermunicipal organisations (see case study on Wallonia). It is an idea that has been developed widely by Regional and sub-regional energy agencies set up under the SAVE programme. It is an idea that could interest those purchasing consortia established in the UK which have a committee and established staff, although there would need to be a change in mindset from purchasing oriented to a more overall view of energy management. It is an idea that will certainly interest those American groups of local authorities that have gone in for aggregation – it has already started in Massachusetts. In fact, when dealing with municipalities that are too small to run their own specialist energy service one has three choices:

- Do nothing,
- Contract a service out,
- Provide that service cooperatively.

Providing an energy management service cooperatively is therefore an idea of such generality and simplicity that one asks why it has not become general.

The answer is of course availability of resources and awareness of the need. Where external resources have been provided, maintained and publicised then bodies such as energy agencies, consortia and syndicates have continued to provide a structured and effective programme. For instance the UK energy agencies have continued to provide services on energy awareness funded by a national programme of grants under the HECA (Home Energy Conservation Act) Funding. Therefore there is a major responsibility on governments to ensure that funding is provided. This need not be a charge directly on public taxes if for instance equitable access is provided to public goods funds. But continuity of policy over a significant period is important if such a service is to have an impact. Rome wasn't built in a day...

## FURTHER INFORMATION

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# Energy performance contracting in pools

# Berlin (DE)

## GENERAL ASPECTS

Berlin is the historic capital of Germany, a city of people and Land in its own right. It has been reinstated as the centre of Government following reunification which has led to a boom in development.



## BACKGROUND

The idea of “energy partnerships” was established in 1994-5. The Berlin Energy Agency, which has the status of a private limited company, had been charged by the Senatorial administration with developing this idea in order to create a viable model and to test it in practice. The “Energy Partnership” is an efficient model of contracting for energy savings (with performance indicators to attain). It has been developed in order to achieve climate protection and energy policy objectives despite a very tight budget. By this means they achieve savings.

The idea arose in Berlin to form pools in a manner that assembled different buildings that are different from the point of view of their use structure, their construction materials, their equipment and their potential for savings. This heterogeneous composition enables the contractor to make an overall estimate of the profitability between different buildings with different performances so that the apparently less interesting buildings are not ignored.

The financing, planning and implementation of the energy saving measures taken for these buildings are left to private partners (contractors) thanks to a call for tender. The contractor invests to meet his contractual obligations, that is to exploit the potential for energy savings and to finance the measures necessary.

The putting together of the pools and the management of the contracts are the responsibility of the project manager who prepares the documentation, ensures that there is sufficient information to estimate the energy savings etc., becomes an expert intermediary between the supplier and the client and oversees the contract in a general manner as a consultant of the client. In Berlin the Project Manager is the Berlin Energy Agency which has expertise in this field.

# ACTION UNDERTAKEN

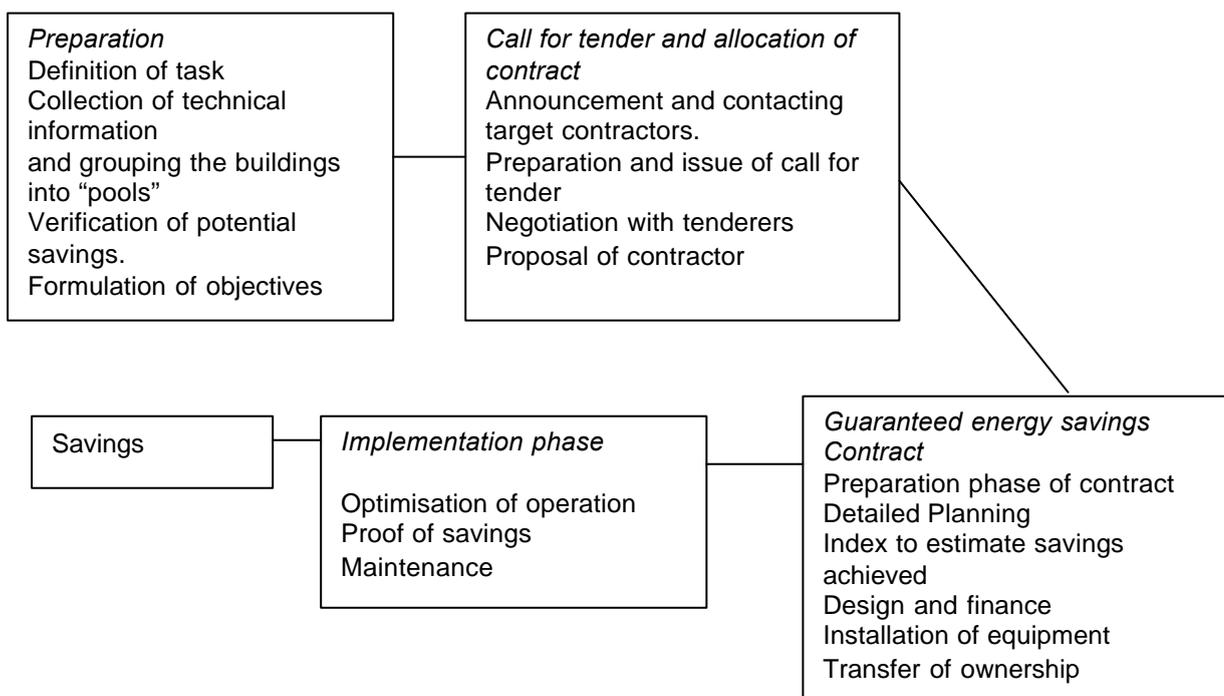
The work of mounting and managing an energy saving project in buildings is carried out following a now well established process.

After defining the technical, legal and organisational conditions necessary, appropriate buildings are identified and the formation of pools takes place afterwards, during the identification of basic data related to the buildings and their energy consumption.

A steering meeting relating to the project defines objectives to be achieved and a timetable and brings together all the parties concerned. The energy consumption and the costs enable one to define the reference baseline costs on which the savings are to be made and enables one to define the requirements in more detail.

The search for the best contractor (outside the management process) is carried out by a tender process at European level typical for a typical guaranteed energy savings contract. The proposals are examined in more detail (advice on the market proposals followed by a negotiation procedure conforming to VOL/A section 2). Once the contract is agreed one still needs to follow the progress of the contract.

## The contract process



## The Main partners to the contract

The senatorial administration for planning and the Berlin Energy Agency have established, with the aid of a firm of lawyers, a model contract for energy saving guarantees based on the experience and the contracts offered in the first pool. Local authorities therefore have the opportunity to use a tried and tested form of contract.

The principal elements of a contract for guaranteed energy savings are :

- A promise of a guarantee from the contractor under German law indicating the level of saving to be expected,
- The options chosen by the contractor regarding servicing and maintenance of the existing energy equipment,
- The options chosen regarding type and the amount of investment to be undertaken by the contractor. The options chosen on the quality, the compatibility and the duration of utilisation of the technical components,

- The declaration that the ownership of the investments undertaken is transferred to the owners of the buildings from the moment of their installation. (This gives security in case the contractor becomes insolvent. If this happens the client can continue with the measures being undertaken on his own account).

### Share-out of responsibilities and risks

The contract is a typical EPC contract. The contractor has the entire responsibility for the operation of the technical equipment and therefore takes the risk of breakdowns. In addition he guarantees the client a minimum threshold of energy savings and supports the financial risk of possible changes in the level of interest rates by the banks.

The client provides a reliable base for calculation to the contractor during the full length of the contract adjusting the annual energy costs (baseline) to possible changes in the climate, the use of the building and the price of energy. This implies, for instance, that if the use of the building intensifies, the client will have to bear any additional costs related to the growth in energy consumption.

The surplus energy savings are shared out according to a percentage agreed in the contract which could, for example, favour the client in order to motivate the users to adopt a behaviour which respects energy and the costs involved. If the savings are less than predicted, the guarantee applies. The bill of the client is in no case made worse.

#### Characteristics of the building pools

The contracts, lasting from 12-14 years, were concluded for 10 pools including overall more than 318 buildings. Different contracts are presented for different buildings. The potential savings vary from one building to the next, but for the most part lie between 5% and 60%. To date 24.5M euros have been invested in energy saving measures by the partners, the majority in the first year of the contract. Berlin has already saved 5.9M euros per year.

### Information on some typical pools

#### Pool 4 Pankow

This was set up in 1998 by the Berlin District of Pankow for local schools. Apart from technical measures which enable one to reduce the energy consumption, the service also offers action to increase the motivation of the users. Caretakers receive training, and the awareness of schoolchildren is raised via energy saving suitcases and games.

#### Pool 9 Freidrichshain

The Berlin District of Friedrichshein entered into an EPC agreement for its school buildings. Priority was given to automatic temperature controls in individual rooms. The individual controls are programmed according to timetables of use and operated from a central point.

		Pool 4	Pool 9	Pool 11	Pool 12
Buildings	number	55	30	41	11
Base costs	MEuro/a	2,075	1,091	1,285	4,871
Original consumption of building	MWh/a	49.513	21952	37140	57141 (plus 637k m <sup>3</sup> water p.a.)
Duration	yrs	14	10	12	10
End of contract		01.03.14.	01.10. 11	01.06.14	01.10.12.
Investment	kEuro	1.771	939	920	7.926
Guaranteed savings	%	24,2	19,67	22	33,54
Savings made by the commissioning party	%	7,1	3,46	2,42	6,71
Participation of the client in savings exceeding the guarantee.	%	80	90	Yr 1 = 90 Yr 2 = 75 Yr 3 = 50	30
Contractor		Johnson Controls	ARGE/MVV/WFM	SFW	Landis and Staefa (L/S), Siemens BT

### Pool 11 Steglitz Zehlendorf

This district reduced the consumption of 41 buildings (mainly schools and kindergartens) by 22% primarily by promoting fuel conversion from coal and oil to gas. A number of buildings were sold and other buildings were included in the pool when the opportunity arose – this was all taken account of in the contract and so these can be very flexible.

### Pool 12 Berlin Public baths

This is a very high return pool with 11 public swimming baths and with planned savings of 33,5% over 10 years. About 50% of the baseline costs refer to water use and this provides a major saving to be exploited by encouraging re-use and improving economies of water use.

### Spreading the message

Following the success of the work in Berlin, the Agency has acted as consultant to help introduce energy saving partnerships in two towns in Slovenia as part of the TRANSFORM programme (funded by the Reconstruction Loan Corporation). The municipality of Kranj had 14 buildings in a pool for which they awarded a 15 year contract to the Styrian District Heating Company to produce an energy saving of 15,1%.

## LESSONS LEARNED

It is clear that the establishment of a unit which gathers together buildings in pools has a number of advantages. The economies of scale are demonstrable and include :

- Reducing the cost of preparing for and going out to tender, including the cost of information gathering before tender,
- Reducing the unit cost of work on one building through bulk buying so allowing more work to be done on each,
- Reducing the unit administrative cost associated with managing contracts,
- Through the establishment of a specialised unit charged with promoting the process, changing the mindset of decision takers in the client(s),
- Facilitating the obtaining of work for the tenderer so enabling a better offer to be made,
- It is easier for the contractor to negotiate long term financing and energy supply contracts, so guaranteeing security.

These benefits are visible, more or less, in all the procedures for setting up a special unit to promote performance contracting including those in Sustainable Peterborough and Graz. It is clearly a very useful response to the problems of promoting energy efficiency investments engendered by liberalisation.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The major issue however is while such a process can be self financing once established, it needs considerable investment and commitment to set up and needs the support of a major and stable structure such as a local authority or utility. Such funding is needed over several years before the process becomes self financing and finding that level of commitment is not easy. Support given by public sector contracts was vital to getting the performance contracting industry off the ground in Canada, and in Berlin the Agency relies on local authority contracts for security. Government can help by easing the restrictions on both local authorities and other public sector institutions and by providing security guarantees.

## FURTHER INFORMATION

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# Promotion of distributed CHP

# Frankfurt am Main (DE)

## GENERAL ASPECTS

Frankfurt is the trade and financial heart of Germany. A former free city located on the River Main, it was a crossroads for European trade and commerce and the official venue for imperial coronations.



## BACKGROUND

The "Energierferat" was founded as a local energy agency for Frankfurt in 1989 to promote CO<sub>2</sub> reduction and to develop an energy strategy for the city.

Their activities concentrate on improving energy efficiency and reducing energy consumption in all areas. In 1990 the "Energierferat" started to perform systematic studies on potential sites for distributed co-generation systems. A consistent method for evaluating the technical feasibility and economic viability was developed for the project. The studies also covered the environmental impact of co-generation and, in some cases, tri-generation.



Co-generation for district heating in Frankfurt has a long tradition. The first CHP-plant started operation in 1926, supplying steam to the University Hospital complex and the office buildings in the nearby harbour as well as dwellings in the city.

District heating supplied from co-generation was extended in 1963-1964 over a large new development area in the Northwest of the city linked to steam from a waste-incineration plant. Successive further additions were made to the CHP capacity linked to the DH network right up to 1994, so that the total capacity is now 1004MW.

## ACTION UNDERTAKEN

The City Council decided in 1990 that distributed co-generation should become a major part of the City's climate protection programme. Following resolutions of the City Council, the Energierferat started to perform systematic studies on potential sites for distributed co-generation systems in 1990. For the project a consistent method for evaluating the technical feasibility and economic viability was developed. The studies also covered the environmental impact of co- and, in some cases, tri-generation.

Thirteen sites with a high heat and power demand (hospitals, public swimming pools, offices) were selected for feasibility studies. In the beginning only sites outside the district heating service areas were investigated in order to avoid competition between district heating and co-generation. The focus of these studies was on

technical viability, taking into account neither the state of the installed heating system nor the readiness of the building-operator to invest in a “new” technology. As a result, only one project in a hospital was carried out as an immediate outcome of these studies in 1994. With an annual operating time of over 8,200 hours in the first year of operation, this tri-generation project in a hospital was very successful.

In the light of these studies, sites for further studies were selected taking into account economic and emotional aspects in addition to technical criteria. Further studies were also carried out for particular applications, e.g. old people’s homes, hostels and workshops for the handicapped.

To date more than 140 feasibility studies have been prepared for hospitals, office buildings, old people’s homes and other areas with high heat and/or electricity consumption. In addition to feasibility studies for new or existing buildings, the Energiereferat is preparing case studies on energy supply alternatives for new urban development schemes.

This process has been given the title systematic discovery planning. As a result of this process distributed CHP generation in small and medium sized units in the city was increased from 0.1 MW<sub>el</sub> to 24.0 MW<sub>el</sub> (office buildings, swimming pools, hospitals etc.) between 1990 and 2002. In total 70 CHP plant were installed with sizes ranging from 5 kW<sub>el</sub> (kindergarten) to 4000 kW<sub>el</sub> (German Federal bank).

The surveys carried out in Frankfurt show that there is a further potential for distributed small and medium size co-generation units of at least 20 to 30 MW.

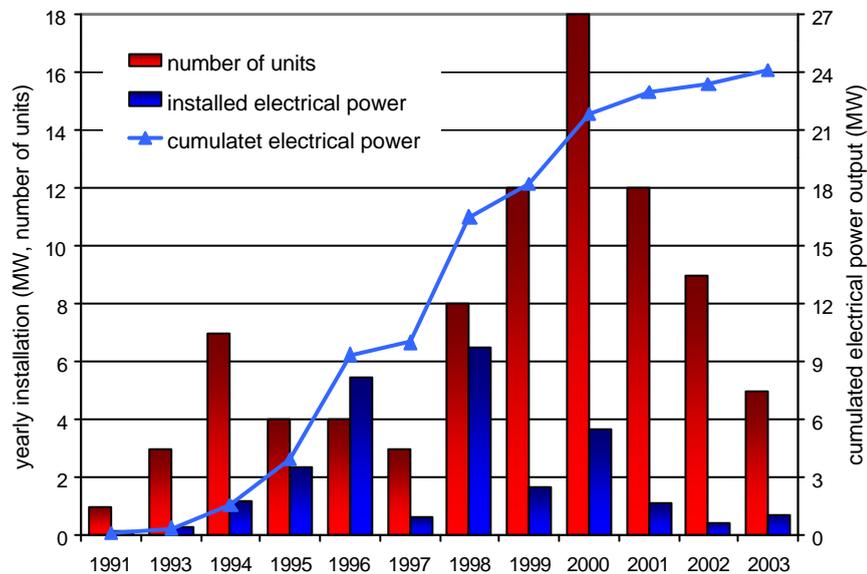


Figure 1: Development of decentralised co-generation in Frankfurt am Main

The co-generation plants are financed and operated either by the owner of the building itself or by contracting companies (e.g. local utility, private contractors, building departments). Most of the plants are powered by natural gas, which allows CO and NO<sub>x</sub> emissions to be reduced to a level 50% below the legal requirements. Fuel oil is also used in some of the plants. The first co-generation plant (440 kW<sub>el</sub>) using biogas from a composting plant started operation in 1999. With a new German law (EEG), rates for electricity from renewable energy have been fixed at satisfactory levels so that in the future co-generation plants using renewables (biogas or bio-fuel) might become more frequent. The wide range of application areas, i.e. hospitals, schools, offices, small residential district heating systems, private houses, swimming pools, a botanic garden and hostels, demonstrate that co-generation is not only limited to industry.

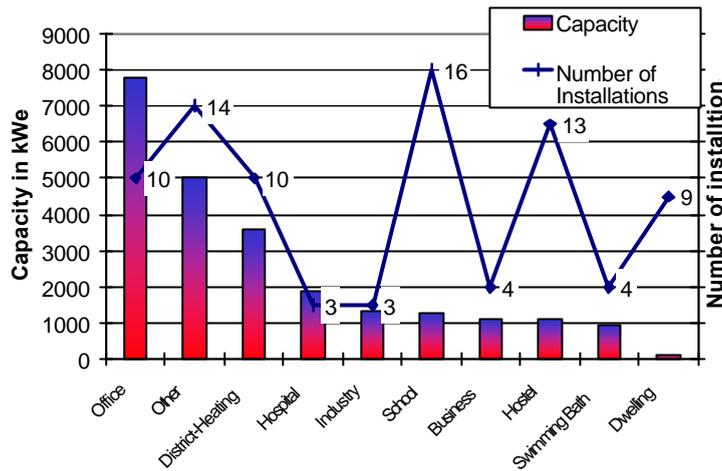


Figure 2: Installed generating capacity and number of installations for various application areas

### Tools for technical and economic comparison

During the last ten years, various tools for technical, economic and environmental evaluation of co-generation projects have been developed by the Energierferat.

This includes spreadsheet programs to evaluate the annual heat-demand curve for various applications, programs to estimate operating hours for co-generation plant and spreadsheets for economic comparisons based on German engineering guidelines (VDI 2067).

Standardised price estimates have been requested from European suppliers on a yearly basis since 1994 in order to have current price information on the various co-generation units available. Energierferat started to publish a summary of this survey in 1995 due to the high demand, especially from engineering and planning consultancies.

In the 2001 edition, information on investment and maintenance costs and prices for overhaul have been compiled for more than 250 co-generation units covering various fuels (natural gas, fuel oil, biogas and bio-fuel). This information is an integral part of an engineering handbook for co-generation plant and is also included in a computer program (BHKW-PLAN; ZSW Stuttgart) for the design and economic evaluation of co-generation units. A special tool for comparing the heat costs of individual gas-boilers with heat costs from district heating with co-generation has been developed in co-operation with the Cities of Hanover and Frankfurt. This tool is especially designed to assist urban development planners in checking energy supply alternatives for new development areas. The above-mentioned tools allow one to prepare feasibility studies within a short time in a standardised and comparable way.

### Practical experience

Since 1998, operators and users of co-generation units are invited regularly for a round-table discussion on problems in operation, maintenance and performance.

In the 2002 meeting, data from 44 sites with a total of 59 motors and a generating capacity of 9,700 kW were analysed.

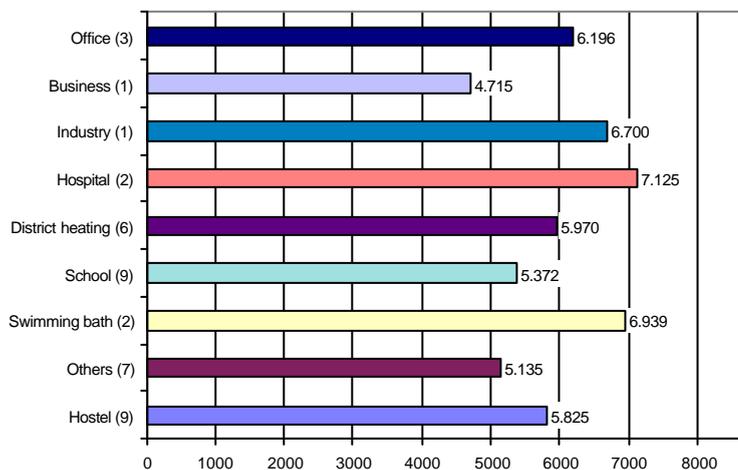


Figure 3: Operating hours of different co-generation plant (2001)

Operating hours varied from 800 hours per year up to 8,715 hours per year and the average availability was above 95 percent. Actual maintenance costs range from 0.35 Cents/kWh (generating capacity: 1,000 kW) to 3.15 Cents/kWh (generating capacity: below 30 kW).

### **Innovative techniques**

Beside promoting the installation of standard motor-driven co-generation, the "Energierferat" together with local utilities and other co-operating partners try to demonstrate and test innovative and/or improved co-generation units.

The first project of this type was a demonstration project for the Senertec-Dachs micro co-generation unit (5.5 kW) financed by the Government of Hessen in co-operation with the regional energy agency and local utilities. This was a major success with 15 units installed in early 1994 (of which 5 were in Frankfurt). To date some of these engines have operated for more than 50,000 hours without any major failures.

In 1998, a fuel-cell co-generation unit (ONSI PC25; 200 kW<sub>el</sub>) was installed to provide heat and electricity for a public swimming pool. This project was carried out by the local utility (MAINOVA AG) and subsidised from an energy saving fund provided by the main utility (E.ON). Project evaluation was carried out by the engineering academy of Frankfurt University.

MAINOVA AG also started a pilot project with a 10 kW<sub>el</sub> Stirling-engine. A co-generation unit in a hostel (50 kW) was equipped with an additional heat exchanger to utilise the latent heat in the flue-gases (condensation-heat exchanger) for pre-heating hot water for the building. This installation proved to be very successful, boosting the overall energy efficiency to above 95%.

A prototype of a high-temperature absorption unit driven by the heat from exhaust gases was added to the co-generation unit in the botanical garden and tested under practical operating conditions. While with a standard condensing-heat exchanger the delivery temperature is limited to approximately 50 C, this unit allows delivery temperatures up to 90°C. The additional cost for this unit will be recovered in less than four years. After the positive test results of this innovative technique two additional units of this type are planned in Cologne and Frankfurt.

In July 2002 a micro-gas turbine with an electrical capacity of 100 kW was installed in a public indoor swimming pool providing heat and electricity.

## **LESSONS LEARNED**

Experience in Frankfurt demonstrated the power of small scale co-generation to assist communities in reducing CO<sub>2</sub>-emissions and improving energy efficiency. The 70 units in operation reduce CO<sub>2</sub> in Frankfurt by more than 68,000 tons per year. The great number of projects already realised as well as the long list of further potential sites for co-generation plant clearly show that there is still a high potential for CHP plant and on site electricity production as part of an integrated supply in Frankfurt and Europe.

The experiences of Frankfurt may be transferred and applied in other European municipalities. The potential for small scale CHP, with its concomitant 30% reduction in primary demand for energy, is very significant and could provide a significant contribution to reducing CO<sub>2</sub> emissions relatively rapidly even in a liberalised market.

The main success factor in the widespread promotion of such units is the involvement of a local independent consultancy service for the promotion and a systematic search for sites for small CHP units. The decision by Frankfurt City Council to offer a feed in price of 7 cents/kWh was a good framework for small and medium CHP plants, but this was stopped in 2000 following liberalisation.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The liberalised electricity market has worsened the conditions for CHP due to lower electricity prices as well as lower feed in tariffs, but policy makers at national and European levels all profess a desire to promote CHP as a means of achieving reductions in GHG emissions. Therefore it is desirable to develop mechanisms at national – or European – levels to improve the economic conditions for one of the most effective measures for CO<sub>2</sub> reduction. The new German CHP-legislation passed in 2002 has given only a slight incentive to the industry by establishing a “bonus” model. This model is only operative for CHP electricity fed into the grid. There are still obstacles to the use of CHP electricity i.e. that utilities do not allow a direct sale of CHP electricity to tenants in residential areas.

The European Commission has set up a draft directive for the promotion of CHP electricity, but this directive sets no objectives and no recommendations for European and national frameworks to help achieve the big potential of CHP. There are two possibilities for a framework supporting CHP:

- A certification scheme combined with a requirement for an increasing (and nationally defined) quota of CHP electricity in each supplier’s product mix (and of course effective fines for non-performance),
- A fixed feed in price (independent of the standard remuneration of the utility) depending on the size of the plant, similar to those provided for in German and Austrian legislation for renewable electricity. The German CHP association (BKWK) has recently proposed such an arrangement.

### FURTHER INFORMATION

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# Integrated Energy and Climate Protection Policy

## Hannover (DE)

### GENERAL ASPECTS

Hannover is the state capital of Lower Saxony. The City itself has a population of 520,000 and over 1.1 million people live within its socio-economic catchment area. Hannover's geopolitical situation has altered fundamentally in the light of German unification and the tremendous changes in Eastern Europe; after occupying a marginal position for many years, it now finds itself at the crossroads of a new Europe.



### BACKGROUND

For a long time Hannover already had an active local energy saving and climate protection policy. At the beginning of the 1990s the municipality already had developed a close cooperation (it was said that the city energy utility, the Stadtwerke, had a *sonderaufgabe* = special mission). An extensive programme was developed directed towards energy-efficiency on both the supply-side (CHP and district-heating) and the demand-side. In a further development of these activities, a decision was taken in the mid 1990s to develop and implement a climate protection programme.

The World Exhibition 2000 gave a tremendous stimulus to these activities. The suburb of Kronsberg, which formed part of the exhibition, was built as an example of sustainable city planning.

### ACTION UNDERTAKEN

The best intentions are useless unless they're followed up with practical action. Hannover has tackled the global climate problem on its home ground. Local campaigns show measurable results – in the form of thousands of tonnes of CO<sub>2</sub> emissions prevented.



The activities can roughly be summarized as follows:

- Close cooperation between the City and public utilities resulting in the establishment of an Energy Agency (proKlima),
- Improved public transport (new tramlines, new EXPO railway station),
- An extensive insulation programme,
- Local Agenda 21 and the KUKA (Kronsberg Umwelt Kommunikation Agentur). The relevant stakeholders were involved in the development of the Kronsberg district via model public participation arrangements,
- Development of small co-generation plants,

- Development of the NEH house (*Niedrig Energie Haus* = Low Energy House),
- Maintaining their independent small Energy Company: the recent wave of amalgamations in the energy sector has passed by Stadtwerke Hannover.

The following milestones can be identified in the period 1992-2002:

**1992** Responding to the objectives set out at the Rio Earth Summit, Hanover City Council resolved that in 2005 CO<sub>2</sub> emissions will be reduced by 25% compared to 1990.

The Council thereby expanded on its 1986 energy policy resolution, in which it drew lessons from the disaster at Chernobyl nuclear plant by setting new priorities: energy saving as the overriding objective, support for rational use of energy and renewable energy sources, and a gradual reduction of the proportion of electricity from nuclear power.

#### Negawatt, not Megawatt at the Stadtwerke

Under some conditions energy providers benefit long-term from reductions in electricity demand instead of having eventually to build a new power station. Following this idea of 'least cost planning', between 1993 and 1999 the Stadtwerke AG implemented 14 programmes for its customers that attracted admiration across Europe, such as grants towards the purchase of energy-efficient household appliances or analysis of electricity consumption in a household. In total 51,000 private customers alone made use of the programmes.

**1994** To implement the objectives of its energy policy, the City Council established an energy and climate protection section within its environmental protection division. Its brief is to set up climate protection programmes and CO<sub>2</sub> auditing, and initiate, devise and carry out municipal climate protection projects. In the following years the section ran successful projects on energy saving in schools (from 1994), kindergartens (from 1998), and city administration buildings (from 2000). The section supports development plans in which energy efficiency is optimised and the inclusion of appropriate clauses in contracts for the sale of developable land e.g. requiring low energy houses and distributed cogeneration plant.

#### GSE', 'Klik' and 'Tatort Büro'

Heating regulation tailored to demand, switching off lights on leaving a room, brief and thorough airing instead of continual heat loss through a half-open window – possible savings by just being careful with energy are around 15% of total consumption.

Hanover energy and climate protection section therefore supports users of municipal buildings with three projects: 'GSE' (energy saving in schools), 'Klik' (climate protection in kindergartens, and 'Tatort Büro' (energy saving in municipal buildings). This saves both CO<sub>2</sub> emissions and money – over 400,000 Euro a year, from which the institutions receive 30 percent, 40 percent goes on further energy and water saving measures and the remainder to the municipal budget. This concept has been copied across Germany

#### Advice for prospective builders

Back in the early nineties, Stadtwerke Hannover set the ball rolling for energy efficient new construction with its Low Energy House demonstration programme. Since 1999 Hanover City Council has provided an advice service on the Low Energy House standard for property developers on municipally owned land. Investment measures and quality assurance are subsidised by proKlima.

#### The Stadtwerke Hannover's THERMIE project for older buildings

Within the European Union THERMIE project, between 1994 and 1997 Stadtwerke Hannover AG subsidised and supervised thermal insulation measures in 26 multiple-occupancy houses with a total of 300 apartments. The project showed that an average 50% saving on heating energy is possible through economically viable measures.

The district heating network was extended in close cooperation with the Stadtwerke. The section also works at national and international level with municipal climate protection organisations such as the Climate Alliance of European Cities or the International Council of Local Environmental Initiatives (ICLEI).

The City Council negotiated a model concession contract with the Stadtwerke for the Hannover city supply area which commits the Stadtwerke to energy-saving activities.

More small scale CHP plant

Small scale combined heat and power stations use their fuel with efficiencies of around 90 percent. Hanover is therefore trying to increase the contribution of such distributed CHP plant via the concession contract between the municipality and the Stadtwerke. The number of such CHP plant has risen to 53.

**1995** A Local Agenda 21 bureau was established within the environmental protection division. Climate protection, an important component of sustainable development, is a central aspect of the Bureau's work.

**1996** A municipal climate protection programme is established as a criterion for action on energy, transport and waste management. The programme recommends effective measures and quantifies their savings potential in terms of climate impact.

**1998** Stadtwerke Hannover AG, the City Council, five municipalities around Hannover and partners from private enterprise and the community set up the proKlima climate protection fund. Financed by the Stadtwerke Hannover AG, its customers and the five municipalities, the fund supports energy-efficient retrofitting of older buildings, innovative designs for new construction, popularisation of CO<sub>2</sub> saving and the use of renewable energy sources. An average of 5M Euro per year is made available for around 1,500 grant applications.

The proKlima special district heating expansion programme

Because combined heat and power stations use fuel more efficiently, proKlima subsidises the connection of customers for whom district heating would otherwise not be economically viable from the Stadtwerke's point of view.

*Annual reduction in CO<sub>2</sub> emissions: c16000 tonnes*

Setting a good example at Kronsberg

The new suburb of Kronsberg has been taking shape since 1997 as an exhibit for the Hanover World Exhibition. It is a model of town planning, social and ecological practice. A low energy standard was set for housing throughout the entire development. A district heating by-law was imposed requiring compulsory connection and use. In this new residential area the City of Hanover has succeeded in reducing CO<sub>2</sub> emissions by 60% compared to conventional new construction.

District heating comes from two distributed cogeneration plants built for the Kronsberg district. An electricity saving programme was also implemented.

Around 1,350 square metres of solar collectors are used to heat 104 social housing apartments in Solarcity at Kronsberg. These also feed a thermal storage tank, sunk six metres into the ground, with a total volume of 2,750 cubic metres. This means that solar energy can be used from Spring to December, covering around 40% of total heating needs, with the remainder coming from the district heating network.

**1998** Proponents of solar thermal energy and photovoltaic generation join together to found the 'Hanover Region Solar' association.

Lummerlund passive house development

The Kronsberg development also features a passive house development of 32 terrace houses. These houses require almost 90% less heating energy than conventional terraced houses, due to 40-cm thick thermal insulation, extremely airtight structures, air extraction plant with heat recovery and isopane triple glazing, while solar panels on the roofs provide hot water almost all year round. The remaining minimal energy needs are compensated for by the owners' shares in a wind turbine generator on Kronsberg Hill, bringing overall CO<sub>2</sub> savings up to 100%. The project was initiated by Stadtwerke Hannover AG and was part of a European demonstration project.

*Annual reduction in CO<sub>2</sub> emissions: c 100 tonnes*

**1999** The 'Energiepass' is created to promote energy efficient modernisation of the building stock.

The H)Eissbär Campaign

Begun in 1999 by Hanover City Council, the campaign advises owners of older buildings on renovation measures. Parallel to this, the 'Haus-Partner Hannover' network was set up to build support for the campaign from as many quarters as possible. The aim is to motivate house owners to combine renovation with energy efficient retrofitting and exploit the enormous climate protection potential in the housing stock. An 'Energiepass', specially devised by the City Council, 'proKlima' and Stadtwerke Hannover AG, describes the energy efficiency condition of the residential building and explains viable renovation measures to its owner. Acquisition of this document is the prerequisite for subsidy towards investment measures by proKlima. The

campaign with its polar bear logo is backed up with special services such as energy counselling or discounts on thermographic inspection charges.

The right advice works:

*Annual reduction in CO<sub>2</sub> emissions: 4500 tonnes in 2001.*

#### Herrenhausen hydroelectric plant

As part of the 'City as Garden' EXPO project, Stadtwerke Hannover AG built a hydroelectric plant with a fish bypass in Herrenhausen. This power station is today one of the main suppliers of green electricity to the Hanover Region

*Annual reduction in CO<sub>2</sub> emissions: 4000 tonnes*

**2001**, the city administration offers investors the chance to install and run photovoltaic units on the roofs of municipal buildings.

#### Solar power from the City's roofs

To encourage the use of solar energy, since 2001 Hanover City Council has made the roofs of municipal buildings available to private investors for the installation of photovoltaic cells. One pilot installation is on the Herschel school in Vahrenheide, run by the 'Windwärts Sonne und Wind GmbH & Co Betreiber KG', an investment fund with private shareholders from Hanover; the other has been set up by the 'Ökostadt e.V.' non-profit association on the roof of the Stresemann school.

#### Wind turbines

Two of the latest model wind turbines have been erected on Kronsberg Hill rated at 1.5MW and 1.8 MW. Together with an existing 300-kW turbine, they meet the electricity needs of roughly 3,000 dwellings in the new district.

*Annual reduction in CO<sub>2</sub> emissions: c 9000 tonnes*

**2001** Hanover City Council, the former Greater Hanover local government association (now the Hanover regional authority), Stadtwerke Hannover AG, Üstra public transport utility, five medium-sized enterprises and a specially established association found the Klimaschutz Agentur Region Hannover GmbH to coordinate all climate protection activities throughout the region. It took over the '*Solar energie kommt*' and '*H)Eissbär*' (for energy efficiency in older buildings) campaigns and continues the climate protection promotion weeks. This is the driving force behind innovative projects and activities, and the clearing house for all questions about climate protection issues.

The agency's aim is to build up the role of climate protection as a regional economic factor and thus give a new impetus for long-term employment in the region.

#### Sun power goes public at the 'Solar Weeks'

The 'Solarwochen' is a solar energy information event in the Hanover Region every May. Under the motto, 'Lust auf Solar', the organisers stage exhibitions, workshops, talks and excursions at numerous locations in and around Hanover, climaxing at the solar festival on and around the city's Maschsee lake, with solar art, the German solar-powered boat championships, a solar market with craftspeople, a children's programme and live music. In 2002 the 'Solarfest' was sponsored by the Klimaschutzagentur Region Hannover, proKlima and the Umweltzentrum Hannover.

## LESSONS LEARNED

A key factor in promoting the local Energy- and Climate protection policy of the City of Hanover has been the fact that the City has its own "Stadtwerke"(public utility) in which it has a majority interest of 76%. In the mid 1990s, 12% interests were sold to Preussen Elektra A.G. (now E.on) and Thyga A.G. In spite of natural strains related to conflicting interests between the interests of the local owners and the management of the utility company, this is the essential foundation for the success of the climate protection policy in Hanover. In particular the model of the Climate Protection Fund "proKlima, unique in Germany, would be unthinkable without this foundation.

The Climate Protection Fund in particular with its annual budget of about 5 M euro has gained an enviable reputation in the City, as well as in the region and far outside, for its innovative and high quality approach,. ProKlima has been in the forefront of the implementation of new technology, in particular promoting energy-efficiency in new construction and renovation activities in the regional market (e.g. introducing "Passive haus" standards). In addition quality standards for new building and renovation activity were introduced, as well as the certification of construction firms, architects and engineers. By the continuing the support and

promotion policy of proKlima (2500/3000 proposals to private house owners per year) a substantial contribution is made towards maintaining and creating new jobs ("Passive-haus" designs, solar energy installations etc.).

Due to the financial crises of the municipalities and public finances in general, the financial support of the city of Hanover comes under great pressure. The result is uncertainty regarding how and under what conditions the involvement of the City will continue after the end of the agreed contract period (mid 2006).

In relation to these developments the future involvement of the Stadtwerke Hannover depends on its relative independence continuing. There is a need for the Stadtwerke to continue to positioning itself in the market as a supplier of quality and this characteristic must continue to be appreciated at its proper value by its clients. Political action can deliver a framework which can initiate, but can also hamper, the build up of the necessary public support for this image.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The example of Hanover demonstrates that all sorts of interesting initiatives and funding in the field of climate protection and energy-saving can be introduced at local level. However, for this to take place, a certain market-freedom must exist at local level for the players involved, so that they can develop their own strategy.

For national politics this implies the need for the development of a regulatory framework for the liberalisation of the market which does not automatically lead to such a concentration of utility companies so that, at a local level, a rigid situation develops that makes an efficient policy for a climate protection difficult, if not impossible. In many countries the situation has already evolved so much that this could only now be achieved by a active programme of deconcentration or municipalisation. There has been pressure in exactly this direction in certain communities in USA for example with the prime motivation being the protection of the consumer's interest. However one other benefit is the opportunity to implement energy efficiency action at local level, close to the inhabitant so that communication is more efficient.

## FURTHER INFORMATION

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## Using the Concession as a tool for policy

## Heidelberg (DE)

### GENERAL ASPECTS

Heidelberg (pop 140 000) is situated in the state of Baden-Württemberg where the River Neckar enters the Rhine. It is a historic city and the site of Germany's oldest university, which was founded in 1386.

Heidelberg, one of the showplaces of German romanticism, was founded just over 800 years ago and remains even today essentially a university and residential city.

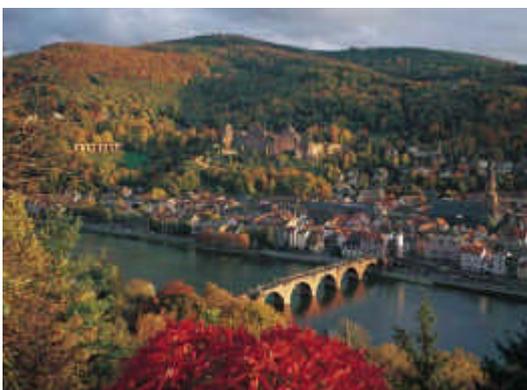
It is, however, also on the point of becoming a major economic growth centre and the hub for the development of the Rhine-Neckar region. In 1997, Heidelberg was awarded with prize as "Federal capital for the protection of nature and the environment" as well as the "European Sustainable Cities Award".



### BACKGROUND

Heidelberg has had a very active environmental programme from the beginning of the 1990s. In 1992 the city drafted an energy plan that introduced various interesting initiatives. This included an energy control and climate protection programme focussed on:

- Increasing energy-saving potential through promoting technical improvements in energy-efficiency and enhancing consumer awareness to develop new habits,
- Promoting the combined production of heat and electricity,
- Recovering waste heat and excess production of electricity in trade and industry,
- The use of locally available energy resources and renewable energy sources.



About a hundred measures were proposed in detailed action catalogues of which about twenty concerned renewable sources. Numerous demonstration-projects were proposed as well as counselling services and a broad based subsidy programme. The development of energy performance contracting was recommended and indeed executed, starting in 1994 for about fifteen schools. Contracts have been let to Heidelberg Stadtwerke (A.G.) and various engineering consultancy firms. In the contracts, detailed lists of energy saving measures with technical standards are specified such as reducing electricity consumption for ventilation and lighting, installing the latest technology in swimming pools and optimising the regulation of heating systems. Other measures

have to be considered according to the type and use of the buildings. Also the training of the City of Heidelberg staff has been included. The payment of the contractor depends upon the energy savings made in a savings ratio with the contractor receiving 80% of the energy-savings made during the contract period.

A wide variety of projects have been undertaken in close cooperation with the public utility (Stadwerke Heidelberg A.G.). The implementation of these measures is essentially in the hands of the City's Bureau of the Environment and since 1997 in the hands of the local energy agency (KLiBA), which was established with help from the E.U.'s SAVE programme. The intention was to give energy saving and energy efficiency in the city a further stimulus and in this it appears to have been successful.

## ACTION UNDERTAKEN

Heidelberg took innovative action to promote and implement elements of its climate protection programme in its concession policy as early as 1995, and in this it anticipated the need for tools under a liberalised market.

In Germany the municipalities let concessions to energy companies (in the case of Heidelberg: the Stadtwerke) to distribute energy (electricity, gas and heat) within the municipality and in particular to install equipment (pipes, wires) on public land. As it is possible to include conditions, Heidelberg took advantage of this possibility to implement the municipal environmental policy when the normal ten-year contract had to be extended in 1995. The City was able to negotiate conditions relating to:

- Cooperation on energy and climate protection projects: e.g. E-teams,
- Work towards achieving a goal of a 20% reduction of CO<sub>2</sub> emissions by 2005,
- Development of co-generation applications,
- Requiring that at least 5% of the electricity supplied should be from renewable sources by 2005,
- The establishment of an energy service company,
- Introduction of Least-Cost-Planning procedures.

These benefits have been obtained by negotiation at no expense to the municipality. The amount of money that the municipality receives for the concession is regulated by the Federal law governing concession contracts (Konzessionsabgaben-Verordnung).

Besides numerous activities, promotion of solar energy, a successful subsidy programme for SME's to introduce energy management systems, and others, the realisation of the hydro electric plant at the Karlstor was a milestone in technical and promotional action. Officially inaugurated in October 1998, about 5000 households in the district of Ziegelhausen could cover their electricity needs from its production.

Within the municipal administration, the Office of Environmental protection, energy management and health promotion, coordinates all these activities. It is supported by Stadtwerke Heidelberg A.G., Heidelberg's public transport company (Heidelberger Strassen- und Bergbahn A.G: HSB), KLiBA and the City's inhabitants.

KLiBA, the local Agency for environmental protection and energy advisor, acts successfully in keeping energy-efficiency high on the Local Agenda. It acts as a consultant for questions of energy-saving and the use of renewable energy, particular in the case of rehabilitating old buildings or designing new ones. KLiBA has a membership of ten towns and villages as well as Heidelberg Savings Bank (Sparkasse Heidelberg).

To achieve a better communication with actors an "Energy Round Table" has been organised to bring together residents, non-governmental organisations, local experts, associations and businesses. This provides them with a forum identifying and implementing energy management projects, based on local cooperation and particularly concerned with energy optimisation when rehabilitating old buildings. The energy market liberalisation will certainly have an effect on the "Round Table", but precisely what effect is not yet clear.

One further item should be mentioned related to town planning and the development plan. Private law-contracts require anyone purchasing land belonging to the Heidelberg local authority to optimise heat insulation, heating system management and heating techniques and to make use of passive solar energy and waste heat in water and air; based on long-term economic and ecological regulations.

The energy ratios for heating (including hot water) must not exceed the values fixed for the urban heritage, being 50 kWh/m<sup>2</sup>a for multi-family buildings and 65 kWh/m<sup>2</sup>a for single-family houses. Besides, the results must generally remain about 30% below the thresholds set by the German Order on heat-protection for 2001.

Heidelberg will continue its climate-protection policy relying on both energy efficiency and renewable energy sources as the twin pillars of this policy. Some new projects have been implemented (such as two biogas plants, a municipal solar-powered district-heating scheme and a photovoltaic array of 300 kWp).

In spring 1997 the Town Council passed the "Heidelberg 2010 urban development plan", which defines the main policies affecting the town in the form of a Local Agenda. It is planned that developments allow the City to retain its character while remaining a social, responsible town in the future, taking care of the environment and being economically efficient.

Heidelberg has also been selected as a model-town by the research programme "Towns of the future". This programme is run by the Federal Ministry of Transport, Construction and Housing and testing future strategies for sustainable urban development as part of an experimental housing construction and urban development project.

## LESSONS LEARNED

The negotiations in 1995 to incorporate environmental matters into the next 10-year concession of Stadtwerke Heidelberg A.G. were successful. Indeed a framework has been constructed to give the municipal energy efficiency policy a structure within the planned activities. The ability to produce a major change with the conditions linked to the concession appeared to be limited. It is unlikely that Heidelberg will meet the ambitious goal of 20% reduction of the CO<sub>2</sub> emissions by 2005; there are simply too many factors outside their control. However, it is beyond doubt that the procedure in 1995 gave a stimulus to environmental activities and thus was a very positive influence: municipal and utility company thinking and behaviour were positively influenced, also having a good effect on other related activities.

This was a first step into a free energy-market. The concession contract has had to be renegotiated and extended in 2005, and this will be of even more interest. Certainly the municipality will then have built a more powerful position to achieve their goals.

Heidelberg feels that the renegotiating had already begun in 2001/2002 and is affected by the changed situation (liberalisation of the market). However any new agreement will certainly retain climate protection objectives and the intention of the municipality is to increase the objective for the share of electricity supplied by renewable sources from 5% to 10%. Indeed it is even stated that in 2003 a proportion of 25% of the electricity consumption originates from green/environmental sources.

Energy Contracting (ESCO's) will remain an important instrument. Although some measures become more difficult as an economically feasible opportunity, others remain of interest. Energy performance contracts are, however, only appropriate if the expected savings are large, so that there is the opportunity for the contractor to make a profit.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

It has been shown that the objective set in 1995 of getting a 20% reduction of CO<sub>2</sub>-emission reduction in Heidelberg by 2005 will not be reached. Taking all sectors into account, it may even be that there is an increase of 6% compared with 1987. This is mainly due to increased energy consumption by the trade and industry sector (24% increase, while domestic emissions increased by barely 1% compared with 1987).

In spite of the disappointing results, the intention of Heidelberg is to continue to play an important role and to be an example in climate protection in Germany.

However, it is felt that the national and international context is simply not sufficiently favourable, so that there are too many factors outside the City's control. General energy-market conditions must give the municipality enough counter power on that market and give them a well balanced role as a player. It is a government task to create these conditions and opportunities. It is very important that it is not the lowest price that counts, but that quality and/or getting more efficiency (in an environmental and energy-friendly sense) for the same price and/or concession-conditions. The tendering process in the liberalised market should, in this respect be legally supported, and in addition there is need to promote the tendering process as a means of focusing on energy quality and services (e.g: energy efficiency; most environmentally friendly electricity production and the like).

Municipalities are in need of stronger support through the legal framework and/or national/international regulations on energy efficiency in buildings, industry and transport if they are to be able to enlarge the effect of their energy-efficiency role and their role as the guardian of a healthy future for their inhabitants.

## FURTHER INFORMATION

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## Putting the concession for new development out to tender

## Almere (NL)

### GENERAL ASPECTS

Almere, situated in Flevoland about 20 km. east of Amsterdam, is the fastest growing city in the Netherlands. It is built on polder land reclaimed from the IJsselmeer. Originally designed as an alternative to the overcrowded urban area in and around the city of Amsterdam, the construction of this new city started in the 1960s. The population, currently 150,000, is now planned to increase to 250,000 or even 300,000.



### BACKGROUND

Almere is a fast growing city with a project-oriented municipal organisation. That means that its environmental organisation is very dynamic and a lot of initiatives have been and are being taken including on environmental matters such as energy-efficiency. The city has implemented the latest building codes (e.g. insulation) and new techniques (high efficiency boilers, heat-recovery), often before they were incorporated in the national regulations.



The site of Almere Poort

Almere was one of the first cities in the Netherlands to install a cogeneration fired district heating system in the late 1970s and early 1980s and in the 1990s it started to implement many initiatives in the field of energy-efficiency. They applied the NOVEM method for a structured approach to planning of energy saving (techniques/communication/target groups). Pilot projects for dwellings have been initiated. Energy-saving activities for municipal buildings have been implemented including investment schemes and energy management procedures.

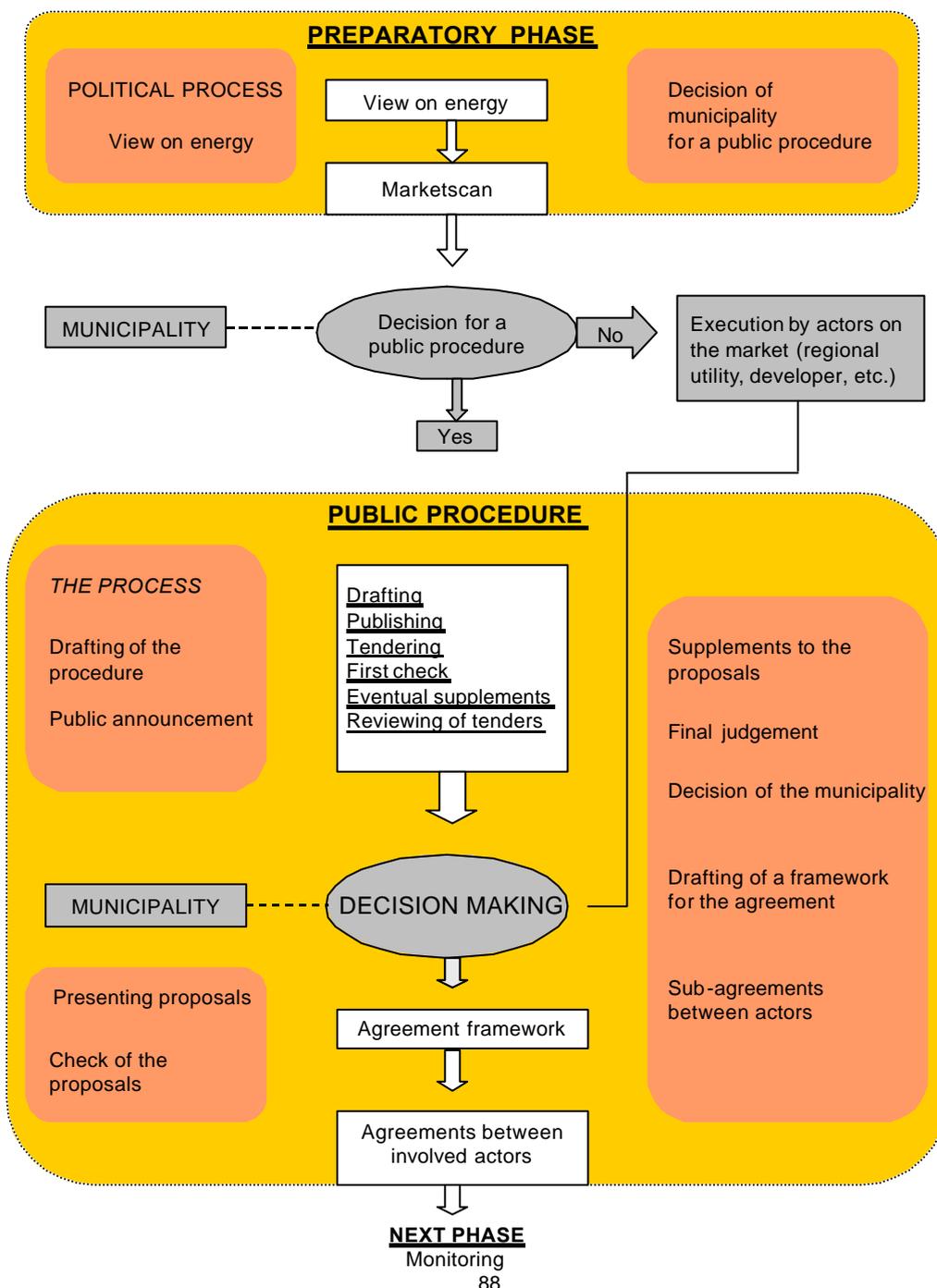
All these activities had been carried out in more or less close managerial and financial co-operation with the public utility (NUON, formerly PGEM). The liberalisation of the energy market changed that situation and the flexibility of the municipal organisation made a quick response possible.

# ACTION UNDERTAKEN

A quick response of the municipality to the new situation of a liberalised energy market was required and has been found via a new concession policy. This resulted in a new and innovative approach, unique in the Netherlands and perhaps even in Europe. For a fast expanding city the concession policy for the energy infrastructure is a most relevant matter.

Liberalisation is meant to promote a sustainable living environment, more economic efficiency and a better service. In practice it appeared to municipalities that there was no legal method to invite tenders from more than one party for a distribution service within their own territory or to impose environmental objectives on the concession holder. In 2001 a new law made it possible to introduce competition for the energy infrastructure. The municipality has been given a certain freedom to choose a company for the construction of the infrastructure based on a range of considerations and this creates the possibility of meeting their own environmental objectives.

## Innovative/creative approach of public invitation of tenders for an optimal energy-infrastructure in a liberalised market.



Almere was the first municipality in the Netherlands to follow this procedure in a tender for the energy infrastructure for the new district of Almere Poort:

If the municipality decides to implement the procedure, the BAEI 2001 decree automatically applies. (BAEI = Besluit Aanleg Energie Infrastructuur = Decree on the Construction of Energy Infrastructure).

The tendering was successful and based on quality via a so-called: "equal costs principle". This allowed the municipality to use quality (including energy efficiency and electricity generation sources) as the determining factor rather than the lowest price.

The "equal costs principle" means that the price is equal to what it would be in the case of normal current practice. Competition is then focused on environmental quality matters. The result was excellent and a successful vindication of the municipal environmental policy: a heat distribution system and electric power supply with energy sources that are 63% of green origin with, amongst other features, the use of a bio-mass co-generation plant. The total reduction of CO<sub>2</sub> emissions will even be as high as 90%, based on a planned district of 25.000 inhabitants.

## BAEI

Up until 1998, public utilities had to have a concession to allow them to supply energy to a local area or region. This concession was granted by the municipality and gave the right to construct, to manage and to supply energy.

Under the new energy laws introduced in 1998, it is stipulated that competition is required in production and supply. This is only possible with free access to the grid. To achieve this the traditional utilities restructured the grid into separate, independent companies and municipalities no longer granted concessions. Under the new law the construction and management of electrical grids is the exclusive right of so-called regional grid-managers, assigned for the country by the Minister of Economic Affairs. As far as gas is concerned: the grid-manager has not got an exclusive right to construct grids, but again the management is an exclusive right for the appointed grid management organisation. The DTE (Dienst uitvoering en Toezicht Energie: public body for the execution and supervision on energy matters) is responsible for a correct application of the law regarding the conditions and tariffs handled by the grid-managers.

The BAEI gives municipalities the possibility to go out to public tender and so to provides an exception to the exclusive right of the regional grid-management organisations. BAEI is an essential support to enable the municipality to achieve sustainable objectives during the construction of the energy infrastructure in areas of new development. When a municipality says "yes" to the procedure, they automatically have to follow the BAEI. Amongst other matters, it is stated in the BAEI:

- *"The importance of energy-saving and a more sustainable provision should be of first priority in the drafting of the criteria for the public tendering procedure (general specifications) as well as the evaluation of the tenders."*
- The tenders must indicate how the specified criteria are to be met.
- There is no "heat law" like the electricity and gas law concerning the construction and exploitation of grids for the transport of heat is, so that their management is, up till now, free and there is no obligation to separate grid management and supply.
- In principle the municipality has no task other than implementing the BAEI. However, the DTE does not supervise the specifications and tariffs for heat distribution and supply, which means that the municipality has a responsibility to protect the consumer interest.
- The essential feature of the BAEI is that it is an exception, specifically identified in the legislation, to the rule that electrical grids are managed by regional grid-management organisations. If the public-procedure of the BAEI is followed, the electrical grid, the gas grid and/or the heat distribution grid may be constructed and managed by another body: the body which has won the public procedure. The BAEI has a legal basis in the electricity and gas law. The objective of the BAEI is to enable a municipality to achieve a higher energy-efficiency target by introducing competition.

If a municipality wants to achieve higher environmental objectives via the BAEI, the following conditions must be met:

- A proposal must concern more than 500 dwellings or 25.000m<sup>2</sup> of "utility" buildings (one dwelling is equivalent to 50m<sup>2</sup> "utility" building surface),
- It must concern new buildings or renovation,

- It must concern an integrated energy infrastructure (electricity and gas/heat).

In this case the municipality has the obligation to prepare a report comparing the impact of following a public procedure for integrated energy supply with the alternative of leaving the construction and management of the electrical grid to the traditional grid - manager.

## LESSONS LEARNED

The procedure has led to a successful implementation of the environmental policy for the new Almere-Poort development by taking advantage of a liberalised market. However, it appeared that careful legal support (BAEI) is sometimes necessary to obtain full benefit. In addition, even if the municipality agrees to use the procedure, all sorts of legal precautions are necessary to guarantee its proper implementation. There was no experience with the application of the BAEI available to Almere, and this had, of course, some implications. The regional grid-manager started a successful legal procedure to restart the tender process, arguing that the publication of the procedure had not been done in the correct way. But in the end the result conformed with the intentions of the BAEI legislation.

Variants on such a procedure could be of interest to other countries. Other legal procedures might be used – for instance in the UK and a number of other countries the provision of infrastructure on large developments is normally carried out by the developer and governed by planning conditions, only being transferred to the utility at a later date. This might give scope for introducing environmental conditions. In France the network is normally installed by, and is the property of, the municipality and so conditions could be imposed on its provision.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

A free market does not automatically lead to optimal situations. If the lowest price is the objective this is usually achieved at a cost in quality, especially regarding environmental matters.

With the liberalisation of the market there is not automatically a new balance on the market with certain, generally accepted, minimum quality levels and codes. So the liberalisation process must be carefully guided by instruments (like the BAEI) to enable local authorities to meet their objectives and to protect the consumer interest. Such instruments can only be introduced by national government.

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# Municipal energy planning

# Apeldoorn (NL)

## GENERAL ASPECTS

The city of Apeldoorn (pop. 153 000) is the 10th city of the Netherlands and lies in the sandy area of Veluwe in the centre of the country. The city's 61,750 dwellings will increase by 10% under current development proposals.



## BACKGROUND

In 1997 the city of Apeldoorn agreed on a memorandum "Apeldoorn Develops Sustainable, Adaptable and Flexible (DAF)". The DAF-memorandum uses the Ecopolis strategy as a framework: the principle of the sustainable city. The end goal is highly ambitious: a CO<sub>2</sub> neutral city, and it is hoping to fund this from the Gelderland Municipal Development Policy Fund. Sustainability has to be achieved in an integral and interdisciplinary manner both in the existing city and in three new development areas to the east of Apeldoorn whose development started in 2000-1.

An essential element in the action in Apeldoorn has been cooperation with the energy company, NUON. This was created as a result of a merger between four regional energy companies and a number of acquisitions. NUON, as a multinational, is well positioned in the market for the distribution of energy and water and related products and services. In Apeldoorn NUON is responsible for distribution, purchase and supply while the local electricity grid is managed by a separate subsidiary: CONTINUON.

## ACTION UNDERTAKEN

The first development area is Groot Zonnehoeve, a semi-rural area in which 1200 dwellings will be built between 2000 and 2003. In the master plan profitable sustainable energy sources, especially biogas, are given much attention. The Energy Performance Ratio to be used will be 0.8. That is a 20% improvement compared to the national standard. The second area is Zuidbroek, a typical urban extension on which 5000 dwellings will be built between 2001 and 2010. Again, utilisation of RES is a major consideration.

These areas are being developed on sustainable lines and their locations have been identified using the Dutch Government's Energy Performance on Location (EPL) tool, designed to minimise the use of fossil energy. Energy infrastructure has been optimised through a NOVEM funded study.

The third area is a commercial and industrial estate of 97 ha called the Ecofactorij which is being developed on ecological and sustainable lines. The objective is to use no fossil fuels at all. The municipality has drafted

a quality plan and a estate management model in order to achieve this. The quality plan consists of three elements and covers nine themes including energy.

The three elements are:

- The **Basic Plan** including those measures for which the community takes responsibility, like energy infrastructure and traffic management,
- The **Location Conditions** element indicates what prerequisites must be met by businesses to be allowed to locate in the Ecofactorij, including the obligation to use sustainable energy,
- The **Additional Considerations** element includes sustainable measures relating to products and process innovation that are not compulsory, but which will yield 'eco-points' to the companies, entitling them to discounts on the price of the land.

Plans designed to create an autonomous energy supply include wind energy from wind turbines, biogas from gasification (and possibly methanisation) of biomass, incineration of poultry litter, and Winnerway. Winnerway is technique by which heat is recovered from asphalt; the road surface functioning as a solar collector<sup>7</sup>. At the moment the city is analysing the demand side - the energy produced should be used to supply part of the (new) residential areas as well - the feasibility of the supply side and the realisation of a hybrid energy system.

An agreement known as a "covenant" has been signed by the city, the energy company NUON, the waste recycling company VAR, the TNO research centre and the centre for gas technology GASTEC in order to implement the targets concerning renewable energy. However liberalisation has limited the direct interest of the energy company in this covenant and it is now taking a less active role. For instance it is not possible to obtain an estimate of the energy use in the city since the Energy Company (NUON) is not willing to provide this information. Unlike cities such as Rotterdam, Apeldoorn does not have shares in the Energy Company serving its area and so is not able to force the issue.

## Energy Purchase

The objective is to purchase 100% renewable electricity within the boundaries of Apeldoorn by 2020, and as a start the City itself has entered into a combined tendering system with neighbouring Arnhem, and obtained a very competitive supply from NUON, part of which is from green sources. Nevertheless this has not been without its problems. There have been disputes with the distributor about the unit to be used for tendering – NUON considering the public lighting, traffic signals and water pumping stations to be small contracts below the limit and therefore captive, and the municipality argued that they were large enough as a single unit to exceed the 2MW limit. In the end it was agreed by the regulator, the Department of Execution and Supervision, that the use of energy in the building overseeing the management of these services could be considered together, so putting them all over the 2MW limit.

## Energy Services and Awareness Raising

The municipality and NUON both participated in the Apeldoorn Energy Agency (EAA). EAA was founded in 1997 with help of the European SAVE programme in order to carry out part of the energy policy plan of the city. This energy policy was developed in the years 1992-1997 in the framework of the GEA.

Two important starting points were defined:

- Internal consistency - meaning that all policy decisions should be checked for their effects on environmental issues, of which energy is one,
- Harmonizing the activities with the activities of the utility companies. The energy saving objectives were calculated as 23 % of the energy consumption of the year 1990, or 92.5 million m<sup>3</sup> natural gas equivalents<sup>8</sup>, to be reached by the year 2000. If the municipality succeeded is unknown, since no monitoring of the energy plan or energy use took place.

The energy agency carried out a programme of awareness raising including a special programme in schools copied from their partner agency, Heidelberg. The Agency, however, was abandoned in 2001 and replaced by KID, the knowledge and information centre on sustainability based on the ashes of the former agency.

<sup>7</sup> The piping system underneath the asphalt abstracts heat from the road. That cools the surface and prevents rutting. In the winter, the road surface is warmed up with help of the same piping system and the heat that was stored in an aquifer. This makes it unnecessary to spread salt when it is snowing or freezing.

<sup>8</sup> This is the total amount of savings on natural gas and electricity expressed in their energetic equivalents of natural gas.

A sophisticated building management system was already in existence covering public schools and sports accommodation. It was planned to extend this as part of the nationally agreed sustainable development plan (former GEA) but it was then decided that the existing system was not working and the whole procedure was outsourced.

The municipal energy plan identifies four targets: the existing housing stock, new housing, new living and working areas and public lighting. Work has already been completed to promote energy saving among owner occupiers and to renovate the public lighting stock. Work is currently under way to promote higher energy efficiency standards of 0.8 EPS in new build housing and to optimise the energy supply infrastructure in these areas. The main problem with this is that the municipality has no real power to impose these higher standards. Other proposals to work with private housing organisations and institutional housing have not yet been able to proceed due to a lack of interest among the housing corporations and institutional investors. This is because this represents a major outlay for them to save money which they do not recoup themselves in lower expenditure. Another interesting regulation will require 70-80% of new housing to be oriented to obtain the maximum natural solar gain.

NUON has contributed to energy saving itself in the past. It financed energy efficiency and awareness raising under the MAP programme until recently, including support for insulation measures, solar thermal panels, heat pumps, heat recovery, efficient lighting and other projects. At present NUON has developed a new approach for businesses: Efficient Energy management (E2) which provides companies with frequent information concerning their energy use and possible avenues for reducing it.

NUON has renewable energy high on the agenda. The company aims to achieve 10% renewable energy in its supply by 2010, ten years ahead of the government target of 2020. NUON is involved in wind power, solar thermal energy, photovoltaic solar energy, bio-energy and hydropower projects. A proportion of 5 % of all energy sold by NUON originated from RES in 2000.

## District Heating

In the past, various proposals to develop a district heating system had come to naught since the experience of central heat distribution systems in single building complexes had not been good. However the city would now like to establish a District heating system in the Ecofactorij development using a closed concession for an energy production and supply system within the area. In addition there would be a biogas supply system to replace natural gas within this area. This is currently under discussion – a CHP unit based on poultry manure is planned with biogas produced from organic waste. However the fiscal system in Germany is much more favourable and it is possible that the system will not be set up in the Netherlands at all.

# LESSONS LEARNED

Apeldoorn's initial plan was admirable with a magnificent objective of a complete adaptation of their energy economy. However Apeldoorn's relationships with its energy distributor have proved difficult to maintain over the transition from monopoly service provider to energy trader and this has clearly had an effect. Cooperative working has become more difficult and it has become more difficult to rely on investment from the company. The buck has passed to the local authority, but it is difficult to work without the support of the utility. In effect the local authority have moved from being partners to being adversaries – while the local authority now has to try to get the best deal possible and may go to other suppliers. The utility has tried unsuccessfully to maintain the municipality's dependent role as long as possible but has not succeeded – not the best context for cooperation. Nevertheless cooperation is taking place and is continuing – but clearly not at the same intensity as beforehand.

Apeldoorn had put fine policies in place to promote sustainable development in the new urban extensions planned under the Vinex programme. However as these start, the rigidity of VINEX is being softened by a new government of a different complexion, with talk of more lower density individual plots and greater freedom of choice. It remains to be seen how many of the other policies – light rail, sustainable local concessions, etc. will be maintained.

The loss of the energy agency is particularly worrying since it is clear that the local authority itself is not sure that it can maintain the commitment to sustainable policy over a continued period of time. The policy towards energy companies in the Netherlands has been one of building a national champion that will succeed in a global marketplace. Such organisations do not have local considerations to the fore and succeed on a

contractual and sales mentality rather than a service mentality. Therefore public service in energy efficiency will fall to the local authority or other levels of government, and if these cannot maintain commitment, the situation will gradually get worse.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

Government must not fall into the trap to think of liberalisation as a free for all. In a liberalised market one needs more support for policies which regulate the free market, not less. A number of financial supports for sustainable local policies have been lifted (e.g. the MAP programme) and have been replaced by the Climate Covenant system. This is based on voluntary cooperation between the local authority and the government. There is need to provide sufficient funding under the Climate Covenant Programme for an active programme of promotion of renewables and energy efficiency if the Government is to hope for any long term improvement in their emissions performance.

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## Partnership with utilities and the impact of liberalisation

## Utrecht (NL)

### GENERAL ASPECTS

The historic city of Utrecht (pop. 240 000) is the fourth city of the Netherlands and forms a part of the ring of settlements known as the Randstad. It is a commercial and administrative centre and a provincial capital in the centre of the country.



### BACKGROUND

Utrecht has been chosen as the location of the largest urban extension in the Netherlands, Leidsche Rijn, identified under the VINEX-location<sup>9</sup> policy of the national government. This development straddled the boundary between two municipalities, Utrecht and Vleuten-De Meern (pop. 20,000) which merged in January 2001. In total 30.000 dwellings will be constructed in this area by 2015 increasing the total population of the combined community to ca. 350.000. Only a relatively small proportion of the population (38 %) live in owner occupied houses, the largest share (49 %) being rented through housing corporations which therefore are very significant players in promoting energy efficiency.

### ACTION UNDERTAKEN

The energy utility company ENECO/REMU is becoming much more commercially minded as a result of the liberalisation of the energy market. The former local authority shareholders were the Province of Utrecht, the city of Utrecht and the city of Amersfoort. The Province and the city of Amersfoort sold their shares at the start of liberalisation, with Utrecht holding out for a bit longer. This was a real dilemma, since selling its 35% share may make economic sense if the dividends of the shares decrease as a result of liberalisation. However keeping the shares would safeguard the influence of the city with regard to grid management and protection of small consumers.

The City's administration summed up the items that need special attention in the new relationship between Utrecht and its energy company:

- Agreements concerning energy infrastructure have to be checked and redrafted, e.g. who will pay for adaptations and extensions. ENECO/REMU had not previously paid a local "precario" tax for installations on public ground,

<sup>9</sup> VINEX-locations are chosen by the national authority. The municipality gets an implementation contract.

- There is need for provisions to secure access to data concerning energy consumption without extra costs,
- This is of importance if the monitoring of CO<sub>2</sub> emissions becomes the task of the municipality. In particular the municipality needs data concerning the energy flows to its own buildings,
- Access to customers is useful for the delivery of environmental messages and suchlike. Therefore some kind of agreement has to be reached in this area,
- The municipality could use its influence to press ENECO/REMU to establish an environmental fund from a levy on its profits to compensate the public for the impact of its commercialisation,
- Part of the dividends received by the municipality could be reserved to finance energy efficiency measures and RES,
- As for the Climate Covenant, the municipality has not decided yet which actions it will sign for. The ultimate choice depends on what the national authority offers to finance and wants to support. Negotiations are still ongoing.

#### The energy company: ENECO/REMU

ENECO/REMU was formed by a merger between GEB (the Municipal Energy Company) and PUEM (Utrecht Province Electricity Company) in the early nineties. Later it merged with GCN, the company that provided gas to the Province of Utrecht with exception of the city of Utrecht.

Under the influence of the liberalisation of the energy market ENECO/REMU has made the switch from a utility to a commercial company. In accord with the unbundling legislation, it was separated into ENBU, that manages the grid and transport, and ENECO/REMU which covers purchase and sale. However, customers still get one contract and one invoice.

ENECO/REMU has half a million electricity clients, 364,000 gas clients and 38,000 district heating clients. There are 1500 employees at present and the annual turnover is about 636 million euro.

#### The FACE partnership

The municipality and ENECO/REMU worked together in a partnership called FACE to provide a joint platform for promoting projects to promote energy efficiency and renewable energy. In addition the municipality and ENECO/REMU have set up their own projects. After liberalisation FACE slowly disappeared.

The majority of these projects are identified in the energy plan drafted in 1988 and which started to be implemented in 1991. The energy plan was developed in the framework of the GEA. The target identified was a reduction of 25 % on the gas consumption in 1986. In 1995 the energy plan was updated and the FACE programme was set up. The approach chosen was mainly to centre on co-ordination and operate via the activities of third (market) parties.

The programme of projects included:

- Thermieplus® - Improvements to the existing housing stock including energy efficiency measures and solar thermal panels (now completed). A follow up programme, IDE, is planned for the social housing sector. Government support via the MAP programme has now ceased. The central government subsidy for energy efficiency measures for housing, energy efficient white goods and renewables (PV) now takes place through the REP (Regulation Energy Premium), which is administered by the utility. The municipality will have to pick up the tab for the other projects that were previously performed in the framework of MAP.
- Gas conversion  
A programme designed to convert oil fired installations in public schools to gas (now completed).
- A three phase municipal buildings programme:  
The first Phase (1996-1999) was directed towards changing behaviour by means of an awareness campaign, supported by the monitoring of energy use in the buildings. In phase II (1998-2001) this energy monitoring formed the foundation for the introduction of energy management. Energy management contains systematic registration, assessment and monitoring of energy flows. In Phase III (2001- ), technical measures will be implemented. This is facilitated by an investment programme based on the lessons learned during these programmes of awareness raising, monitoring and management. When implementing the three phase approach, it is reasonable to expect an energy saving of twenty five to thirty percent, compared to the historic energy use of the buildings. An important feature of this approach is budget-neutral funding. In 1999 savings of 350,000 kWh (3 %) and 274,000 m<sup>3</sup> natural gas (10,8 %) were achieved.

- Environmental vignettes  
A programme targeted at the hotel and catering industry.
- District heating improvements  
A programme of improvements, including heat and cold storage, implemented by ENECO/REMU and funded under the MAP programme.
- Regulating new development on municipal land  
The municipality partly gives land in hereditary tenure (long lease) and partly sells land. The municipality can only impose conditions on the project developer when it actually owns the land. A new tool has been devised for this, called Integral Living Quality. This includes the National package on sustainable building<sup>10</sup>, energy, safety and accessibility. Use is also made of the Government tool, Energy Performance on Location to assess the overall energy performance of a location.
- Awareness raising programmes  
A programme targeted at the general public via monitoring, communication, publicity and networking. This includes a programme of environmental advice for SME's as part of a job creation programme and DREES, a self administered programme to develop environmental advice for homes for the aged. The local authority already has a monitoring role over SME's via the energy element in the environmental permit process which it administers.
- A zero energy house and information centre has been constructed as part of the Leidsche Rijn project.

ENECO/REMU participates in development projects for renewable energy, e.g. the Sunpower project which is promoting integrated solar energy for 500 houses (1 MW-project), and supplies energy efficient installations like CHP and heat pumps. Likewise one swimming pool has already had a solar installation installed and others are in the pipeline when renewals become due.

For two years now, ENECO/REMU has offered green electricity in its range of products. Taking the exemption of REB (Regulating Energy Tax) into account, this costs the small consumer 0.009 Euro per kWh extra. The company is negotiating with municipalities for the construction of wind turbines and has plans to build a biomass installation fuelled by waste wood.

Energy efficiency and awareness were until recently financed by the MAP programme. The main measures financed are double-glazing and insulation for residential customers<sup>11</sup> and efficient lighting systems for businesses. A part of the MAP money is reserved for financing green labels. In January 2000 the MAP programme related to customers was terminated.

Subsidies for energy efficiency measures for housing, energy efficient white goods and renewables (PV) now take place through the REP (Regulation Energy Premium). REP is a financial instrument of the national Economic Affairs Department, for which ENECO/REMU is a mere service hatch.

## Energy purchasing

The local authority has searched for renewable electricity in its supplies for two buildings and when the lighting/traffic signals contract went out to tender. The reduction of CO<sub>2</sub> emissions by careful choice of origin formed a consideration in the appraisal of tenders.

For the energy supply of the largest buildings and the public lighting, a tender has been issued and a contract awarded of about 36 GJh/year to ENECO/REMU with requirements of CO<sub>2</sub> reduction.

## Concessions

There is no concession since Utrecht was shareholder in the utility. However for new developments the possibility has arisen to issue a tender to install and manage the distribution network. A general measure of rule called BAEI has been issued that gives municipalities the possibility to choose a prescribed public procedure to grant the construction new energy infrastructure. This procedure enables the municipality to impose conditions relating to energy efficiency and renewables.

<sup>10</sup> National package on nationally standardized sustainable measures and materials.

<sup>11</sup> Consumers are divided into customers or small users and business clients.

## LESSONS LEARNED

In the recent past energy-saving plans and action have been designed and implemented in close relationship with the utility-firm (REMU, now ENECO). With the liberalisation of the energy-market this relationship is slowly being reduced, if not stopped. This is limiting the opportunities for carrying out a broad range of action on energy-saving at local level. Financing is an especial problem. However, in Utrecht, there was a unique financing system for the energy planning of their buildings (which consists of a three phase approach: awareness raising, energy-management and an investment programme). The system was based on a reduction of energy budgets for several municipal departments and was used to finance the energy-saving activities. It is regrettable that now, under the heavy pressure of the need to cut down on municipal expenditure, even these budgets are in danger. Probably the budget will be reduced by one third in 2004.

The local authority will be more and more responsible for energy efficiency in general terms and for the continuation of innovative programmes. There are however limits to the financial resources of the municipality and help will be required. In the Dutch situation it is not possible to impose regulations at a municipal level. However, some possibilities remain in the interpretation of national regulations through the local authority role as an inspector. Furthermore some extra benefits can be achieved in negotiation with the relevant actors on a voluntary basis.

There has also been progress and initiatives relating to the purchase of energy where the local authority can set requirements for the most environmentally friendly production of this energy (in particular relating to limits to CO<sub>2</sub> emissions). However to be able to continue the intensive energy-saving policy, new methods and resources must be found.

## IMPLICATIONS FOR GOVERNMENT POLICY MAKERS

Utrecht is a municipality in the forefront of promoting sustainability. However its room for manoeuvre has been severely trimmed, resulting in a cut back in its programme. The key question is whether appropriate funding will be available to maintain innovative action. The Government is now offering a new programme, the Climate Covenant, via Novem, but co-financing is a major problem. Furthermore internal politics play a role. There is jockeying for the position of the department in charge which affects the positioning of the municipality. This problem of resources has to be resolved if local authorities are to take on the role offered them in sufficient number.

Access to data is a vital resource for local authorities. Under a monopoly, publicly owned system there was no problem for the utility in providing data to other public sector bodies. Now such data has commercial value and is seen as a vital asset in a competitive market. In particular there is value to the local authority in data broken down into target groups since this is a vital resource for the design of energy efficiency programmes. This is now almost impossible to obtain from utilities competing in the market place. Freedom of information at this level can only be imposed by regulation.

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# Spatial Planning for Sustainability

# Vlissingen - Flushing (NL)

## GENERAL ASPECTS

Vlissingen is a small city, in a beautiful location at the mouth of the river Scheldt, the main entrance from the North Sea to the port of Antwerp.

The City has about 45 000 inhabitants (or 90 000 in the built up area including its twin-city Middelburg). It has a historic centre, nice beaches with a promenade, an old historic shipyard, an old harbour, a new container harbour in development and a large industrial area to the east of the City.



## BACKGROUND

At the beginning of the nineties Vlissingen started an ambitious energy-saving plan, following the procedure developed by NOVEM. There was a "loose" cooperation with the twin-city Middelburg, while the cooperation with the utility company was very close.

The energy-saving policy was directed towards:

- Public lighting,
- Sustainable and energy-saving measures for new housing,
- Application of solar-energy,
- Participation in European projects,
- Awareness raising projects directed at key players, and in particular towards the relevant public servants.

In 1994/1995 an energy-management system was introduced for municipal buildings and schools (25 sites).

## ACTION UNDERTAKEN

The City is now coping with the challenge of building a prosperous future under sustainable conditions. Recreation and tourism is a principal objective, the main challenge is to create a strong and competitive city and strengthen its economic and social position.

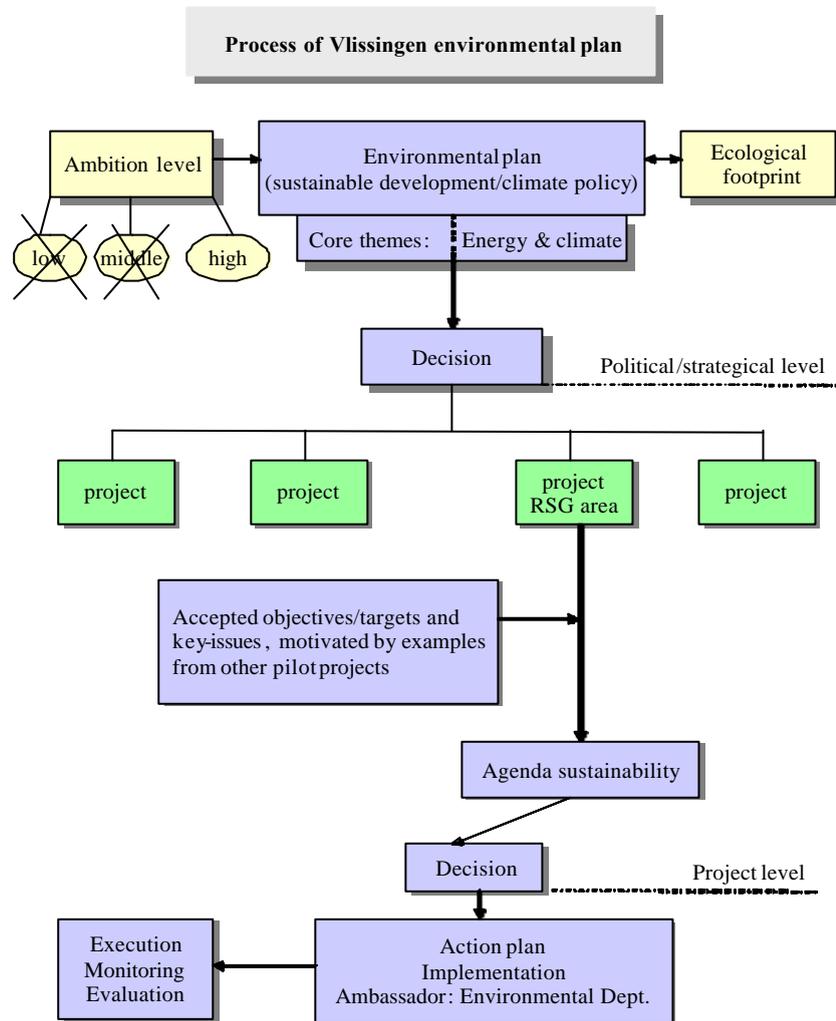
Intensive action has already been carried out in a new housing area of about 300 dwellings, to promote solar-energy and to support the energy-management system by awareness raising.

A consortium has been formed to purchase energy together with eighteen other "Zeeuwse" municipalities. This has enabled them to obtain a supply from the utility company that is guaranteed to be 100% green electricity but without any price increase.

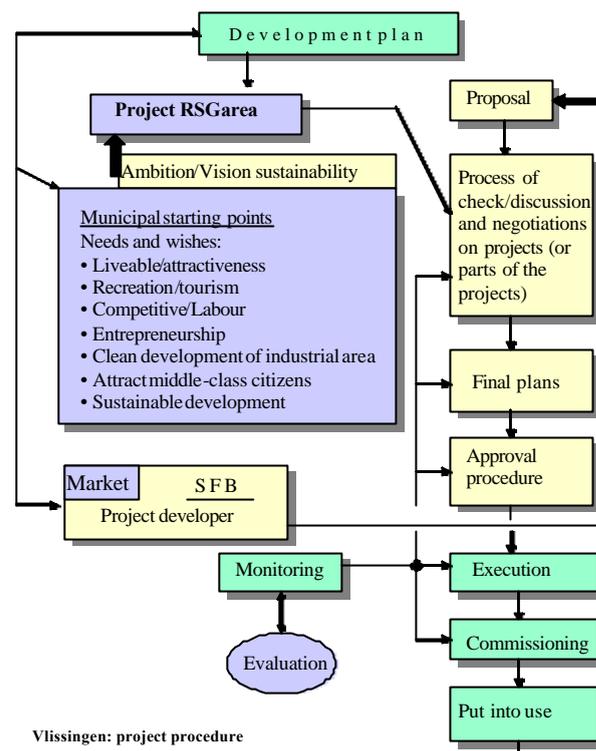
This competitive purchase demonstrates the change in the situation following liberalisation. Cooperation with the utility company in Vlissingen is loosening and slowly disappearing.

However the problems facing the municipality do not go away because liberalisation has been imposed on it. The City is facing a big challenge: a large industrial area, the former RSG (Royal Scheldt Group) shipyard: (44 ha/26 ha net) will be developed and connected to the centre of the city. The City is responsible for getting possession and developing this area with about 1100 dwellings and wants to upgrade the centre and the rest of the city to create a showpiece of sustainable development. The ecological footprint should not be increased and, if possible, should be reduced. Also the industrial area (“Sloegebied”) nearby should also be developed to suitable standards regarding safety and noise. This was a great responsibility for the municipality.

The reaction of the municipality has been to design a new sustainability policy with the use of the NOVEM methodology. A report on this “Climate Policy” will be forwarded to the council in December 2003. The management process for preparing this environmental plan is outlined in the diagram underneath.



The plan is comprehensive and included transport issues for instance proposing to link up the cycle path network and to enforce a more stringent parking and location policy. Public transport will be improved. The future development of the City has very much centred on promoting environmental plans and/or energy-saving measures relating to CO<sub>2</sub> emissions. The RSG area will play the most important role in this and will also set off other municipal activities.



In order to come to some initial conclusions, the City's needs have to be related, through the plans of the project developer, to the potential techniques available on the market. These concepts have to be developed up into final proposals. Consulting/communication with direct and indirect players constitutes an important role in that procedure.

The newly designed neighbourhood will have its own identity and at the same time deliver a contribution to a positive image of the whole City. A fixed starting point is the fact that Vlissingen is, and wants to present itself as, a maritime City. In the new scheme a procedure for developing new projects has been worked out:

The acquisition costs and the site preparation costs determine the costs of the ground and this is the main factor determining whether it is possible to achieve an attractive plan in line with the municipality's high ambitions.

The action plan has the following basic objectives:

- Vlissingen is and wants to present itself as a maritime city,
- The ambition level must be high,
- The ecological footprint must at least not be increased.

## LESSONS LEARNED

The municipality faces a lot of challenges. The liberalisation of the energy-market makes it more difficult to solve the problems and increases the effort needed. This is even more complicated because a small city like Vlissingen only has limited possibilities, due to its organisational infrastructure.

Action is necessary and the municipality takes its own responsibility in drafting a new plan to face the new reality. However the financial uncertainties are great and in the future any sustainable policy is likely to come under pressure. The municipality holds on to its role in management and will have to develop and maintain a strong position in the negotiations while encouraging cooperation with the players on the market to achieve positive results.

Vlissingen is studying several possibilities for obtaining financial support (on Provincial and National level). NOVEM can make a contribution to energy-saving policy via funds provided to support the new Climate Covenant, but... the uncertainties for 2004 persist.

## IMPLICATIONS FOR GOVERNMENT POLICY MAKERS

Government must realise that, at least in the short term, liberalisation complicates the situation for municipalities promoting sustainable policies on both an organisational and a financial level.

The Climate Covenant (a voluntary cooperation between the government, provinces and local authorities) gives a partial response to this problem by providing financial support for implementing projects designed to reduce CO<sub>2</sub> emissions. However uncertainties remain for the time being at local level.

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# Sweden

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# Sustainable renovation

# Kalmar (SE)

## GENERAL ASPECTS

Kalmar is a regional centre in Småland in southeast Sweden with 35000 inhabitants and 60 000 in the municipal district.

Kalmar, formerly powerful, was a member of the Hanseatic League in the 1200s and is full of historic monuments. However its isolated location centred on the sea caused relative decline until the 1990s when Kalmar started to thrive again with a new university and its strategic location on the Baltic Sea, a new focus of interchange within the EU.



## BACKGROUND

A long-term programme of work is in progress in Kalmar designed to improve environmental conditions and sustainability within the region. The Mayor of Kalmar announced his vision of a sustainable democratic society, based on cooperation, environmentally sound policies, equality and integration.

Energy efficiency and renewable energy is a integral part of this vision.

## ACTION UNDERTAKEN

During the last 30 years a municipal district heating network has gradually been developed and today covers most of the city area. In the beginning the heat was mainly produced by a number of small oil-burning units but today most of the production comes from the central district heating plant which uses different kinds of biofuel.



A large solar thermal panel on the roof of Lars Kaggskolan

The heating plant also recovers energy from treated sewage effluent. This is transported from the sewage treatment plant to the district heating plant where energy is recovered with a heat pump. This energy is then used both for district heating and cooling.

Furthermore, the municipality gives residents allowances of 25% of the total investment costs when they exchange oil boilers for more environmentally friendly wood burning stoves or boilers. The money for these allowances comes from a 65 000 euro grant from the Swedish government to the municipality.

Kalmar does not have a local energy company but owns a 50% share in Graninge Kalmar Energi Holding AB, which is the parent company of a group of companies with operations in southeastern Sweden around Kalmar. The group concentrates on energy distribution and district heating.

### Saving energy when renovating a school

Lars Kaggskolan in Kalmar has recently been renovated on sustainable lines at a cost of 8 million euro and is now one of the most environmentally friendly schools in Sweden. The Swedish Government contributed a grant of 800 000 euro. The design of the school includes new systems for energy supply, ventilation, waste management and recovering rainwater. All together, the new techniques contribute to a 40 % reduction in energy consumption to 75 kWh/m<sup>2</sup>/year.

The main source of heating at the school is still biofuel-based district heating. However this is also complemented by a 30 kW heat pump which recovers energy from six 115 m deep boreholes.

The ventilation system is regulated to run in coordination with the heating system and this further decreases energy consumption. The system is adapted to the seasons with low flow rates in wintertime and higher rates in summer. Furthermore, the ventilation system takes account of the heat generated by the pupils in the school.

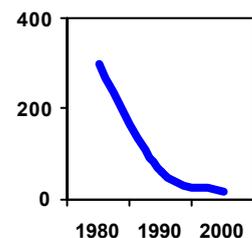
The school has a very economical lighting system that uses only 10-12W/m<sup>2</sup> instead of 25-30W/m<sup>2</sup>. It also uses a new type of windowpane which limits solar gain during the summer. Above each window on the sun shield there are also small solar cells that provide the school with some electricity. In addition, some hot water is produced by large solar panels on the roof.

The surface water is also managed by special systems. Rainwater is collected from roofs, filtered and stored in underground tanks, from which it is pumped into a piping system for the toilet flush.

### Additional projects

The municipality of Kalmar has further environmental projects in addition to those described above. For example the municipal wastewater plant includes a special biogas digester for dairy waste, meat offal and liquid manure which produces methane, used for heating and for vehicle fuel.

The local energy company, Graninge Kalmar Energy Ltd. considers sustainability as a crucial part of their business plan. They have a long tradition of environmental protection and have managed to dramatically reduce their production of carbon dioxide (right).



Special windowpanes provide for a better indoor climate during the summer. In addition, the sun shield is provided with built-in solar cells.

## LESSONS LEARNED

Kalmar demonstrates that with the will and a policy programme, liberalisation need not spell the death knell of energy efficiency activity. Kalmar has decided that its future lies in an environmentally friendly system of energy production and use. This includes both the use of renewables and also the incorporation of the latest technology in the renovation of the municipal building stock. Without a clear policy mandate it is doubtful whether this would take place.

In effect, liberalisation separates the funding for environmental motives and economic motives, so that those wishing to promote environmental improvements have to justify them to the consumer. Political motives are a major factor in promoting environmental improvements and with suitable political commitment very far reaching projects can be achieved in the existing building stock, as at Lars Kaggskolan.

## IMPLICATIONS FOR POLICY MAKERS

The assumption may be that the market does all. In fact the market is not the main player in promoting energy efficiency in a liberalised market. This may seem like a contradiction in terms, but action is really dependent on political commitment and awareness. Both were present in good measure in Kalmar. Governments can support this political commitment with funds. Liberalisation places the business responsibility on the producer and distributor. In principle this takes the onus for environmental impacts off them in return for public goods charges and taxation and puts it onto the public sector. This is a redistribution of responsibility and has major implications for the public sector. The funds coming in from the taxation side should be used to improve sustainability of our energy use, promoting an Agenda 21 approach, and this needs a political will to redistribute funds to those willing to apply this both at local and national level. This is a government responsibility. How many truly discharge it conscientiously?

## FURTHER INFORMATION

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# Fossil Fuel Free

# Kristianstad (SE)

## GENERAL ASPECTS

Kristianstad, named after the Danish king Christian IV, is a town of 35000 inhabitants in Skåne in the very south of Sweden an area formerly ruled by Denmark. The wider municipality, with a population of 75,000 covers a diverse area of forest, farmland and coast and includes many other urban areas. The area is a centre of agriculture and the food industry with considerable specialised investment in research and development.



## BACKGROUND

In 1999, the executive committee of Kristianstad Municipality unanimously decided to declare the municipality a Fossil Fuel Free Municipality. This decision was made as a part of the overall work on a district development plan as well as to fulfil the 15 environmental quality objectives, established by the Swedish Parliament.

The objective of achieving Fossil Fuel Free Municipality status is to replace all their own consumption of fossil fuels for electricity, heat and transport by renewable fuels and in tandem also strive for improved energy efficiency and lower energy consumption. The municipality also proposes to try to influence others to use renewable fuels. The local energy advisor has an important function in this latter context.

The municipality has their own energy company, C4 Energi AB, named after an emblem on King Christian's arms, which provides district heating in the central part of Kristianstad and in some other towns in the municipality. The subsidiary company, C4 Elnät AB is responsible for the electric distribution network in the settlements of Kristianstad and Åhus (Other distributors, primarily Sydkraft, service the rest of the municipality).

The reduction of fossil fuels has been achieved primarily by the use of bio-fuels. Biomass has been used for heating and the production of electricity and biogas as fuel for local buses and other vehicles. Other activities are efforts in the field of energy efficiency, community planning and changes in behaviour patterns.

## ACTION UNDERTAKEN

The municipality has developed the following important projects within their energy programme:

### Allöverket - Energy from biomass

Since the middle of the 1980's Kristianstad Energy Ltd (C4 Energy), has worked toward replacing oil and electricity by bio-fuel and developing a combined heat and power and heating plant in Kristianstad. Major parts of the city are now served by district heating and new areas are continually added.

A combined heat and power unit entirely fuelled by biofuels was established at Allöverket in 1994. This is estimated to have reduced carbon dioxide emissions in the municipality by 50,000 tonnes. Surplus biogas from the city refuse tip and from the biogas production plant is also used as a fuel in Allöverket. The bio-fuel mainly consists of forestry waste from within a 100 km radius of the plant.

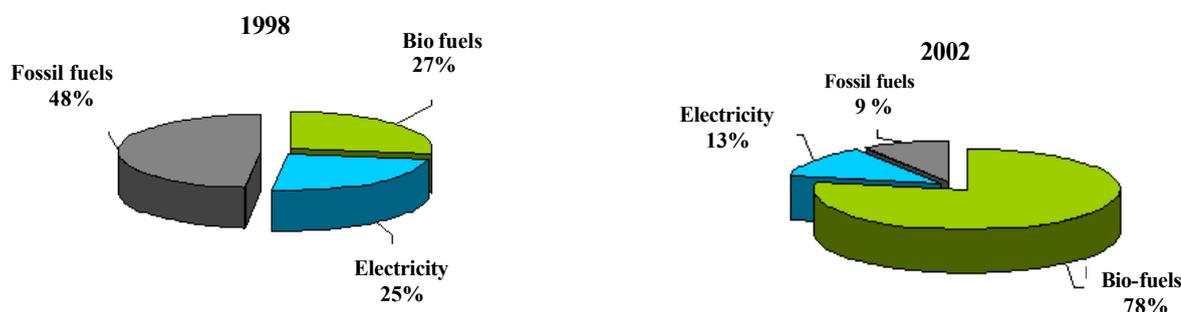


Modern and clean, Allöverket  
bio-mass fuelled CHP

In addition C4 Energi is planning to build local heating plants in the communities of Åhus, Fjälkinge, Vä and Färlöv.

### Converting heating in municipal buildings to biofuels

Heating in municipal buildings using 2500m<sup>3</sup> of oil and 7000 MWh of electricity has been converted to biofuels. This means that the emission of sulphur has been reduced by 7.1 tonnes and the emission of nitrogen has been reduced by 6.2 tonnes. An investment of 45 million SEK, (approx. €5M) was needed to carry out this conversion.



### Biogas

In 1997 the *Municipal Waste Company* established a biogas production plant in Karpalund designed to improve sustainability and energy production. The biogas is produced from organic household waste, manure from agriculture and waste from the food industry.

When the waste arrives at the plant, it is pulverised and heat-treated, then digested by bacteria and transformed to methane and carbon dioxide. Finally, the biogas is transported to the biogas delivery system and used both as a vehicle fuel and also in the district heating system. Every year Karpalund produces approximately 2 million m<sup>3</sup> gas, which is equivalent to the energy requirement for 600-800 households.

### Transport

Emissions of carbon dioxide in the transport sector continues to increase. In Kristianstad efforts are being made to introduce biogas as an alternative vehicle fuel.

From November 1999 biogas produced at the sewage treatment plant was upgraded and used as a fuel for buses and other vehicles in a joint venture with the Sydgas company. The town's public transport company, Skånetrafiken was using 22 buses fuelled by biogas by December 2002.

The municipality is also trying to encourage the public to buy cars that run on biogas. In 2002 the gas cost 2 SEK/litre, or 0.22 Euro, much cheaper than petrol. There are also some free parking places set aside for these cars in Kristianstad. In addition subsidies of 50% of the additional costs are available when buying a car fuelled with biogas.

### Energy efficiency activity

The Municipality of Kristianstad, with financial support from government, has had an energy advisor from 1998 onwards whose target is to reduce energy consumption in the residential and small business sectors. The advisor promotes the conversion of heating systems from oil to bio-fuel in households outside the district

heating area. The advisor has supervised a project in which a total 6000 m<sup>2</sup> of windows have been upgraded to make them more energy efficient. The total amount of energy thus saved is estimated to be 1490 MWh/year, including about 500 MWh/year of electricity.

The use of district heating in itself is a major source of energy efficiency. The power station uses the latest exhaust gas condensation techniques which cannot normally be adapted to biomass fuelled boilers in individual houses at acceptable cost. This measure will add about 10-12 MW to the district heating system. Thus conversion from local heating to district heating is in itself an efficiency measure. The performance is raised from about 70 % for an individual oil boiler to about 90 % overall in the district heating system and in addition electricity is produced as a by-product. They plan to increase the yield of electricity from the district heating system by installing an additional 30-40MW cogeneration boiler at the power plant in the near future.

The municipality has also promoted other programmes to save energy. Traffic signals are being progressively replaced with new equipment using light emitting diodes (LEDs), so saving over 50% of their energy consumption. There is a continuing programme of insulation of municipal buildings and a project is being carried out in conjunction with schools to reduce energy consumption by 10% by influencing energy using behaviour.

## PROJECTS

The next step in becoming a fossil free municipality is that all local transport will be fuelled with biofuels. Other efforts proposed are to stimulate citizens to heat their houses with pellets and district heating instead of oil. One way used to promote this conversion is a subsidy of approximately 30% for the additional costs of buying a new stove designed for pellets or investing in a district heating system. The government partly finances this project by a local investment program (LIP).

### Results 2002

#### Significant milestones reached during the year 2002

Description	Figures
Energy for heating sold from the power plant	270 GWh
Electricity produced in power plant	30 GWh
Number of dwellings connected to the heating system	11451
Number of houses converted to bio-pellets	259
Number of schools and other buildings converted to bio-pellets	43
Biogas production from the sewage plant, for heating	2700 MWh
Biogas production from the sewage plant, buses and cars	3500 MWh
Biogas production from the biogas production plant, for heating	23 200 MWh
Electricity from wind turbine generators	7 400 MWh
Electricity from two solar panels	11 MWh
Cycle path network	140 km
Biogas used for vehicle fuel	9000 MWh

Another challenge for the municipality will be to reduce the production of greenhouse gases within trade and industry.

## LESSONS LEARNED

The replacement of fossil fuels by renewable energy is a major challenge which appears unachievable in the real world of low fossil fuel prices and a liberalised energy market. However it is clear that local authorities can have an influence on this if an ambitious headlining-grabbing target is set and resources are applied.

The ownership of a municipal energy company is undoubtedly a help since the municipality can influence their policies. Many of the investments described in this case study were carried out by the municipal energy company within the context or in the expectation of a liberalised market. The use and expansion of a district heating system is an essential element for promoting biomass since biomass is generally much more conveniently used in communal heating systems than individual ones (even automatically fed individual units require periodic topping up). In addition this allows the introduction of CHP which improves the efficiency of primary fuel use.

Energy efficiency is however an essential adjunct of such a policy since the limited resources of renewable energy, in particular biomass, mean that the target really is unachievable unless energy efficiency is improved. Again such improvements have to be applied at local level.

This example is interesting in comparison with solarCity Linz. Kristianstad has designed a proposal to adapt and upgrade the existing infrastructure whereas solarCity Linz has promoted a utopian new settlement. There have been real achievements in Kristianstad in actually implementing effective communal energy supply with CHP which is an essential element in meeting renewable and efficiency targets. However the scope for introducing bio-climatic design, which saves energy demand, is limited when dealing with existing buildings.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

There is a real benefit in promoting the achievement of political targets via municipally owned local energy companies. One of the impacts of liberalisation is the retreat of municipalities from local energy companies. However liberalisation only affects the production and sale of electricity and gas, not the production of heat nor the distribution of all forms of network energy, which still remain monopolies. Therefore there is no particular business reason why this retreat should occur, and the control of networks at local level gives the opportunity to protect the consumer from the impact of vertical reintegration. This restructuring can clearly be seen in liberalised countries as major players attempt to regain control of access to the consumer. However most of all it gives the local authority the tools to apply its own local energy policy regarding district heating, energy efficiency and renewables.

Some countries have discouraged the sale of municipal utilities to protect local energy planning (e.g. Denmark). Others (e.g. The Netherlands) have encouraged such sales with the intention of building up large players competitive on the international stage. In fact there are two elements of the role of a local utility. Utilities may well find that they have no place in the competitive sale and production of electricity and gas and retreat to a role of supplying heat (with electricity produced as a by product and for their own use) and distributing electricity and gas. But Governments might also wish to consider whether in encouraging municipalities to sell utilities they might not be "throwing the baby out with the bathwater".

## FURTHER INFORMATION

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# City of Tomorrow

# Malmö (SE)

## GENERAL ASPECTS

Malmö is Sweden's third-largest city, with more than 265 000 inhabitants.

A former member of the Hanseatic League, Malmö has developed round its harbour. The economy is centred on investments in new technology and training programmes of high calibre. Malmö University, which opened in 1998, is Sweden's latest venture in the field of higher education, accommodating some 20 000 students.



## BACKGROUND

The first Malmö Environmental Plan was completed in 1990 and a second plan was produced in 1998. The overall objectives of the programme are to become a sustainable society. The result of the plan is, amongst other things, an expansion of the district heating system and greatly reduced emissions of sulphur oxides. However, the use of energy is still mainly based on non-renewable fuels and the emissions of carbon dioxide are considered too high.

### The Western harbour/Bo01

In 1996, the Swedish Government decided to start funding Local Investment Programmes (LIP) to promote the transition to an ecologically sustainable society in Swedish municipalities. In 2000, Malmö received funding for the transformation of Malmö into ecological sustainability, according to strategies in local "Agenda 21" and the 1998 – 2002 Environmental Plan. Their idea was to build an "ecological" district located in a harbour quarter in Malmö (The Western Harbour) that would function as inspiration on how to reach the goal of sustainability. The project won the Campaign for Take-Off Award, 2000.

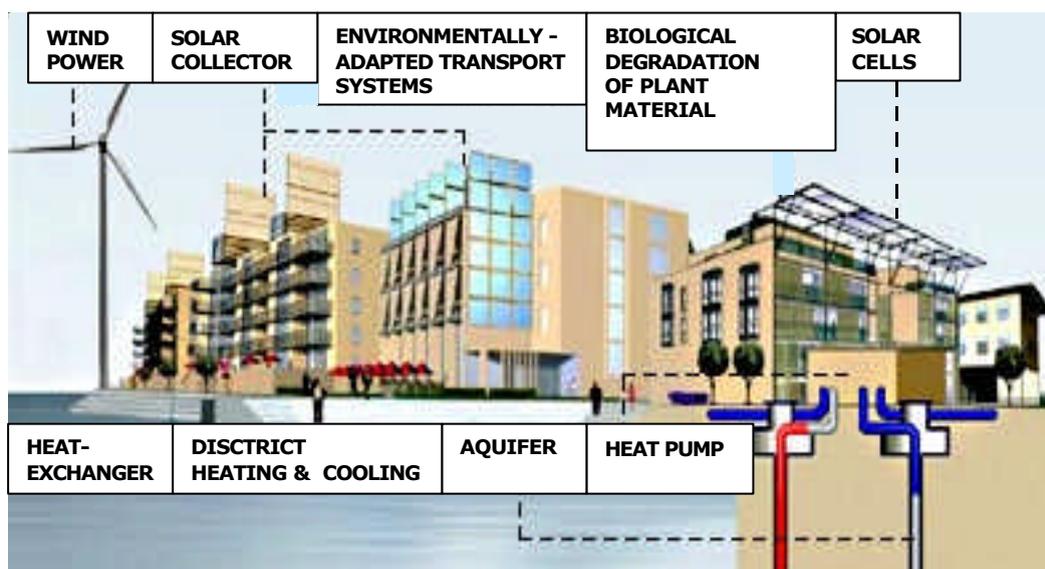
In 1997 it was also decided that this area should function as the first European Housing Exhibition, *Bo01-City of Tomorrow*. The objective of the exhibition was, as the name indicates, to define a city of the future in a sustainable society based on information and welfare.

The Western Harbour was reclaimed from the seabed in the 18th century but was abandoned and filled in as the port and industry migrated in search of space. The area is therefore old industrial land with environmental problems of contamination. However, the area has at the same time, many positive aspects in its location by the sea and the city centre.

The intention with Bo01 was to create a leading international example of an environmentally sound densely built up urban environment. Planning, building and construction follows environmental principles, incorporating innovative ideas and new techniques. A cooperative organisation, Bo01 has produced the energy plan for the Western Harbour. Members include the City of Malmö, the Housing Expo company Bo01 AB, the Swedish National Energy Administration, Lund University and Sydkraft.

Sustainable energy production and consumption is an important part of this environmental approach. The district is therefore 100% supplied with locally produced energy from renewable sources. Electricity is generated by wind power and photovoltaic solar cells. A heat pump recovers energy from sea water and accessible aquifers. Solar collectors will convert solar energy into heat. This is then transferred to the district-heating network. Bio-gas is produced from waste generated in the area, and this gas is returned to the district through the existing natural gas network of the city.

The aim is that the Bo01 area should consume only half the amount of energy used in other residential properties in Malmö. The target for energy consumption is 105 kWh per square metre a year. The buildings in the district are hence designed to minimise energy demands for heating and the electrical equipment that is installed is highly efficient. Many of the apartments also have their own electricity and district heating meters that allow residents to monitor and adjust their own energy consumption.



The new electricity grid and district heating network is linked to the existing systems of the city. This is done in order to use buffer energy, e.g. be able to bridge the time-lapse between the point of production and use of energy without the need for energy storage.

The total cost of investments in electricity and heat generation will be approximately 6,000,000 Euro of which the partners' share is 3,000,000 Euro. The Swedish government is supporting the project with 1,165,000 Euro and the EU supports it with 1,500,000 Euro.

The transport system is also environmentally sound. Bicycle and pedestrian traffic will be given priority and will constitute an attractive alternative to short journeys by car. Furthermore, the buses run on alternative fuels.

Additionally, a new facility is being built which will be used for the treatment of garbage and sludge, e.g. residual products. After treatment this can be used for heating or as a vehicle fuel.

Biological diversity is another issue that is considered in Bo01. Different types of natural area are incorporated providing areas for relaxation and recreation and reducing the desire to travel for recreation.

## FUTURE DEVELOPMENTS

At present, several major research projects are underway for following up the work on environmental adaptation. A major project for adult education is also in progress, with both European and local elements. The district will have its own special environmental television channel on Internet, [www.ekostaden.com](http://www.ekostaden.com). The municipality is participating in a SAVE funded programme to establish pilots for internal performance contracting in municipal buildings, in this case to renovate and improve the efficiency of lighting.

## LESSONS LEARNED

The project makes great use of buffer supplies – taking account of the fact that energy is often not produced when it is needed. The mains network is a significant potential buffer and part of the fee paid to the distribution and transport networks is for balancing. So it is most unlikely that Bo01 could have considered the 100% renewable objective without using third party access to the network which is part and parcel of liberalisation.

However it is interesting that the producer, Sydkraft, the owner of the municipality's distribution network after the city sold its company, is a partner in the project. Many small generators find major obstacles in using this right of access and pay excessively high fees for balancing and involving the distributor would appear to be an intelligent way forward.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

If projects designed to develop renewable communities are to develop, the opportunities for equitable third party access to the network are essential. In some countries the market, although nominally liberalised, is effectively closed for the smaller consumers and generators. Little movement has been seen in Germany and Austria for example. Public policymakers should see the network as a major store of energy and ensure that suitable investments are made to meet this function. It is vital if cogeneration and renewable energy are to make the necessary impact. At local level this emphasises the need for local partnerships, such as that developed in Malmö.

## FURTHER INFORMATION

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# Installing energy efficient traffic signals

## Stockholm (SE)

### GENERAL ASPECTS

Stockholm, winner of the first European Sustainable City Award, is strategically positioned at the outlet of Lake Mälaren. It is the capital of Sweden as well as the country's largest municipality with 700,000 inhabitants. It lies at the centre of a conurbation of a million inhabitants which has gone through a period of rapid expansion in recent years.



### BACKGROUND

Over the past 30 years Stockholm has consistently followed policies designed to improve the environmental performance of the city and has devolved action to the local level within the city - for example every department in the city has their own energy consultant. Policies concerning energy in recent years have mostly been designed to increase the use of biofuels and these have been quite successful.

However almost none of the energy sources used in Stockholm are produced within the city. Fuel (coal, wood fuel, olive stones, pine tar oil etc.) is imported both from different parts of Sweden and also from other countries. Electricity comes from hydroelectric and nuclear power and, marginally, from the combustion of oil, coal and other fuels.

Stockholm converted its energy company, Stockholm Energi AB into a joint venture with another company in 1998 and founded Birka Energi AB. The company, has now been sold to Fortum, one of the leading Nordic energy companies with the city only retaining a 50% share in the district heating system. Prior to this restructuring and liberalisation, the company provided electricity to the lighting system free of charge, discouraging savings. However once the system was liberalised and privatised, the municipality was obliged to pay for the electricity it used. They became interested in the savings to be made.

### ACTION UNDERTAKEN

#### The Traffic light system

In 1995, the city of Stockholm was one of the first major European cities to make an in-depth analysis of its use of energy and to take serious steps to reduce its energy consumption.

As a part of this analysis, a number of projects were studied for their energy-saving potential. Among the projects considered was the modernization of Stockholm's traffic light system. The overall objectives were to improve management of the traffic control system, reduce energy consumption, reduce maintenance costs while at the same time increasing reliability and public security.

The traffic signal system was equipped with ordinary incandescent bulbs, which have a high energy consumption and are expensive to maintain as they need frequent replacement. It was an ideal target for savings.

#### Stockholm's Traffic Control system in figures (1996)

Annual Preventative Maintenance (Euro) = 1,800,000

**Annual Operating Maintenance (Euro) = 600,000**

Annual Total Maintenance (Euro) = 2,400,000

530 traffic signal control points in different models

6 000 columns

4 000 pedestrian push buttons

2 500 loop detectors

10 500 signal heads

27 000 incandescent bulbs

Any new system had to be able to resist Stockholm's cold winter climate with temperatures around  $-20^{\circ}$  C for weeks on end. The long dark nights also make the reliability and visibility of traffic signals of critical importance. In addition, as Stockholm is a seaport, the traffic control system has to deal with both humidity and salt.

After some *in situ* testing of different traffic control systems and signal heads the choice fell on LED-based (light-emitting diode) traffic signals. These are exceptionally energy-efficient and have a short payback time. Unlike ordinary incandescent bulbs, LEDs work on the electron flow in semiconductors and do not burn out nor waste much energy as heat. They are the lighting equivalent of a standard transistor and have a similarly long life. The average consumption per lamp, using LED instead of bulbs, decreased from 70W to approximately 7W.

The specific aims of the project were to:

- Use market forces via a large purchase to reduce the price of LEDs, which will help others to carry out similar project without being dependent on subsidies,
- Reduce the cost for management and maintenance and thereby encourage other improvements in the signal system,
- Reduce energy consumption, bulb turnover and transport costs and thereby reduce the environmental impact of the signal system,
- Increase public security through increased visibility and a reduced risk that signals are out of order.
- Reduce maintenance on site and hence increase security for maintenance staff.

The project was introduced in stages. There was a learning process at each stage and the city could take account of the lessons learned as the installation progressed. The project was completed by the end of 2001.

The savings are summarised in the tables below.

#### Cost of lighting furniture, LEDs, installation and documentation (US\$)

Furniture and installation	\$3,000,000
LEDs	\$3,000,000
Total cost	\$6,000,000

#### Annual Saving from LED Traffic Signals (US\$)

Power savings	\$470,900
Maintenance savings	\$243,000
Total savings	\$713,900
Payback	4.2 years

Besides energy efficiency, LEDs have other advantages compared to incandescent bulbs. LEDs only contain a small fraction of electronic waste and most parts are made of plastic material that can be recycled. Previously the 80 000 bulbs a year were placed in landfills, deposited 1,5 - 2 kilos of lead and other

hazardous substances. Furthermore, as LED signals do not need to be replaced as often as ordinary bulbs, the estimated distance travelled by vehicles will decrease by approximately 14 000 km/year.

## Results

While the objectives were met, as often with new technology there were some initial problems and a certain time is needed before an accurate evaluation can be made. However energy savings are larger than the original calculation.

Bulbs only	6,440MWh/year
LED only	640MWh/year
Savings	5,800 MWh/year

The project is unique in Europe with regards to its extent since no city other than Stockholm has exchanged their complete traffic signal system. Similar comprehensive exchange programmes were however common in California when subsidies were available.

Considerable awareness raising activity has followed this programme. Two workshops have been held by the Swedish National Energy Agency and one presentation to the Norwegian National Road Administration in Oslo. Furthermore, several articles have been published both in Swedish and international journals.

## LESSONS LEARNED

The energy saving potential of this project is very significant, can easily be replicated and there is a clear financial benefit to the local authority. But the incentive was greatly increased by the changes induced by liberalisation and the change in the utility from a service mentality (providing electricity to the municipality as a service free of charge) to a business mentality (maximising sales and profits).

Other local authorities which have had a very close relationship with their energy utility will no doubt be finding the same change in incentives. Such local authorities should review **all** their energy using services since there will certainly be similar examples of extravagant use of energy resulting from services previously being available free of charge. One of the benefits of liberalisation is that it makes the cost of each service transparent and therefore encourages the user to reduce energy costs.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

In general the separation of payment from responsibility is a disincentive to efficiency. In this case the provision of electricity was paid for by the utility but it had no means of reducing this cost. Once the municipality paid the bills, they took the necessary action to reduce the electricity consumption. Similarly in countries where street lighting equipment is provided by the utility but the electricity it uses is paid for by the municipality, there is no likelihood that the system will be run in an energy efficient way. Liberalisation accentuates these problems. It is clearly desirable that any such separation of responsibility should be removed during the liberalisation process and a clear relationship introduced between investment costs and running costs. This may mean revising a number of traditional practices developed during a period where utilities were seen as service providers rather than businesses.

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# Local Energy Planning

# Trollhättan (SE)

## GENERAL ASPECTS

Trollhättan, a town of 53 000 inhabitants on the Gota river not far from Lake Vanern, Sweden's largest lake. It is centre of a commuting region of 160 000 people. It has a dynamic economy with more than a million inhabitants in its hinterland. The town is famous for its waterfalls on the Gota river which provided hydropower for the development of local industry, and for the historic Gota Canal, built as a direct route to Stockholm at the dawn of the 19C.



## BACKGROUND

Trollhättan has a long tradition of both environmental action and energy planning. Their Agenda 21 programme won Trollhättan the King Carl XIV Gustaf Environmental Prize, as the most environmentally sound municipality in Sweden and Trollhättan received two other national awards for good environmental practice.

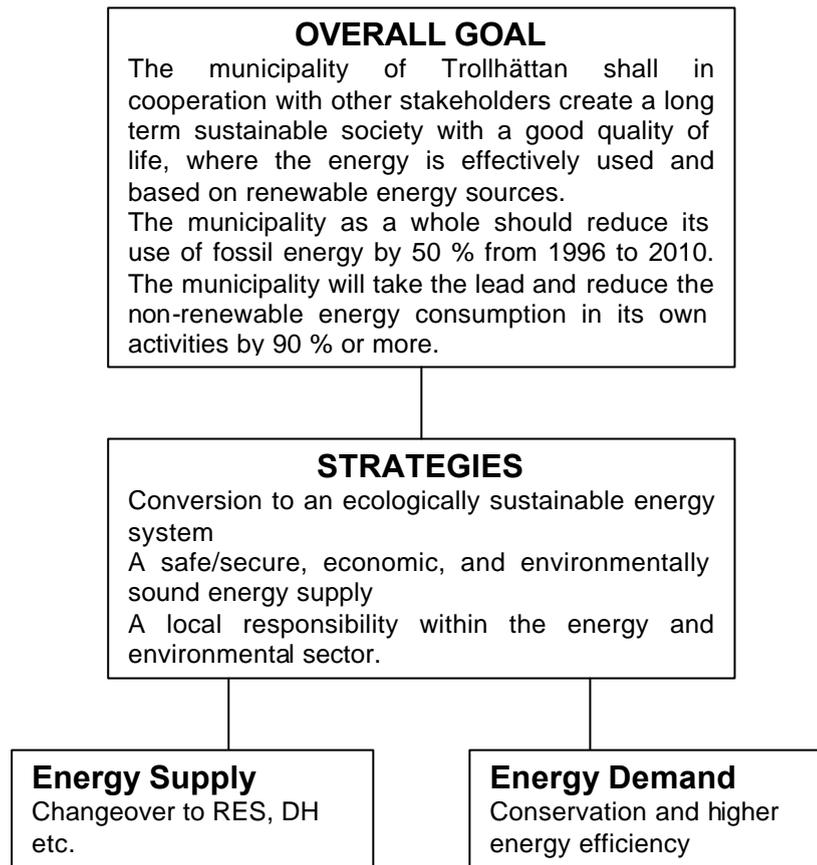
The town has had a series of energy plans (1994, 1998, 2003) each one evaluating the preceding one and building on it. The following criteria for a rolling plan have been put forward:

The plan shall be:

- Immediate and current,
- Comprehensive and overall,
- Environmentally sound,
- With a long-term view,
- A stimulation to growth.

The City Council has adopted a vision, aim and direction: "Trollhättan – a model for a leading tech, trade and industry municipality in Europe".

The connections between vision, aim, direction, strategy and measures within the energy sector may be illustrated thus:



## ACTION UNDERTAKEN

The goal that the municipality should reduce its overall use of fossil energy by 50 % between 1996 and 2010, means that about 750 GWh per year will be supplied by RES or be reduced by energy efficiency measures. Most of the fossil energy is currently used for transport or heating. In addition the municipality will be a trailblazer and will reduce its own fossil energy consumption in its own activities by 90 % or more. That corresponds to 50 GWh per year.

The municipality's instruments of control vary. To meet the latter, 90%, reduction goal is in this respect somewhat easier for the local authority to fulfil. Satisfying the goal for the municipality as a whole is largely dependent on an effective and long lasting co-operation and agreements between all the local and regional stakeholders.

The strategy and structure of the action programme is best illustrated by the current project list. Every project is well-defined and the plan presents a description of the project, an assessment of its environmental and economic impact, the time schedule for implementation and the names of those responsible.

## PROJECTS

The projects identified by the plan are broadly divided into two fields, energy supply and energy demand. Action on both sides is necessary to meet its ambitious targets regarding sustainable energy.

## Energy supply

Field of action	Sub field	Projects
<b>Distribution network</b>	<b>Emergencies</b>	<b>Emergency plan</b>
	<b>The grid network</b>	Grid improvements Improvement of central control systems.
<b>Energy production</b>	<b>Bioenergy</b>	Biofuel CHP, biogas use for district heating, new boiler at Lextorp Bio/solar boilers at Tvåstads Elektriska AB and R. Brorsson Förvaltn. AB
	<b>Wind energy</b>	Proposals for new plant
	<b>Solar energy</b>	Solar cells at Vårviks Gård Installation of Solar DHW systems
<b>Fuel switching</b>	<b>District Heating</b>	Extensions in Trollhättan City and West of river. Small scale systems in Åsaka and Paradiset
	<b>Other switching</b>	Conversion of direct electric heating Conversion of oil heating by 2010 Removal of direct electric heating in Trollhättan AB.
<b>Transport</b>	<b>Biogas vehicles</b>	Increasing the number of biogas vehicles Increasing biogas production

## Energy conservation and efficiency

Field of action	Sub field	Projects
Awareness raising and cooperation	Energy guidance	Households, companies, and others
	Cooperation	Regional (EnergiRåd Väst) With municipal estate managers With the housing enterprise Bostads AB Eidar
	Awareness raising and Education	Marketing the energy plan Preparing teaching materials Promoting eco-driving
Improving efficiency in municipal plant	Energy efficiency projects	Street lighting Housing company (electricity demand and electronic monitoring, improved security lighting, individual metering) Roof insulation at Trollhättans Tomt AB
Transport	Employers	Regulations for municipal staff. Green transport plans
	Individual transport	Car pooling – car sharing and increased occupancy Improved mobility information Official cars at Volvo Aero
Land Use Planning	New infrastructure	Include energy in EIAs Make shorter links to the principal road network Improve cycling and walking facilities Expanding the public transport system
Business and industry	Investment/improved management	Improvements to ventilation and compressed air systems – Volvo Energy efficiency improvements, Saab

## Adoption and implementation of the Plan

A clear managerial chain of responsibility is indicated in the Energy Plan. Following adoption of the plan by the Municipal Council, political responsibility passes to the Municipal Executive Board. Practical management is entrusted to the Managerial Group consisting of representatives of the Local Agenda 21, Trollhättan Energi AB (the municipal energy company), Bostads AB Eidar (the municipal housing company) and Trollhättans Tomt AB (the municipal property management company).

Implementation and design is entrusted to a working group with representatives of the municipal architect's, planning, technical services and environment departments and Trollhättan Energi. They liaise with a

consultative group with representatives of all the main interests including an energy generation company, a haulage contractor, a public transport company, a taxi company plus students from local schools and the university.

## LESSONS LEARNED

The 2003 Energy Plan of Trollhättan also contains a follow-up of the 1998 Energy Plan. Many activities in that plan have already been accomplished are on their way to being carried through:

### Energy supply

Field of action	Sub field	Projects
Energy production	Bioenergy	Biofuel boiler for district heating
	Small hydro	New small sale hydro at existing dams
	Solar energy	Solar energy plant
Fuel switching	District Heating	Extensions in Trollhättan City Small scale systems
	Other switching	Estimate of take up of green electricity
Transport	Biogas vehicles	Continuing biogas project at Arvidsdorp Increasing no. of biogas cars Development of combined methanol and electricity based fuels.

### Energy conservation and efficiency

Field of action	Sub field	Projects
Awareness raising and cooperation	Energy guidance	Extended energy advice service
	Cooperation	Improved Regional cooperation ( <i>EnergiRåd Väst</i> )
	Awareness raising and Education	Teaching of solar collectors in Skogshöjden school Development of technical centre for high schools
Improving efficiency in municipal plant	Energy efficiency projects	Measures by municipal housing company Measures by municipal property management company
Transport	Raising awareness	Promoting the public transport system Cycling campaign
Land Use Planning	New infrastructure	Include energy in EIAs Make shorter links to principal road network Improve cycling and walking facilities
Business and industry	Investment/improved management	Use of waste heat

Liberalisation does not mean the end to the role of the municipality or municipal action, rather it puts more pressure on the municipality to deliver. To deliver an effective programme it needs a framework, to guide action and to enable the local authority to bid for resources. No longer can it just say, "That is the municipal energy company's" business. It has to plan and search for resources and in effect become more businesslike in delivering public services and meeting public objectives. Trollhättan demonstrates this in exemplary manner, showing that there should be a smooth transition through liberalisation with energy planning continuing with even more urgency. It is only local level actors like the local authority that can deliver many of these objectives.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

While Trollhättan is exemplary in preparing and delivering its plan, it cannot do this without resources. The potential resource from the municipal utility is now much less secure. While part of its monopoly role, distribution, remains secure, it is covered by heavy regulation and the large profits of the past are now a memory. The sale and production functions are now competitive and there also profit margins are squeezed by competition. Trollhättan is clearly using many of its own resources to help deliver, but these are limited and the investment need is very significant.

Therefore some mechanism must be found to channel resources to meet public benefit objective No. 1 in the energy field – the reduction of climate change inducing emissions by conversion to a renewable fuel society and the reduction of unnecessary energy demand. While there are many possible scenarios for achieving this, there is no need to beat about the bush, that transfer can only be organised by Government.

## FURTHER INFORMATION

### Trollhättans kommun

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# Electricity any colour you like

# Geneva (CH)

## GENERAL ASPECTS

Geneva with its 178,000 inhabitants is situated on the extreme south-west of Lake Lemman. The city is set among hills on either side of the Rhone. Geneva is home to many international organisations, e.g.: the United Nations and the International Red Cross. The city is also an important banking centre.



## BACKGROUND

The inhabitants of Geneva have always taken a keen interest in the origin of the electricity they consume. In 1986, they decided by popular vote to add a new article to the *Constitution of the Republic and Canton of Geneva* in order to promote the production and use of renewable energy sources and oppose the erection of nuclear plants on their territory or in neighbouring ones. The canton's policy in terms of energy supply, transformation, distribution and use is based on principles of energy conservation, indeed this is even specified in paragraph 1 of article 160C of the Constitution. Priority is given to the development of renewable energy sources and respect for the environment.

Paragraph 5 outlines the motives for such opposition to nuclear energy and constitutes a mandate given to the local government. It reads as follows:

**"the canton's authorities oppose by all legal and political means the installation of nuclear plants, landfill sites for highly and moderately radio-active waste as well as recycling plants within the territory of the canton and in the surrounding area. [...]"**

(Extract from the Constitution of the Republic and Canton of Geneva A 2 00, art.160C, al.5)

*Services Industriels de Genève* (SIG) – the company responsible for distributing energy through transmission grids – now proposes to meet this demand by offering a new range of tariffs for the supply of electricity to all its customers.

This innovative approach, the first of its kind in Switzerland and maybe in Europe, fits into a specific context in terms of energy policy. The idea is to give each consumer the possibility of choosing from among several options the electricity that best meets their expectations and priorities, whether they be economic, social or environmental.

As owner of a building stock of more than 800 buildings and initiator of the local energy policy, the Municipality of Geneva plays a pivotal role in this project by supporting energy produced locally in the canton and by encouraging the use of renewable energy sources.

# ACTION UNDERTAKEN

## An Energy Act

These firm principles, defined in the Constitution, are repeated in the objectives of the Energy Act which came into effect on November 7, 1987.

The Act concerns the production, supply, storage, transmission, transformation, distribution and use of energy, as well as energy planning.

For example, measures are proposed concerning **energy use** in buildings, including the following:

- Restrictions applicable to
  - o Electric heating, which is virtually prohibited,
  - o Air conditioning, which is subjected to a requirement clause and an obligation to be integrated into the overall building design,
  - o Water heating in swimming pools, which is authorised only provided that the energy used is derived from a renewable source or from waste heat.
- Obligation to calculate a heating requirement index for buildings with five or more users,
- Obligation to submit an energy plan when applying for a building permit.

## Obligation to purchase energy produced by independent producers

One of the objectives of the act, and maybe the most important one, concerns the feed-in obligation.

Provided that technical or management conditions on the network are favourable, Services Industriels de Genève (SIG), which is responsible for distributing water, natural gas and electricity to consumers in Geneva, is under the obligation, by virtue of art. 21A of the Act, to purchase electricity produced by independent producers.

Feed-in conditions are set by contract between the parties involved. The tariff applicable is determined by taking account of the effective costs and the origin of the electricity produced. When the electricity is produced from renewable sources, the contract may include a minimum feed in period so as to ensure that independent producers can make profit in the end.

## New tariffs for electricity supply

### Priority to renewable energy

The approach adopted by Services Industriels de Genève (SIG) and its decision to innovate in the field of the supply of electricity to customers must be seen in the light of this specific context and complies with the political commitments that were formally made in the Constitution and in the Geneva Energy Act.

Since 2002, SIG has been proposing a new range of power sources to its customers with new products whose origin is certified. A new price list, adapted to each type of electricity, has also been introduced.

The project has two objectives:

- Reducing drastically the share of “dirty” energy (thermal and nuclear energy) by proposing hydroelectricity as the reference energy distributed by Geneva’s networks and symbolised by the VITALE BLUE tariff,
- Increasing the share of renewable energy sources (solar energy, wind power etc.) and that of energy produced locally (hydroelectricity, energy from waste produced at the local incinerating plant or energy from local independent producers).

### What energy quality would you like to use?

The system provides consumers with the possibility of choosing the type of electricity that best suits their expectations and priorities, whether they be economic, social or environmental, from the following four brands:

### The VITALE range

Brand	Product description	Feature	Deviation from tariff base
VITALE BLUE (default)	Electricity derived entirely from hydropower	Contributes to limiting CO <sub>2</sub> emissions	Tariff base - 0,6 €cts / kWh
VITALE YELLOW	Electricity produced entirely in Geneva	Contributes to maintaining and developing locally produced energy sources while not depleting natural resources	Tariff base + 1,2€cts / kWh
VITALE GREEN	Electricity produced entirely from renewable sources	Supports research and development in the field of renewable energy. Finances two special funds	Tariff base +5 €cts / kWh
MIX	Electricity with various origins	Derived from several energy production possibilities, including non-renewable sources, such as fossil fuels and nuclear energy	Tariff base -1 €ct / kWh

### Results

The result of introducing this new tariff lies within the replies given by the consumers themselves. It is to be noted:

- An increase in the use of hydropower, due to the fact that if no reply is forthcoming, the VITALE BLUE tariff is proposed by default,
- A strong decrease in conventional nuclear and thermal use with a drop from 30% to 9%,
- The emergence of new renewable energy sources, thus leading to the development of new and more environmentally-friendly modes of production and to the necessity of introducing energy management measures, as such resources entail higher energy costs.

By and large, the introduction of the new tariff has resulted in an **increase of renewable energy in total energy production from 60 to 91%**. This is a new trend. The point now is to make energy production and purchasing coincide with consumer demand. This new approach, which is based on consumers' free choice, is truly innovative. It is a good way:

- For private individuals to take action as responsible citizens,
- For local authorities to show their commitment to their energy policy in their own stock of buildings,
- And finally, for private companies to promote their image in their communication strategy.

Many companies and organisations, which represent the most important group in terms of energy consumption, have understood how important it is to take measures aimed at improving the quality of life and to act in a responsible manner to preserve the future of our planet. Such measures have been well received by customers and shareholders alike, and several private companies do not hesitate to publish an environmental report on their activities.

Similarly, several local authorities, either at regional and communal level have developed local Agenda 21 programmes.

### The choice made by the Municipality of Geneva as consumer

In 2001, the Municipality of Geneva consumed over 40 million kWh to meet the electricity requirements of its buildings and for public lighting, which corresponds to an overall expense of 8.7 million francs (5.8 M€). It is therefore directly concerned by this new tariff project and has had to make its own choice like any other consumer.

To meet the energy requirements of its stock of buildings, which represents some 800 buildings and around 1,200 supply contracts, seven scenarios were examined:

- All the contracts were changed to the same tariff, with the relevant economic and budgetary consequences (scenarios 1 to 4),
- Mixture of several tariffs, the overall expenses remaining the same or not (scenarios 5 to 7).

<u>Electricity consumed in 2001</u>	40,262,000 kWh	
<u>Expenditure in €</u>	5,820,000 €	

	Scenario	Variation in €	%
1	100% VITALE BLUE	- 145,000	-2.5%
2	100% VITALE YELLOW	+ 725,000	+12.4%
3	100% VITALE GREEN	+ 2,165,000	+37.2%
4	100% MIX	- 230,000	-4.0%
5	82% VITALE BLUE & 18% VITALE YELLOW	0	0%
6	94% VITALE BLUE & 6% VITALE GREEN	0	0%
7	80% VITALE YELLOW & 20% VITALE GREEN	+ 1,045,000	+17.9%

### Table showing the different scenarios examined by the Municipality of Geneva for its own consumption

Finally, the Executive Committee opted for the following:

- Modification of all existing contracts to the VITALE YELLOW tariff: this decision represents an additional cost of more than 725,000 € per year, i.e. a 12% increase in the municipality's electricity budget,
- Subscription to the VITALE GREEN tariff for all new buildings, which are more energy efficient.

This decision embodies several objectives that are in line with the policy guidelines set by the municipal government:

- No more nuclear energy in the buildings owned by the municipality,
- Support for the SIG's approach and promotion of environmentally friendly energy sources,
- Support for the production of local and renewable energy sources, and therefore for the local economy.

## The role played by the Municipality of Geneva in this process

As regards the promotion of renewable energy sources by means of the VITALE GREEN tariff, the new tariff structure contributes to creating a commodity market for new energy sources and the Municipality must learn how to operate on this market.

Of course, it must pay attention not to distort the market by injecting too much public money into the system, which by definition is based on the principles of the free market economy. The law of supply and demand shall apply in the present case, the prevailing rule consists of promoting relations between energy producers – who benefit from a long-term feed-in obligation clause – and buyers who are concerned with the origin of the product they consume.

The Municipality of Geneva has a crucial role to play in this process:

- First of all, as a customer-user, for it can set an example by using energy sources that have a high social or environmental value to cover part or all of its energy requirements,
- Secondly, as a possible investor to finance decentralised energy production installations, especially photovoltaic ones.

Consequently, the opportunity to apply the VITALE GREEN tariff, which is more expensive but based on renewable energy sources, to part of their consumption will be investigated on the basis of the supply and demand mechanisms at canton level. For instance, they may decide to apply the VITALE GREEN tariff to part of their consumption if the supply of clean energy exceeds demand.

As a preliminary step, the Executive Committee has decided to promote market penetration of clean energy by promoting:

- The integration of energy production equipment by means of photovoltaic modules in new building projects, the electricity produced being fed into the network and bought by the distributing company;
- The possibility for interested third parties (companies, associations etc.) to use part of the roof of municipal buildings to install such equipment.

## LESSONS LEARNED

This example demonstrates the options that can be presented to local authorities when the market opens up and the scope for the municipality to choose their electricity on quality in terms of its pollution impact and the efficiency of its production. In addition the regulation at Cantonal level has already, for many years, discouraged wasteful uses of electricity for space heating, swimming pools and air conditioning. This occurred before liberalisation, but it is even more appropriate under a liberalised regime.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

Most states do not allow the region to make real regulatory decisions on issues of energy efficiency – such regulations being determined at national level and only applied at local level. The Swiss experience suggests that regional administrations are likely to be more stringent than national government administrations in promoting regulations to protect energy efficiency. The regulations limiting electric heating for instance make sense in a predominantly urban canton with universal energy networks. The issue is placed even more to the fore by liberalisation since the pressure on the supplier to sell will put even more pressure on the regulator to prevent the consumer using energy in an extravagant manner. The Swiss experience also shows that municipalities, at least the more affluent ones, are also willing to consider paying significantly more for “sustainable” energy to meet political objectives. This could act as a motor for more sustainable energy policies and therefore Governments should consider public policies promoting choice and ensuring sufficient freedom for municipalities to follow their preferred choice in their public procurement policies.

## FURTHER INFORMATION

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## A new way of organising local services

## Martigny (CH)

### GENERAL ASPECTS

Martigny is a town of 14 000 inhabitants in the Rhône valley (canton of Valais). This part of the Alps produces most of Switzerland's hydroelectric power, which is why industries which are heavy consumers of electricity have set up here. It is also a summer and winter resort that attracts a lot of tourists all year round and enjoys good accommodation facilities.



### BACKGROUND

Switzerland is a highly decentralized country and municipalities play an important role in the energy field. They are responsible for providing consumers with energy. Some towns have delegated this job to regional companies, but most of them provide this service themselves. This is the case in Martigny, which, through its "Industrial services", manages the energy networks (electricity, gas, district heating), water (power, purification), television and Internet. One way of managing these has been set up with the help of the "Ecole Polytechnique Fédérale de Lausanne - EPFL" (Lausanne Federal Polytechnic School), with which it has been associated since 1979.

This cooperation led to the creation of the "Centre de Recherches Energétiques et Municipales" - CREM (Energy and Municipal Research Centre) in 1986. The CREM uses Martigny as a town-sized laboratory. Many experiments have been carried out since it was first set up.

The basic idea consists of treating all the energy networks as a single system, to optimise their use (minimizing energy consumption and pollutant emissions). The electricity, gas and water networks are thus considered as a single unit, the television network being used for local communication. This concept of energy networks means that action taken in Martigny is never isolated, but affects the entire system.

However, in anticipation – a key-word in Martigny – of the liberalisation process <sup>12</sup>, the municipality has modified its organisational structure and adapted its approach.

<sup>12</sup> However, on 22 September 2002, the Swiss people rejected by referendum the Electricity Market Law which - for the first time in Switzerland, a confederal country – would have regulated electricity supply throughout the country.

# ACTION UNDERTAKEN

## Structural modifications

Up to 2002 and the creation of « Sinergy » (see below), the Municipality of Martigny acted simultaneously as energy consumer, producer, distributor and planner. The “Industrial Services” were integrated into the municipal departments and were responsible for producing and distributing energy as well as planning the networks. The energy distributed was essentially district heating in the most densely populated area of the town, followed by gas and individual solutions in more scattered areas. The “Industrial Services” had a local monopoly and the municipality as “energy consumer” could consume freely the energy supplied by its own departments.

## What happened?

The **distribution**<sup>13</sup> activity was externalised, thus leading to the creation of *Sinergy Infrastructures SA*. Although the municipality currently holds all the shares of the company (2003), the memorandum of association includes the possibility, should the opportunity arise, to open up the company’s capital to other shareholders. The company now owns all the networks that were previously managed by the “Industrial Services” – property was conveyed from the municipality to the company through a long term debt – and is responsible for managing them. The company has signed concession contracts with the Municipality (one contract per network) so as to be able to use the public domain and pays a tax to the Municipality in compensation.

*Sinergy Infrastructures SA* :

- Has interests in other companies operating in the cable and telecommunications fields?
- Develops new activities such as illumination development plans or leasing agreements.

District heating is mainly produced from gas and is the property of *Sinergy Infrastructures SA*, which is also responsible for operating the district heating network.

A **marketing** activity was created in order to enable the company to provide competitive products and services. The transition from a position of monopoly to free competition indeed imposes a requirement to provide competitive and innovative products and services on those who want to survive and thrive. A new company – known as *Sinergy Commerce SA* – was created for this purpose. The company is responsible for selling energy and water. Its activity is not limited to the territory of Martigny and extends to the entire interconnected European area. *Sinergy Commerce SA is also a municipally-owned company.*

The Municipality reserves the right to fix the level of charges for connection to the network, which is a way to preserve municipal authority over captive customers.

In order to keep overheads costs<sup>14</sup> as low as possible, both companies share the same staff and *Sinergy Infrastructures SA* charges *Sinergy Commerce SA* working days when invoicing its services. There are 26 staff in total.

Both companies have their registered offices at the address of the former “Industrial Services”. The premises belong to the municipality, which receives rent from both companies.

*Sinergy Commerce SA* concluded a strategic partnership agreement with a supplier (EOS – Energie Ouest Suisse) that guarantees long term prices as well as an extended distribution area.

*Sinergy Commerce SA* is also a founder member of *SwissPower*, (see other case study + [www.swisspower.ch](http://www.swisspower.ch)), a service company created by Swiss municipal companies. The decision-makers in Martigny have indeed considered that a municipal company of this size had no chance of survival if it remained isolated. This initiative seemed indispensable, at least to be able to develop a marketing policy and to attract multi-site customers. A similar initiative was undertaken in the telecommunications sector.

<sup>13</sup> In fact, only “transmission” is concerned.

<sup>14</sup> it is sometimes, and rightfully, said that the *unbundling* in small municipal companies will lead to too heavy structural costs and reduced competitiveness. The recent Directive on the liberalisation of electricity and gas provides for exceptions to the *unbundling* obligation.

As far as **production** is concerned, it has been decided that this should remain a municipal prerogative, both for water and energy. Why? Local production (except for heat produced from natural gas) is mainly composed of electricity produced by harnessing drinking water to drive turbines. Martigny is located at the foot of the mountains and the catchment works are situated at an elevation of 636 m, above the town. Since 1981, electricity generation from the drinking water supply produces 5,500 MWh/year with an installed capacity of 1MW, if one includes a water supply reservoir whose overflow is also used to produce electricity. It is an indigenous green electricity that the municipality can use as it sees fit, for example to provide energy to inhabitants experiencing payment difficulties at a very low price or even free, to increase the share of green electricity in the town's energy supply, or to sell it at a premium price on the international market where there is a strong demand for such electricity. This is what the municipality is currently doing.

However, as the municipality did not wish to employ people to take charge of producing and marketing this green electricity, such functions were entrusted with the *Sinergy* companies as service providers acting on behalf of the municipality. A reference selling price for green energy is set and if *Sinergy* sells at a higher price, the difference is shared in equal parts between *Sinergy* and the Municipality.

Finally, **consumption** is a prerogative of the municipality which is now considered as an ordinary customer by *Sinergy*.

The municipality can benefit from a number of services, like any other customer. In practical terms, since financial flows take place in both directions – from the municipality to *Sinergy* in case of purchase of energy or services; from *Sinergy* to the municipality for the rent of the premises, the access to services and the purchase of electricity produced from hydropower (see “production”) – only the difference is paid once all the respective invoices have been netted out. This system enables the municipality to avoid paying VAT on all its purchases and to limit such payment to the “balance” paid. As for *Sinergy*, the company has VAT refunded on all its activities.

## New services

Whereas a monopolistic company can content itself with sending an invoice to a captive user, a company operating on a competitive market must convince its customer base in order to build loyalty and try to attract new customers.

### Multi-services

*Sinergy* activities, either as network manager or energy supplier, are wide-ranging and concern:

- Electricity,
- Gas,
- District heating,
- Drinking water,
- Street lighting,
- Tele-networks (television, Internet); this service concerns 5 other communes in addition to Martigny.

Being able to provide customers with such a wide range of products and services is a major commercial advantage, provided that the company is able to innovate continuously.

### Green energy

*Sinergy Commerce SA* provides its customers with electricity generated from hydropower and solar energy which is sold under the “SwissPower Premium” brand developed by the SwissPower company (see case study). Two products are available within this range: “Premium Water” and “Premium Solar”. Premium is “Star-naturemade” certified.

Consumers can choose between several options:

- 95% Premium Water + 5% solar all year round for all uses,
- The first 400 kWh as Premium Water (which is sufficient for a dishwasher),
- The first 800 kWh as Premium Water (which is sufficient for the cooker and the freezer),
- Free choice of the number of Premium Water kWh,
- The first 400 kWh as Premium Solar (which is sufficient for a dishwasher),
- The first 800 kWh as Premium Solar (which is sufficient for the cooker and the freezer),
- Free choice of the number of Premium Solar kWh.

Prices:

- Premium Water: 0.18€/ kWh (off-peak hours: 0.10 €/ kWh )
- Premium Solar: 0.58 €/ kWh

For information, average yearly consumption is typically 2500 kWh for a household composed of two members and 4500 kWh if the household has four members.

#### Monitoring and Demand-side management

The works of the CREM ([www.crem.ch](http://www.crem.ch)) on energy consumption monitoring and the “energy signature” tool (see the Energie-Cités case study on this subject) provided the *Industrial Services of Martigny* and continue to provide its successor, *Sinergy*, with a means of monitoring the energy consumption of their customers, both in terms of power requirements as well as the energy that is actually consumed.

*Sinergy* benefits from real-time **monitoring data** concerning:

- All the energy consumed by the Municipality for all the energy sources and fluids distributed,
- Sub-areas of the town that correspond to network nodes,
- Large customers: industrial companies, hotels, swimming pool, skating rink etc. where data acquisition systems have been installed to facilitate remote-measuring.

Data are transmitted via the cable network managed by *Sinergy*. For sites that are not connected to the network, data are transmitted by modem, and even by GSM in the case of mountain sites that only have a photovoltaic supply.

The data available on each site make it possible to obtain:

- Real-time information,
- Information on the evolution of consumption over time,
- Comparable information for specific periods (per hour, per day, per week, per month etc.).

However, the number of customers being limited, it is not possible to develop benchmarking that would allow customers to compare themselves to other customers in the same category. Work has been carried out simultaneously by CREM, with the hotel trade in particular, to raise awareness of the issue. Differences from 1 to 2 in energy expenses per year and per bed were recorded.

*Sinergy* now provides its customers with the possibility to have **access to such data** (previously they were only accessible by the company and CREM for research purposes). The interested customer must pay:

- An installation lump sum that includes the data acquisition system its installation of it
- A monthly subscription

Large customers can also benefit from a **dynamic pricing service** (see Energie-Cités case study) which provides consumers with real-time information on the load curve of the network thus allowing them to adjust their energy demand to match the situation on the network. If customers can keep their energy demand below a given threshold value, they can benefit from a price reduction, an option which is not possible with conventional pricing systems based on fixed daily or hourly time-slots. This system provides greater flexibility for the benefit of all the parties involved and avoids useless peak loads.

#### Energy consumption management

In addition to the monitoring service provided, customers can take all the measures they want to control their consumption and can apply to any service provider to carry out additional surveys if they consider that they do not have the necessary in-house skills to do so.

*Sinergy* will of course try to tap this new engineering market, thus competing with other companies liable to provide such services. There is however an obstacle to this: being in a transitional phase from a monopoly position to free competition, *Sinergy* has a significant competitive edge on all its competitors thanks to its knowledge of its customers' consumption. A too rapid development of such activity, provided that there is a demand for it, may lead to charges being made against the company for abuse of a position of superiority.

The transition should therefore take place in progressive steps.

## LESSONS LEARNED

This case study can be used as an educational example in the sense that it broaches all the issues raised by the liberalisation process, including:

- *Unbundling*, here applied in a pragmatic way from a functional approach to municipal tasks,
- The creation of new contractual relations between the municipality and the new companies on the one hand, and the customers on the other hand,
- The prerogatives that remain with the local authority,
- The link established between local autonomy and “national” solidarity, by setting up common services with other similar municipal companies,
- The provision of new services,
- The risk of abuse of a position of superiority when developing new services.

The conclusion of this is that some form of *local regulation* has developed.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

This shows a pragmatic and effective response to liberalisation from a small municipal utility. The importance of separating the role as consumer and owner of energy consuming facilities from that of supply and distribution comes out several times in the examples. Government’s role in this should promote the clear separation of expenses and functions, so inciting local authorities to save money by careful use of resources. This is possible even within a small municipal company where the functions are not legally unbundled.

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## A grouping of municipal companies selling current and energy services

## Swisspower (CH)

### GENERAL ASPECTS

Switzerland, a country with a population of 7.2 million, has not (yet) chosen to join the European Union. Attempts at membership have always been rejected by referendum, giving rise to a sharply contrasting situation: the country is at the heart of European exchanges, but remains aloof from the institutions which Member States have created for themselves. Nevertheless, there is no denying that Switzerland closely follows the processes that are currently taking place within the EU and tries to adapt to Community legislation in almost every area, including in the field of energy sources distributed over transmission grids.



### BACKGROUND

A symbol of this contradiction: on 22 September 2002, the Swiss people rejected by referendum the Electricity Market Law which – for the first time in Switzerland – would have regulated electricity supply throughout the country, in the same spirit as Community legislation. But this does not mean that Switzerland is standing still in this area.

Switzerland has about 1,200 electricity distribution companies, most of them at municipal level. This situation is also the expression of a confederal system where local level organisation cannot be dictated to by a higher level, except in the case of fundamental issues of law. Some of these companies are small or very small, whilst the size and technical expertise of others are fully acknowledged.

However, at a time when markets for energy sources distributed over transmission grids are becoming European, this fragmentation clearly brings to light a number of contradictions: How to get – and guarantee – supplies without becoming a victim of one's (lack of) size? How to create synergy between companies in order to pool experience and set up a true marketing policy? How, if necessary, to group together to attack particular markets? How to provide multi-site (and multi-service) customers with answers that are unique and suited to their needs, regardless of individual site location? How to offer new services? To develop a certified green electricity market?

This debate led to the creation, in the year 2000, of *SwissPower*, an energy service company established by Swiss municipal companies anxious to preserve their particular identities. *SwissPower* draws together 15 companies with different status: municipal departments which are integrated into the municipal administration (Industrial Services) or municipality-owned public companies. Towns such as Zurich, Basle, Bern, Winterthur, Schaffhausen, Bienne and Martigny are members of *SwissPower*.

# ACTION UNDERTAKEN

## Grouping municipal utilities

SwissPower partners have the advantage of:

- A common distribution network for national customers with scattered sites,
- Common marketing.

SwissPower:

- Draws up proposals for the whole range of energy uses: electricity, gas, heat – which is less common and even less widespread, and water,
- Offers synergies and the possibility of making savings on the energy market.

SwissPower is:

- Switzerland's biggest supplier of electricity (direct supply to the end customer) with a market share of 18% ; market share is 26% for gas and 31% for heat,
- The biggest employer in the electricity field,
- The operator with the largest markets for green electricity.

The advantage for the customer is that they have access to:

- Identical contracts throughout Switzerland, with simplified detailed accounts,
- Energy and energy management services,
- A transparency on products, with the possibility of buying the electricity they choose,
- A guaranteed supply.

*"With Swisspower we now have only one point of contact in cities. This gives us more transparency in the price jungle. This new solution takes full account of our particular needs, regardless of the "administrative jungle" of cities and towns."* says M. René Graf, manager of SwissCom Immobilier SA

SwissPower does not act as a substitute for its members and only provides services in areas where there is a member municipal company. When a service contract needing a technical service is sold, the local company carries out the work. SwissPower is only a sales service company.

## Services offered

As far as energy management is concerned, the services provided are those outlined in the Martigny case study (see elsewhere). Some member companies offer a **Contracting** service, in other words, a complete technical / financial / plant operation updating service.

However, it is in the area of renewable energy supply that the range of services and marketing initiatives is the most developed. As in other sectors, there is a gap between supply side and demand side management policies. However, increasing the price of renewable energy, (the price of solar power as outlined in the Geneva case study for instance) should have repercussions on action on the demand-side.

Within the range of **renewable energy services**, SwissPower offers "Premium Solar" and "Premium Water" and the company hopes to be able soon to offer electricity produced from wind power and biogas.

"Premium" products have received the " *naturemade star*" ecological quality label awarded by the Swiss Association for environmentally sound electricity, which receives sponsorship from WWF Switzerland, Pro Natura and the Swiss Consumer Forum, as well as energy supply companies and green associations.

### What is naturemade ?

**Naturemade** rewards two levels of electricity quality: **naturemade basic** is awarded for electricity produced from renewable sources, whilst **naturemade star** is awarded for environmentally sound electricity, that is to say electricity that is at the ecological forefront and meets stringent ecological standards. The promotion model – which applies to both quality levels – involves direct promotion of new renewable energy sources such as wind power, photovoltaic power, biomass and hydropower, which fulfil the star criteria, on the sale of **naturemade** electricity of both quality levels.

The **naturemade star** quality label fulfils maximum ecological requirements according to an independent [study](#) (in German).

The **naturemade** quality label is owned by AERE (Association for environmentally sound electricity), an association which enjoys a unique position in Europe due to its wide support base. The organisations which make up its steering committee have equal representation: ecological organisations, consumer organisations, interest groups working in renewable energy sources or hydropower economics, electricity producers, distributors and suppliers, major electricity consumers.

This label can be used by local companies for their own sales policy and is a good example of shared service. Companies with multiple sites, such as Crédit Suisse, SwissCom or Migros (retail chain) buy "Premium" electricity as part of their supply.

*"SwissPower supplies Migros, at their request, with 60% of electricity from hydropower and a significant amount of solar energy. By opting for a mix of energy sources, Migros is able to assume its responsibilities for environmental protection whilst encouraging local energy production.", says M.Rolf Hauri, Technical and Construction Department, Migros Zurich.*

Prices are as follows:

- Premium Water: 0.18€/ kWh (off-peak hours: 0.10 €/ kWh ),
- Premium Solar: 0.58 €/ kWh.

For information, it is also indicated that the average yearly consumption is typically 2500 kWh for a household composed of two members and 4500 kWh if the household has four members.

### Heating is not forgotten

In the current restructuring process, electricity tends to "set the tone" in all the countries, sometimes to the extent that all the initiatives made only concern electricity.

SwissPower, on the contrary, is also involved in promoting district heating with more than one third of the district heating market. According to the advertising : *"in the cities of Switzerland, district heating networks are partners of Swisspower. They allow customers' homes to be heated directly 24 hours a day. Without the need of a boiler, a water tank or heating oil, you can have the benefit of an energy supply at stable prices and without any extra cost".*

As in other countries only in certain towns, in this case Winterthur, Basle and Martigny, offer this service.

## LESSONS LEARNED

Deregulation does not necessarily lead to financial concentration. It is possible to find viable solutions that allow one to benefit from:

- The economies of scale,
- Shared services,
- Close contact with consumers and citizens,
- The involvement of municipalities which are close to the citizen and partial municipal control,
- Innovation in terms of energy management as well as renewable energy sources.

The success of this exercise is based on voluntary action on the part of municipalities and municipal companies and involves a break with past habits, where "localism" was king. This implies that municipalities need to dedicate some time and effort to clearly defining what contribution they want to make to the new order.

A first step has been undertaken. The second is expected to involve an increase in the number of partners as well as developing energy services with a clearer focus on demand-side management. However, the search for new services constitutes a powerful stimulant for energy management, as computerised management systems make it possible to offer monitoring services which are inexpensive for the service company and very useful for the consumer.

A challenge within our reach?

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

There has been an assumption that a restructuring into larger companies able to compete on an international scale is a *sine qua non* of liberalisation. However this example demonstrates that the advantages of local contact can be combined with the advantages of scale, and that the municipal interest in local energy

companies could be retained, given the desire and commitment and willingness to work out new management structures such as Swisspower.

The key factor is a willingness to cooperate for the common good. The cultures of some countries are better adapted to cooperative behaviour than others. To work it is necessary to put the survival of the individual rights of each partner company to the fore – the parallel between the Swisspower arrangement and the Swiss Federal structure is striking.

The advantage of combining to provide energy services and a carefully categorised range of renewable-sourced electricity products is innovative and commendable. Governments could provide support for this approach so that municipal utilities can compete with the potential competition from large international utilities. This should also promote a more active and locally adapted approach to energy services contracting, and thus promote it more actively.

However it must not be assumed that local authority owners of utilities will necessarily provide good energy efficiency services – the municipality, like any other shareholder, may not be particularly politically committed and may not wish to promote activity that reduces electricity or gas sales.

All this does depend on the messages municipalities and municipal utilities get from central government. Central government has a great responsibility here. It can follow the Dutch approach and build new international utilities – sweeping away all municipal interest. It can follow the German approach of washing its hands and “leaving it to the market” so that monopoly step by step gains ground. It can follow the Danish approach – keeping everything in local or regional companies or cooperatives, but with a risk of the loss of part of the market with liberalisation and the entry of the big foreign utilities. Or it can follow a cooperative Swiss type approach.

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# United Kingdom

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## CBC and other consortia - Energy purchasing in consortium

## South East (UK)

### GENERAL ASPECTS

CBC is a public sector purchasing consortium covering South East England. There are a number of such consortia covering much of the UK.



## BACKGROUND

With the opening of the energy markets local authorities in the UK have been presented with the opportunity to put their energy supply out to competitive tender. Within the UK local authorities have long made bulk purchases in consortium. The reason is simple, in consortium the local authority's purchasing power is much greater and a significant reduction in price can be obtained. The purchase of energy is therefore a natural extension of their operations. The establishment of consortia is currently governed by an Act passed in 1970. Effectively public sector consortia can sell to local authorities and certain charities and voluntary bodies, but not to private individuals or companies.

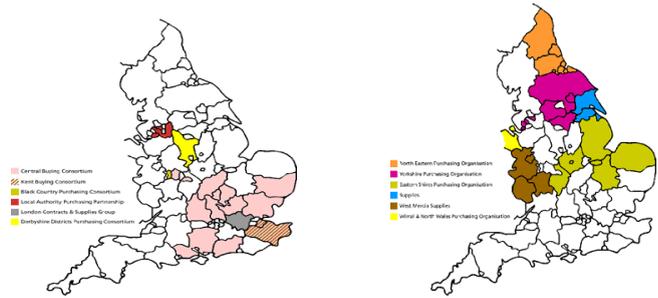
### The Objectives of Purchasing Consortia

The objective of purchasing consortia is to achieve the optimal price for products that can be bought in bulk, and so meet the local authority's duty to obtain "best value" when using public money. As far as energy is concerned, competitive tendering has always applied to coal and oil, but not to monopoly suppliers. With the opening of the gas and electricity markets, the local authorities have gone out to tender for these also. The call for tender can specify not only the simple price per kWh or Therm, but also the quality of the product. This could include energy efficiency services, supply from efficient generating sources (e.g. co-generation, renewable sources) or the avoidance of supply from particular sources (brown coal, nuclear). A number of local authorities and local authority consortia have tried to promote energy efficiency and the use of green energy through their purchasing role and such experience is discussed here.

## ACTION UNDERTAKEN

Consortia may be virtual organisations with no staff and no legal structure other than an agreement between authorities or they may be an association governed by a joint Committee. In the UK the consortia of local authorities in Northern England and Scotland tend to be governed by a joint committee and those in the South tend to operate by collaboration. With committee consortia there may be a central jointly funded office to provide services. With collaborative consortia the individual local authorities provide services for the others and develop centres of expertise – for instance Southwark carries out energy purchasing for the Central Buying Consortium, the UK's largest. Where the purchasing service is based on agreed protocols without a

formal committee, peer pressure under the British cultural ethos appears to work well and this system has a proven track record. In other local authorities (e.g. Lancashire, Greater London Education) sections of the local authority were separated into local authority owned organisations which in due course were sold off (often in management buy-outs). This permits the organisation to sell to all potential clients which may allow even further aggregation of purchases.



Collaboration Consortia in England

Joint Committee Consortia in England

The draft further Directive on electricity and gas proposes the obligation to open the market to all enterprises, including local authorities. So each local authority site will be open to competition and the Codes governing purchase by public authorities will apply. In effect all purchases will need to demonstrate that optimal value has been obtained. This has been the situation in the UK for 10 years, initially for 1 MW sites, later for 100kW sites and since 1998 for all sites.

### The British Experience

The following consortia operate within the UK

Joint committee	Collaboration without statutory joint committee	Local authority stores trading beyond their boundaries	Privatised companies
ABC (Authorities Buying Consortium) (Scotland)	Black Country Purchasing Consortium	<b>Birmingham City Council</b>	<b>A-Z Supplies - formerly, Essex county supplies</b>
CFG (Counties Furniture Group)	CBC (Central Buying Consortium)	Cheshire Business Services (Cheshire County Council)	GLS Educational Supplies (previously Greater London Supplies).
CHEEP (Consortium for Higher Education Energy Purchasing)	Derbyshire Districts Purchasing Consortium	Cumbria County Council	Lancashire Purchasing Agency - formerly Lancashire county supplies
ESPO (Eastern Shires Purchasing Organisation)	Kent Buying Consortium	Devon County Council	"The Consortium" (Owner - Hammond Bridge. Formerly South West Authorities)
NEP (North Eastern Purchasing Organisation)	LAPP (Local Authority Purchasing Partnership -formerly Greater Manchester Consortium)	Essex County Council	
NHS Logistics Authority	London Contracts and Supplies Group	Hertfordshire County Council	
Supplies	Welsh Purchasing Consortium	Kent County Council (also in CBC) inc LASER for energy	
WMS (West Mercia Supplies)		Northamptonshire County Council (also in CBC)	
W & NW (Wirral & North Wales Purchasing Organisation)			
YPO (Yorkshire Purchasing Organisation)			

Local authorities operating via a committee consortium tend to have a headquarters base that can carry out part of the work. The establishment of a common base was sometimes seen as a defence against local authority restructuring.

Some local authorities have privatised their purchasing operations and these now operate as separate purchasing organisations. Some were subject of a management buy-out, others were part of larger company structures.

The size of the consortia varies tremendously, but overall consortia are thought to deal with between 4 and 5% of total local authority purchases of goods and equipment. Savings on energy purchases vary depending on the size of the consortium and the degree of wholesaling that is possible. CBC suggests that savings of 5% are made while CHEEP (below) suggests savings of 2.7%.

### **Approach to energy services**

The degree of involvement in energy issues varies, but the consortia have undertaken a number of interesting models:

#### Subcontracting out energy purchasing

The Consortium – the privatised consortium of local authorities for the South West now owned by Hammond Bridge, has subcontracted its energy purchasing to a specialised organisation, Energy2000 rather than appoint its own specialists. It may be that in this field there are advantages in aggregating even further to include non-local authority clients.

#### Offering green energy and energy advice

Consortia are centred on the purchasing role. For instance, all ESPO's staff are members or studying to be members of the Institute of Purchasing and Supply. So they have adapted to the purchase of green energy since this is simply the adaptation to purchasing a product with a different specification. For instance the ABC consortium of 12 Scottish local authorities and associate member organisations will save approx €700,000 on their electricity bills over the next two years. This is because they are buying 20% (about 112 GWh) of their electricity from renewable sources, which is exempt from the Climate Change Levy. This means that they will reduce carbon emissions by at least 10,000 tonnes per year. The consortium has also negotiated for 5% of its unmetered supplies for street lighting from 'green energy' sources, believed to be the first contract of its kind and one which delivers a further saving of approx. €53,000.

#### Central Buying Consortium

Central Buying Consortium put out a restricted call for tender for a long term contract to supply green energy linked to a major investment in renewable energy. The bid was handled by Suffolk County Council on behalf of five members of the Consortium.

A draft contract was prepared and this identified a proposed contract period of 10-15 years with the period chosen being designed to achieve the pricing constraint of not exceeding the price of other forms of generation. The contract specified a list of sites which would purchase the current and their demand/load profiles so that an estimate could be made of their ease of adaptation to the proposed capacity. The technology used, the balancing mechanism proposed, and how the respondent supplies the current and where the capacity was located was up to the discretion of the generator – the local authority would have no interest in it and only wished to purchase the necessary supply as continuous current. But at the same time, since the local authority wished to promote the installation of new generating capacity, they wanted to know which capacity is being applied, and that the capacity is exempt from Climate Change Levy.

The call also specified a price per kWh for the first 12 months and proposed a method for assessing the price in future years so that an equitable balance of risk and reward could be obtained. The current was to be billed separately to the target sites, and so a flexible approach to billing was also required. Any additional services offered by the client (energy management, data collection from the target sites, etc) were also seen as a plus point in the bid. Other issues, such as changes in the buildings supplied, would also be the subject of agreed procedures

In effect therefore the bid was to a trader who could put together a consortium of services in return for long term certainty with regard to the client. In the light of the experience in California, such long term contracts

also act as a stabilising influence on the market and so they could also be seen as desirable for other reasons. But it could well be a services contract as much as a straight energy supply contract.

In practice the bid did not receive any replies from the three tenderers selected. The bidders concerned did not criticise the bid and the Consortium is still optimistic of getting together a successful bid. It is intended to repeat the exercise at some point in the future. However this emphasises the difficulty in actually implementing such a bid and the need for specialist expertise if a call for tender is to be made.

Most consortia seem also to promote energy efficiency among their members by exhortation, but none offer any direct services in this field. There is in fact no real link with the purchasing function. Effectively investment in energy efficiency has a cost and the introduction of energy efficiency as an incentive increases the bottom line price per kWh. When making price comparisons, the client will go for the cheapest.

However the consortia do enable the authority to bulk buy energy efficiency equipment and materials – e.g. light bulbs, insulation materials etc and many include such items among the products on sale. However this action is independent of liberalisation.

#### Purchasing Energy Efficiency– the example of CHEEP

In principle one could offer bulk purchase of energy efficiency on the Third Party Financing model, like the case in Berlin. This action has always been open to competition. But there are no real examples among the consortia? Why?

One possible reason is that Third Party Financing needs a great deal of investment up front to gather baseline information (e.g. by energy monitoring) and no purchasing manager is willing to invest this to cover any likely putative savings. The funding available for going out to tender is too small to fund this preliminary work itself, and the benefits don't fall back to the purchasing agent. This may explain why it is energy units in local authorities that have done this type of Third Party Financing project and invested in information gathering, rather than the superficially more efficient purchasing section.

There clearly is scope for purchasing energy efficiency improvements collectively, but there is need for a large amount of background work to be carried out for it to be effective. The one advantage of combining might be that each partner could gather information on one or two buildings at a time and then go out to tender as part of a larger unit, with better prices.

The Consortium for Higher Education Energy Purchasing (CHEEP) represents an interesting example of the potential and the problems. Universities are not local authority, and indeed are private institutions although funded by the public sector. Their model could be used by local authorities, although they probably have greater freedom from capital spending restrictions than local authorities. CHEEP is a committee based consortium and is effectively a club of university estates managers. It has a central team of four based in Birmingham University which coordinates purchases of energy for 110 British Higher Education institutions. It also started carrying out activities promoting energy monitoring and promotes energy saving in its literature. It needs centralised consumption data to enable it to bid for wholesale supplies and also to enable it to maximise savings through efficiency investments.

For instance the central unit noted that there are no across sector measures, benchmarks or indicators of energy consumption performance by higher education site. They therefore planned to collect data using the dataplus system from the main fiscal meters for electricity at all participating institutions and to use such data to establish performance indicators across the sector. Energy waste within the sector can be identified and corrected through comparison of use and best practice.

However setting up the project proved easier in theory than in practice. The project was proposed by CHEEP, but the participant universities were not defined at the outset and were not involved. Once approved six were identified but these soon declined to four and finally three pilot universities, Birmingham, Cambridge and Manchester. They evaluated the feasibility of extending the collection of data from fiscal meters for gas and water to all utilities and also to go beyond the fiscal meters to smaller local meters on a site or building basis. The potential rewards are great. Even if such limited action saves only 1% of electricity use, this equates to a £1 million annual saving or £2.1 million if the same saving is applied to gas and water.

#### Other clients

Under British law local authority consortia can also act for other public sector organisations and charitable non profit making associations. This can increase their client base and help them achieve greater savings. ESPO, a committee based consortium based in Leicester has permanent staff dealing with the different

energy purchasing functions – electricity, gas, oil and coal etc. In total they service about 4000 organisations, which allows them to put out 35 million (€50 million euros) of energy needs out to contract.

#### Individual local authorities

Many individual local authorities have purchased green energy in the competitive market. In the UK for instance, Leicester purchased green energy for its main Council offices from 1995 onwards. This was the City's only site exceeding the then current threshold of 1MW. Two years later it organised the purchase of green electricity for two other sites in its ownership. Gloucestershire County and Stroud both purchased 100% green electricity for their main offices. More recently many other councils have purchased 100% green electricity – Lewisham, Newham, West Wiltshire, while others have purchased a proportion (e.g. Plymouth = 20%). Herefordshire commenced purchasing "green" electricity to cover 100% of the authority's needs in December 2003 under a contract negotiated via West Mercia Supplies.

#### Consortia in other liberalised markets

##### **Sweden**

In Sweden over 200 of the 289 local authorities put their energy bills out to tender through one private company, set up by the Swedish Association of Local Authorities (Svekom) and obtain "substantial" savings. This company Kommentus, predated liberalisation and was established by the association in 1927. The arrangement was established to ensure that the local authorities got a good deal in oil purchase and has purchased oil competitively for many years among other products. The company apparently takes a commission of about 0.3% of the costs, which is regarded by some local authorities as high although it compares favourably with a suggested cost of 10% of the savings indicated five years ago by a British consortium.

##### **The Netherlands**

Groups of Dutch authorities have also successfully experimented with a joint call for tender. The attempt by the first group of 22 municipalities led by Utrecht did not succeed in getting an acceptable offer due to problems with the quality of consumption data provided. They asked for guarantees about the source of the electricity and a lower price. But they are trying again and other consortia have succeeded. For instance consortia led by Nijmegen (16 authorities), and Vlissingen (19 municipalities) have both succeeded in putting out a joint bid and getting a lower price than previously although they were bidding for 100% green electricity. In the case of Vlissingen this amounted to 2.5% or €50 000 per annum. The trend looks like it might spread.

It is interesting that many local authorities putting out to tender individually in the Netherlands got no offers – it is easier to draw interest if one is a big player on the market. In addition the quality of data is often too poor to permit tendering. This is a factor that has been evident in the UK and is a great advantage from the energy efficiency point of view since there is a major motivation for improving the basic data available, so highlighting inefficiency.

## LESSONS LEARNED

### **Implications for energy services**

The suitability of the different method depends on local culture and local expertise but it is apparent that different methods are effective and profitable in terms of the savings they generate. The key advantage of the competitive purchasing process is that it raises the possibility of identifying the best opportunities for making energy savings in local authority stock through monitoring and targeting. Therefore there is potentially the possibility of selling further energy services.

The experience of CHEEP is salutary. Professional boundaries have a big impact on behaviour. CHEEP brings together purchasing managers employed in university estates departments. They did not see the point of benchmarking or local monitoring, since they buy in the whole of their supply at university scale and aggregation of demand is the objective. Energy saving is another person's responsibility requiring different skills. Twenty British Universities already monitor at the building level, but there was no support for using this resource to promote benchmarking. Following the completion of the project, no further universities wanted to participate or take it forward.

This failure is however a significant lesson. Clearly energy purchasing and energy saving must be seen as separate activities each with their own markets, and more importantly their own professionals. Nevertheless each speciality is susceptible to the economies of scale.

So to sell services one needs to think savings, and purchasing managers think of savings on purchase prices not energy consumption. That is their training and ethos. Thus the system works well for buying Green power – which is a product like any other. But it is clear from the experience of those that tried to also involve energy efficiency issues that the cases where energy efficiency will be used as a real lever in the purchasing process will be few and far between, and that in effect there will be two processes in operation: buying energy and buying energy efficiency improvements. Where the whole process is managed by an energy management unit, as occurs at Leicester City, then innovative ideas can develop. But usually it is purchasing managers who are involved and like all professions, they are unlikely to welcome others treading on their domain. Without the enthusiasm that comes from the quasi religious commitment of the committed energy manager, the results will be disappointing.

## Projects

The idea of operating in consortium for energy purchases has already been put forward in the Netherlands and France. French Syndicats intercommunaux offer a good model within which one could aggregate demand to increase purchasing power. What is still required is the desire of enough local authorities to buy green or cogenerated power. Similarly the consortium model is a good way to purchase energy efficient equipment more cheaply, and therefore to render it more economic. Hessen in Germany has acted as an intermediary purchasing small CHP units for a “bulk” price.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The introduction of consortia in the UK is specifically provided for in legislation relating to local government which gives local government the confidence to develop such structures. Similar legislation is needed in other countries if consortia are to develop for energy purchase. Where there is any doubt or hesitancy on the part of local authorities and other public bodies in developing such structures, it is worth considering introducing specific legislation to ensure that the legality of such action is indisputable.

In the UK a new avenue is now open. With the changes introduced in 2000 whereby local authorities can set up enterprises for the good of their area, one could envisage local authority owned companies jointly purchasing on behalf of the shareholders. Such an avenue appears to be more widespread already elsewhere in Europe, and this might be the legal framework favoured by some groups of local authorities as part of their energy services activity.

But the key to all this is information on energy use. It is the first step to good purchasing and good energy efficiency policy makers. The more one can promote monitoring the better, and governments would be well advised to think how they can ensure that this takes place at local level. It is again another field where cooperative action to support energy monitoring on a sub-regional scale could help since there are clear economies of scale in this operation.

## FURTHER INFORMATION

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# A comprehensive community based programme

# Leicester (UK)

## GENERAL ASPECTS

Leicester is the chief town of Leicestershire. A city with 294 000 inhabitants, it has the largest Asian community in the UK. Originally a Roman settlement, the city is a focus of communications in central England. A green city, it became a highly industrial town, noted for hosiery. Now services form the largest sector.



## BACKGROUND

Leicester has a long tradition of environmental activism having run many environmental projects since the 1970s. It had already run a series of projects to improve energy efficiency in the municipal stock of social housing before 1990 which had saved a total of 90 000 tonnes of CO<sub>2</sub> emissions per year.

In 1990 Leicester was appointed Britain's first "Environment City". Leicester then committed itself to a process of consultation with different environmental interests via an organisation called "Leicester Environment City Trust". This organisation promotes discussion research and consultation and is composed of 8 working groups focusing on individual environmental issues. They developed strategies for the city for each of the sectors concerned including energy. The Trust was merged into a new charity, Environ, that promotes sustainable lifestyles.



18C New Walk , Leicester

Municipal policy has a target of reducing the city's energy consumption by 2025 to half that of 1990 and to ensure that 20% of the energy derives from renewable sources by 2020. The action plan proposes to achieve this by initiatives in the field of cogeneration, renewable energy, waste, transport and energy efficiency, particularly in housing. These proposals have been supplemented by the adoption of the city's Local Agenda 21 and Community Plan.

Liberalisation in the UK has been complete and there is fierce competition between suppliers at all levels, large users, small business and the domestic customer. The vast majority of this competition is based on price although a market for green electricity has developed. If local authorities are going to compete with this price based advertising, they too have to campaign actively and imaginatively to promote energy efficiency and renewables. This is precisely what Leicester has been doing.

# ACTION UNDERTAKEN

## Action in housing

Environ with the support of Leicester City Council, opened a pioneering "Eco-House" in a park in Leicester. This 70-year old traditionally built house operates as a show house open to the public. It has been adapted to incorporate many improvements designed to raise its environmental performance. It demonstrates to residents how they can improve the performance of their house even when it is relatively old. This is an essential issue in a town where one third of the housing stock is over 80 years old.

Leicester's action on housing was built on a firm foundation of action in their own stock of social housing. The energy performance of housing in the city had risen from around NHER 3 to around NHER6 before full market opening.



Following liberalisation the UK government set up a body to promote energy efficiency activity, the Energy Saving Trust, funded jointly by a levy on energy sales and Government grants. This organisation has funded a programme of action in local energy efficiency advice centres which covers the entire country. In addition they have funded programmes (so-called HECA Action) to promote energy saving in housing under the Home Energy Conservation Act 1995 which require local authorities to plan for a reduction in energy consumption of 30% by 2010. A major motivation of this saving is to reduce fuel poverty, defined as a household spending more than 10% of its income on energy.

Delivery of these programmes has frequently been conferred on energy agencies and these have often taken on the responsibility for adjoining areas. Thus Severn and Wye Energy Agency now covers all of Gloucestershire and Milton Keynes covers South Bedfordshire. Leicester Energy Agency was set up in 1996 in cooperation with Leicester De Montfort University. It is based in premises on the main market square in Leicester and is host to Leicester Energy Advice Centre and Leicester and Northamptonshire and Energy Efficiency Centre and Energy Agency and so covers a wide surrounding area.

There is a national "Home Energy Check" questionnaire that is available free to enable householders to assess the performance of their home. It enables the Advice Centre to provide advice tailored to the householder's particular needs. This can include advice on sources of funding, low energy consumption appliances, approved companies to carry out improvements and sources of clean and renewable energy. Some low energy appliances are sold cheaply at the Advice Centre, for instance low energy light bulbs and efficient power points for refrigerators.

The City is continuing a programme of energy auditing within the municipal social housing stock which is used to prioritise their programme of improvements.

In the private sector a Home Energy Strategy programme has been launched. This includes training for the building trade, the financing of initial energy efficiency audits for housing, advice for private individuals and subsidies for work carried out. In addition the agency runs an information campaign "save energy in the home".

Regulation plays a role in maintaining a high energy performance in the housing sector. Planning regulations cannot require a higher standard of construction than that in the nationally determined "Building Regulations" although high performance can be indicated as a favourable consideration in the UK's discretionary planning system. Nevertheless the authority can and do require developers who purchase land from the local authority to develop to a NHER rating of 9.9.

A solar club has been set up by LNEECEA and Environ to provide training to individuals who wish to install their own solar thermal panels and which also sells the equipment on preferential terms.

## Action in the home

Leicester Energy Agency has developed a programme to promote energy saving technology. Equipment producers and suppliers can become “Energy Sense” partners and customers can obtain a reduction from these partners by showing an “Energy Sense” card.

The Turning the Tide Campaign has been set up to counteract a lack of awareness of environmental matters and is run in partnership with the neighbouring cities of Nottingham and Derby. A campaign has been run on energy in which it was possible to purchase reflective radiator panels at cost price. The campaign is run in cooperation with the local media – TV, radio and newspapers.

Environ provides free training for people on a wide range of issues relating to energy. Introductory sessions on energy conservation are held. Programmes of five afternoon sessions at the Eco House are devoted to questions of heating lighting insulation and subsidies available for energy saving activities. These people are called energy advocates and are able to advise others on the energy efficiency of their own homes and can spread this information to their network of contacts. This training is also given in depressed neighbourhoods in the city to encourage them to save energy and therefore costs.

Leicester Energy Advice Centre has promoted renewable energy with its “Plug into Green Energy” campaign. This draws attention to the benefits of purchasing sustainably produced power and of saving energy - the cheapest energy is that which is not needed.

Leicester has indicated that it will copy Merton Council which requires all new development over 1000m<sup>2</sup> to provide 10% of its energy from renewables. This pioneering new planning regulation was accepted by Government in November 2003.

## The industrial sector

The industrial sector is also a target for information activities. Large companies are targeted via the National Energy Efficiency Office in each region as part of a national campaign. They have created the “Leicester Energy and Environment Group” as a vehicle to deliver to these companies.

SMEs are approached by the city’s Energy Agency through a mobile conference centre “Energy User Cruiser” in cooperation with the national energy agency, ETSU, financed by the Government’s “Best Practice Programme” This provides training for employees and is designed in particular to develop savings by changes in behaviour.



## Utility Supplies

The City Council has purchased green electricity for its main council offices and for two other smaller offices (including the energy agency). This amounts to 15% of its total demand. However it has also installed a number of small CHP schemes and renewable generation schemes in the city amounting in total to 9% of the Council’s total supply. Leicester is keen to promote sustainable energy across all the city. In November 2003 it got Government support for a pioneering city-wide district heating network which will incorporate an element of biomass (in the UK district heating has not been well developed).

## Monitoring Energy Use

Leicester Energy Agency is responsible for monitoring and paying energy bills for other departments on their behalf and can therefore monitor excessive use. It is thus able to propose and manage energy efficiency investments which it does on behalf of the other departments. This monitoring system has been very successful in increasing interest in energy efficiency investments. Recently the Agency has set up an advanced continuous remote monitoring system of water and energy use. Meters are connected to the Agency’s offices by radio link. The Council has set up targets to save energy in its energy policy (see above) and the Energy Agency’s role in monitoring energy use in the municipal stock is an essential tool for meeting these targets.

## LESSONS LEARNED

Leicester has used a broad ranging and hard sell approach to sell energy efficiency to the citizen. It has backed this up with resources and has kept its programme, established long before liberalisation and in a different political climate, going hard and strong. This has borne fruit in terms of improved performance and continued commitment. The support from the municipality has been broad ranging and has included other regulatory controls and not simply subsidies. It has allowed the local authority to lever out support from other sources, even though it has no priority for EU funds and is still, in international terms, a relatively prosperous city.

The United Kingdom approach has given a high priority to local action in which the local authority or local authority sponsored body (e.g. an energy agency) acts as a coordinator of the various players in delivering energy efficiency in the housing sector. There is an active national "HECA" network and complete coverage of local and regional energy advice centres. This is funded by a levy, the "Energy Efficiency Commitment", which is charged as a flat fee per domestic customer per fuel.

## LESSONS FOR PUBLIC POLICY MAKERS

If local authorities are supported and given a secure source of funding, they can deliver energy efficiency services at local level, particularly in the housing sector. But this requires long term commitment. There is nothing so demoralizing to a local authority than to have the budget increased and then cut according to the whim of political fashion. The best way to do this is to have a firm financial allocation affected to action in this field with a clear allocation to action by local authorities or local level organisations.

## FURTHER INFORMATION

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# Reinvesting the Climate Change Levy Warm Zone Initiative

# London Borough of Newham (UK)

## GENERAL ASPECTS

The London Borough of Newham (population 243 000) is a local authority in London's East End with the full range of local authority functions. It has a high ethnic minority population and many relatively poor areas often associated with social housing estates.



## BACKGROUND

Newham is participating in two major projects to promote energy efficiency. Like most projects to promote energy efficiency in the UK, the link to liberalisation is indirect. Liberalisation has created situations where the traditional funding channels for encouraging energy efficiency among those on low incomes and for improving energy efficiency in the local authority's capital stock have changed. This case study describes two separate and parallel initiatives that tackle these problems.

The introduction of the Climate Change Levy (CCL) was associated with a reduction in the employers social security contribution. In the case of many local authorities, this provided a considerable net saving and the opportunity was presented (as was the intention of the central government) to reinvest these savings in energy efficiency measures. At the same time funding is available from a fixed charge per consumer for public service obligations – the Energy Efficiency Commitment (EEC) administered by the energy companies concerned who need to use it to achieve given energy efficiency targets.

Newham has a very large housing stock, both social and private, nearly all of which could benefit from improved energy performance. They have been a key partner in a Warm Zone project to help promote energy efficiency investments in local housing to reduce fuel poverty.

## ACTION UNDERTAKEN

### Objectives of the projects

#### Recycling CCL savings in Newham

The introduction of the CCL was intended to encourage investment in energy efficiency measures and the opportunity for using the rebate was first discussed at a group meeting of the London Boroughs Energy Managers Group (LBEMG). The Energy Efficiency Officer at the London Borough of Newham (Newham

Council) calculated that the reduction in its social security contributions would outweigh its increased fuel costs due to the CCL by €344 000 per year. This meets the local authority's objectives in terms of improving their environmental performance, improving the standard of heating and comfort in its stock and reduces the energy bill in the long term in line with Government objectives to reduce CO<sub>2</sub> emissions.

#### The Newham Warm Zone pilot project

Energy efficiency programmes were not reaching those in greatest need. Schemes were designed to deliver the greatest savings in kWh per unit of investment and all funding had to be matched by a 50% contribution, an insurmountable obstacle for the true fuel poor. Work carried out through the HECA programme (HECA = Home Energy Conservation Act which imposes an obligation on local authorities to improve energy efficiency in the residential sector) had very variable results with local authority commitment varying from exemplary to minimal. Installing energy efficiency measures, thus reducing energy expenditure and removing families from the fuel poverty threshold, was still, however, seen as a means of reducing fuel poverty. The Warm Zones sought to target help to those in greatest need.

Warm Zones are a Government-led pilot initiative promoted by two Government departments, the Department of Trade and Industry and the Department of Environment, Food and Rural Affairs. The national initiative, launched in 2001, will last three years and has an overall budget of €10M. It is designed to investigate ways of tackling a condition referred to in the UK as "fuel poverty" via public private partnership. A family is defined as in fuel poverty where they spend over 10% of their disposable household income (excluding benefits) on energy. The British Government has a target to "end the blight of fuel poverty among vulnerable households by 2010"

Eaga Partnership was active in proposing the warm zones approach. This is an employee owned company which administers the Warm Front programme (a Government scheme for funding energy efficiency improvements among the fuel poor in receipt of a range of benefits) through much of England. It worked with two "regeneration" consultants in preparing the proposal and they are now lead consultants to and board members of Warm Zones Ltd., the not for profit company specially set up to run the Warm Zones programme. Eaga is actively involved in delivery in five of the six current zones, including in Newham.

The main objective of the programme is "to eliminate a significant percentage of fuel poverty within each zone within 3 years" by involving all the key players and interests in an intensive programme in five pilot areas of need.

However it is also intended to:

- Improve energy efficiency across the entire housing stock,
- Better deliver measures funded under the Energy Efficiency Commitment measures,
- Increase general awareness of energy efficiency in the domestic sector,
- Improve carbon emissions strategies for the domestic sector,
- Create new jobs and training opportunities.

The Zones combine resources and measures at local level and use specific Energy Efficiency Commitment and Warm Front money to deliver effective energy services to the fuel poor. In general direct grants from the Energy Efficiency Commitment are targeted at social housing where additional capital resources are available for co-financing, and Warm Front grants target the private sector.

The Warm Zone organisational structure follows a model typically used in Britain for projects delivering services to a local area. A semi independent unit is established with a project director. This has freedom of manoeuvre outside the usual constraints of administrations. The project director is independent but reports to the sponsors, in this case both those at local level and by a bi-monthly report to the central coordination team which in turn liaises with Government. The project also involves all the key players in the locality via a committee of interested parties (stakeholders). Each of these players continues to play its normal role and is encouraged, via its involvement in the project, to co-operate and give priority to delivering results in the project area. A key element of the Warm Zone projects is the secondment of staff by the main parties, an energy company and/or a local authority.

Each Zone is funded by contributions from the local energy company, the local authority and a government grant. In Newham's case, London Energy contributed \$140 000. In both Sandwell and Stockton the sponsoring companies contributed \$350 000 to the local teams. Close liaison is also retained with Eaga partnership.

The Zones collaborate at local level with energy companies, local authorities, the Warm Front scheme, health authorities, local businesses and community and voluntary organisations. The best existing programmes, together with some new approaches are brought together to reduce fuel poverty via improved energy performance in the fuel poor households. An assessment of the entire housing stock in the zone is made during which energy efficiency advice will be offered to all householders, carbon emissions will be reduced, and new jobs and training opportunities created.

The Warm Zones Programme was originally set up in five local authority areas. The local authorities concerned form major partners to the scheme in their area: Northumberland, Stockton, Sandwell, Newham and Hull. Redcar and Cleveland has joined the programme after the initial launch.

## **Details of Projects in Newham**

### Recycling CCL savings

An internal partnership between the Environment Department and the Financial Services Division of the Chief Executives Department provided the essential key to implementing this project. The Energy Efficiency Officer from the Energy Conservation Unit in the Environment Department, approached the Head of Finance to discuss using the net savings to fund energy efficiency measures. The idea was based upon the highly successful water conservation programme that the Council had already undertaken which had reduced the Council's water consumption and saved money. The two Departments presented a paper to Cabinet Committee in March 2001, and following full explanation of the impacts and with the full support of the Finance Director, they agreed to the proposals in full. In the light of action in the first year, they have agreed an ongoing annual investment of €344 000.

An initial €47 000 was spent on a baseline energy survey of the municipality's buildings carried out from Sep-Dec 2001. The funding available is to be split between corporate buildings and schools on an approximate 50:50 basis.

In parallel with this initiative, the Council is encouraging energy saving by making each end user Department financially responsible for their energy use, and with the support of the Energy Conservation Unit these are encouraged to reduce their energy use and so save money for the Department.

Work carried out in the initial months of the programme includes arranging for specialist Building Energy Management Systems to be installed as well as cavity wall insulation, roof insulation zoned heating controls, lighting controls, as well as low energy bulbs. Targets have been identified for CO<sub>2</sub> reductions and payback periods. The investment undertaken in the first year will have an estimated payback period of less than 5 years in both the corporate buildings and schools.

### Warm Zones

There is a Central Coordination Unit for Warm Zones with a core management team that analyses the fuel poverty situation and provides the skills necessary to identify fuel-poor households and apply appropriate measures. In each Warm Zone there is a Zone Director with key involvement of the local authority and a local energy company. All the zones work under the guidance of national performance, delivery and best value targets and generally raise awareness of related issues. These include health and energy conservation, promoting neighbourhood support and care for the disadvantaged, providing new sources of finance for those without resources, and, through advice on available benefits and finance, reducing poverty generally.

Newham was originally intended to be an example of a local authority led approach. The Zone Director was originally a second tier officer seconded from the local authority but has now been replaced by an independent appointment. A partnership team, led by the two key partners, London Borough of Newham and London Energy (a subsidiary of EDF Energy), meets every three months to provide an overview of the action in their area. This team includes representatives of all local players concerned with fuel poverty and energy efficiency. (In all the other zones the Director is seconded from the electricity company – and a member of the Newham team is provided by London Energy).

The two key partners have each contributed to setting up Newham Warm Zone's central management team. Newham Council supplies office accommodation, one seconded officer and some funding from the Housing Department's Budget. London Energy provides computers, funding, one seconded officer, cavity wall insulation & low energy light bulbs. There is a regular swapping of information between the Council's Energy Conservation Unit and the Warm Zone so that each is aware of action taken by the other in their own field of

responsibility (Newham in the Council's stock, the Warm Zone in the private residential sector). Installations are funded by grants from Warm Front, EEC money, and funding from the London Energy and the local authority.

In the past schemes in the private sector had relied on referrals by other agencies. It was felt that if one is serious about the fuel poor, one should systematically identify and target them. Referrals had not been effective in getting to the need. In Newham it had originally been proposed to use a desktop analysis approach using benefit data fed into a computer programme to identify those in fuel poverty, to identify hotspots of fuel poverty and to target those in need. This approach was abandoned as ineffective and a detailed street by street approach, as adopted in the other Zones, has been preferred to identify them. However the Newham Zone still has access to the Council's database which enables it to focus on those in need.

The key first stage is a systematic identification of the targets. The contact rate varies considerably from 72% in Stockton to 30% in rural Northumberland. After the first year, Newham's scheme is concentrating on the private sector which is not easily approached by traditional methods. Neither landlords nor tenants in private rented accommodation have much incentive to save energy since neither is likely to see a direct return from the investment and so the best target is the private owner occupier sector. In Newham the Zone has used approved installers to collect the data for the assessments free of charge. They provided seconded staff who are managed directly by the Warm Zone office and each is responsible for a particular territory. The actual assessment is carried out later by the Warm Zone staff using the data collected and all work arising in their "territory" is allocated to the installer concerned. In all about 50 000 assessments had been completed in Newham by late 2003. This almost exactly matches the target of 60% of the entire stock of about 90 000 dwellings.

The management approach has varied between different pilot areas. In Newham the project is managed by a coordination team that provides strategic guidance and operates via subcontractors. Management is divided into two separate areas, each area managed by a separate team. Eaga Partnership manages the northern and eastern area team and Osborne Energy manages the southern area team. In addition the local authority has appointed GM Energy Services to run an insulation programme in their tower blocks and it will run a fuel poverty assessment programme at the same time.

Newham Warm Zone's programme has concentrated on the private sector since at present 50% of the fuel poor representing roughly 15% of all households in Newham are not eligible for grants. Newham Council is running a parallel programme in its own social housing stock. This latter uses a 50% EEC grant provided by London Energy and is systematically replacing electric heating with gas central heating and installing insulation, so reducing CO<sub>2</sub> emissions and reducing heating bills for tenants. Where Newham Warm Zone finds an uninsulated council property during its assessments, it would automatically install the necessary insulation.

Newham Council delivers Warm Front Grants to those in receipt of social security or other benefits. This funds 100% of the cost of approved works. The Warm Zone also targets private sector residents over the age of 60 who are in fuel poverty but who don't meet the required minimum criteria for Warm Front grants. To plug this gap, the Zone has set up a fund of €575 000 to provide grants to householders in this category. Half was contributed by the local authority from local "Regeneration" budgets and this was matched with funding from London Energy's EEC money. Grants are also provided at a rate of 100% of approved works and this has proved most successful – the only problem is that the funds available are too small for the potential need. The main problems are found in the older private housing stock, especially the private rental sector, which is generally less well insulated and with poorer heating systems than the local authority stock.

Following approval as a fuel poor "client", the "client" is advised of the work that is recommended and the contribution available. They are referred to other providers of help who administer their support directly. These include the Warm Front grants, Energy Efficiency Commitment moneys, local authority funds etc. They are then given the opportunity of getting the work done by an approved installer. Newham takes a fee from approved installers which helps finance the programme. Installation contractors are appointed to do the energy efficiency work on a bulk, "fixed price" basis.

In addition Newham Warm Zone has appointed a benefits advisor to advise the fuel poor of potential state benefits to which they may be entitled. This has so far put over 100 people on additional benefits with an average additional income of €42 per week. This has a greater effect than any heating or insulation measure and since they now receive benefit, they should also get Warm Front grants to pay for energy efficiency work.

# LESSONS LEARNED

## Recycling CCL savings

Experience demonstrates that it is vitally important to have the support of elected members and senior officers – particularly when large budgets are involved. Such a programme depends at times on a very fragile political commitment. Therefore when promoting energy efficiency activity, it is useful to tailor the selling points of the energy efficiency programme to the particular audience. The Energy Conservation Unit has found that school head teachers, who face tight budgets, are most interested in financial savings, whilst the elected members give greater weight to environmental benefits because of their concerns for the local environment and developing Government policy in this field.

It is a basic market principle that each department should have a financial incentive to use energy more efficiently. Transferring the responsibility for managing energy bills over to each department, or better each building manager, helps to achieve this.

## Warm Zones

The Warm Zones are continually being monitored by an external evaluator appointed by the Energy Saving Trust with the intention of comparing it with other competing initiatives. That evaluation, published in May 2003, demonstrated a slow start in the assessment process. This implied that the project initiators may have made over-optimistic assumptions about the ability of the Zones to carry out assessments on the scale desired. At that time it seemed unlikely that the Zones would reach their targets. In Newham the delays were partly caused by the abandonment of the previously untried desktop analysis approach. The evaluator, however, felt that this desk top process warranted further development since, if successful, it would have been useful in targeting those most in need.

In three out of the five pilot areas (including Newham) the number of assessments was 4-6% of all the fuel poor households at 18 months into the project, way below target. Over all five zones only 14% had been assessed instead of the 50% planned. The experience of Newham suggests that this rate has dramatically increased once the programme has got under way. To reach targets rapidly, some Zones, including Newham, were using installers to provide “free” surveys. Newham have devised a system that places an “arm’s length” between the installer and the survey, emphasising that this relationship has to be handled with care to avoid a lingering uncertainty about the disinterest of the assessor and the accuracy of the information. However, with a financial interest, the assessor has an incentive to ensure take up of grants.

The low eligibility of the fuel poor for grant aid is a general feature and needs particular consideration. Overall it is estimated that 38% of households in the zones are not eligible for Warm Front grants and the penetration rate is therefore perforce limited. In this context Newham Warm Zone’s own grant scheme is an admirable initiative. The Warm Zone approach is efficient at identifying the fuel poor but given problems of take-up it seems unlikely to reduce fuel poverty by the desired 50%. In Newham the evaluator noted that only 1% of the fuel poor had been removed from fuel poverty. About three quarters of households where work has been carried out remain in fuel poverty since grant aid does not cover a sufficient range of measures (and indeed sufficient measures to lift them out of fuel poverty might not prove cost effective). Thus where the objective is to reduce fuel poverty, it must be recognised that this is produced by poor housing and low incomes. Energy efficiency on its own is not likely to become an issue. This point was emphasised by both national and local project managers. But if low incomes are the main problem, then in the end income supplements are more likely to be effective and Newham’s appointment of a benefits adviser seems particularly appropriate.

The most successful of the zones at the time of the evaluation, Stockton, has taken full control of the process and energy efficiency programmes itself and has taken charge of the local authorities housing capital programme for energy efficiency, a significant block of funding (€17.8M). A number of factors have led to this situation, including a well organised and committed local authority. The local authority the sponsor Transco and the EEC provider, British Gas, have all provided generous and flexible financial contributions and there was a strong pre-existing relationship between the Director and the local authority.

The leading role of the electricity companies in the zones poses a number of questions noted in the evaluation. One of the objectives of the programme is to promote action on fuel poverty without promoting commercial advantage for the electricity companies. This is naive. In only one zone is Energy Efficiency

Commitment funding sought from companies other than the sponsoring companies, so the sponsoring company is getting all the benefit in meeting its energy efficiency targets. Private companies are not charities and they will seek advantage from their investments (or go bankrupt). The leading role of the electricity companies therefore limits the Zone's ability to tap independent resources for meeting its own targets. But at the same time it generates commitment to supply resources from the sponsoring company.

To counter this influence the evaluator recommends getting sponsorship from Transco (the national electric grid and gas transport company) since it is neutral with regard to Energy Efficiency Commitment moneys. In order to improve transparency, the evaluator felt that the local authorities could be alternative partners without a specific energy efficiency interest since they already have a critical role at the strategic and operational level. It recommends trying out such an arrangement in future zones by setting up another local authority led zone to test the local authority led approach with a suitably senior manager seconded from a local authority. Some local authorities appear ambivalent about that critical role under the present arrangement.

The evaluation comments that progress on soft measures (advice on behavioural measures, benefits etc.) has also been limited, and Zones do not pro-actively offer advice on energy tariffs – arguing that this is too complicated – although this was a clear objective outlined by the central team. The political difficulties of energy company sponsorship may have had an influence. The delays in delivering assessments and achieving take up of grants have clearly dominated management thinking. Maybe soft measures are better delivered by other organisations without such responsibilities.

Despite the evaluator's critical comments, it should be borne in mind that few programmes are subject to such intense evaluation at such an early stage in delivery and that the Zones are specifically intended to try out alternative approaches so that the optimal format can be identified. This is really admirable since public sector administrations rarely like to admit to their (inevitable) weaknesses. There is always a balance to be struck between designing an efficient, independent and directly controlled system and bringing in partners who reduce independence and provide more resources. The Warm Zone programme tries to achieve this in the British context where the energy companies have control of significant Energy Efficiency Commitment resources - it is impossible to ignore them. There is always a vested interest of some sort – the reluctance of local authorities to take a leading role in a semi independent organisation is related to priorities in funding and, perhaps, also to a reluctance of local authority staff to countenance outsourcing which threatens their jobs. The willingness to delegate control of funds found in Stockton, identified by the evaluator as the ideal organisational format, may not be easy to replicate.

The Warm Zones represent an interesting model that offers great promise despite the inevitable “teething problems”. They will no doubt be refined in the light of experience. The initial emphasis on a wide partnership, central to the promoters' philosophy, seems to have been overtaken by worries about delivery. The independent Warm Zone structure is proving a flexible means for achieving this but the need for core funding has clearly been underestimated. While the Zones' ability to take people out of the politically significant category of “fuel poor” has limits, it seems an excellent model for other countries to follow in order to deliver higher energy efficiency in less affluent households, improve take-up of available resources and contribute to meeting Kyoto targets.

## **IMPLICATIONS FOR PUBLIC POLICY MAKERS**

### **CCL Savings**

It is apparent that if one relies on local authorities to apply savings generated by political action linked to liberalisation or environmental policy (such as the CCL) on energy efficiency, one is likely to be disappointed. Local authorities have many fish to fry, and there is no certainty that energy efficiency will be the prime beneficiary of a windfall like this.

So a Government lead on this is essential if Governments really want to obtain environmental benefits. Newham demonstrates that it can be done, the question is more whether there is the political will to do it. Simple incentives might help – for instance by backing up recycled funding with additional grants, by excluding such recycled funding from tax charges (e.g. VAT in countries like Ireland where local authorities pay VAT). Grants however can be arbitrarily allocated and cannot be relied upon which can make work programming of large projects haphazard. Grant aid should always be matched with a firm financial programme. The CCL Savings programme provides a really significant and continuing resource that could be

applied to energy efficiency, and once results start to come in, this can kick start a really significant saving in energy expenditure.

## Warm Zones

The Warm Zone programme has been applied in different ways in different areas. In contrast to Newham's area management approach, in Stockton all funding has been put into one pot administered by the Warm Zone management, keeping most of the service provision in house. This requires a relatively large staff. In Northumberland and Sandwell the role is more of a facilitator of the programmes of other organisations while in Hull most service requirements are contracted out. However the involvement of the local authority is an essential common denominator to a successful approach. The evaluator emphasises the important role of strong local authority commitment in any future Warm Zone and in particular the administration of the current Warm Zones clearly demonstrates the limitations of administering energy efficiency funds via energy companies (see also San Francisco case study).

Such high intensity local initiatives are often promoted as "cost effective" (read cheap) ways of delivering energy efficiency or reducing fuel poverty, but detailed survey and partnership (i.e. democracy) needs staff time, which costs money. The Warm Zones have taken an enormous challenge. They are approaching up to a hundred thousand homes each for assessment, a much larger target group than in San Francisco but with less funding and greater partnership obligations.

The involvement of many "social partners" is essential if projects are to have full backing and most importantly the financial commitment of the partners. Utilities want to see their money used to meet their EEC objectives, and to develop a caring image to their potential clients. Local authorities have political targets of relieving poverty and meeting government environmental objectives. Local voluntary groups have charitable social aims that need resources and can help identify those in need of help. Health Authority managers have objectives in terms of public health and reducing the 30 000 excess of winter deaths in Britain attributable to poor heating and housing. Local businesses have their own objectives of visibility in their community. Involving these together will give the programme better credibility and involve all the partners in promoting the objectives but it can slow delivery.

In general there are clearly advantages in promoting intensive area-based approaches to fuel poverty and/or energy efficiency via independent or semi-independent structures. They have the dedication and drive to tackle local problems at local level with the freedom of manoeuvre given to the private sector. They need strong links with a committed local authority and sufficient funds. Warm Zone experience also suggests that direct control and application of funds is desirable, with limits set to the energy company interest in the choice of targets and projects. But the promotion of such an approach on a widespread basis needs a lead, support and funds from Government.

## FURTHER INFORMATION

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Case study prepared by Energie-Cités as part of Task 9 of the International Energy Agency DSM Implementing Agreement, Municipalities and Energy Efficiency in a Liberalised System. The cooperation of London Borough of Newham, Newham Warm Zone and Warm Zones Ltd is gratefully acknowledged.



## Promoting small scale cogeneration and energy services

## Waltham Forest (UK)

### GENERAL ASPECTS

Waltham Forest (pop.221 000) is a suburb in North East London, with a high proportion of social housing stock. Like other cities in the UK, a significant proportion belongs to the local authority which has responsibility for ensuring adequate housing for this in its area. It has a number of multi-family housing blocks on its estates and has run an energy efficiency programme in its housing stock for many years. The population has significantly declined over the last 50 years as in other metropolitan districts.



### BACKGROUND

In 1987 the London Borough of Waltham Forest was faced with a major task of maintaining and improving its social housing stock of 20,000 dwellings which are directly owned and administered by the local authority. It was estimated that at least 14,000 of the 20,000 dwellings were in need of some form of renovation. The majority of these dwellings were occupied by low income families or the elderly. Work required included the upgrading of inefficient heating, lighting and ventilation systems fitted 30-40 years previously, insulating the structures (there was minimal insulation already installed) and draught proofing the windows. The housing stock was continuing to deteriorate, there was fuel poverty as poor tenants wasted money in achieving a reasonable comfort. The local authority was very restricted in its ability to find investment funds to resolve these problems due to government controls on capital spending. There was need for the authority to develop investment policies to promote energy efficiency and they therefore chose to establish an energy company wholly controlled by the local authority in order to resolve their problems. This company – now fully privatised, offers a good example of a type of structure that a local authority could develop to supply the social housing sphere, and other energy services needed by local authority clients.

### ACTION UNDERTAKEN

The ethos of the Company's operation is 'affordable energy'. The company was set up in 1988 as a charitable company wholly owned by the London Borough of Waltham Forest. Charitable companies can be established under British law. They are widely used by charitable bodies undertaking trading activities or works (for instance restoring an old railway line or managing a historic site). They are non profit-making, all their receipts being recycled to further the objectives of the company. Normally the owners hold shares of a nominal value of £1 and they have the right to vote at annual general meetings in the same manner as other private companies but they have the tax advantages of charitable status. In the case of Waltham Forest Energy Services, the London Borough of Waltham Forest held 100% of the shares. The council shares were sold to the existing staff in 1995. The company is now wholly owned by the staff with the directors owning

60% of the shareholding and it operates by trading in energy services, particularly small scale CHP, primarily but not exclusively, to local authority clients.

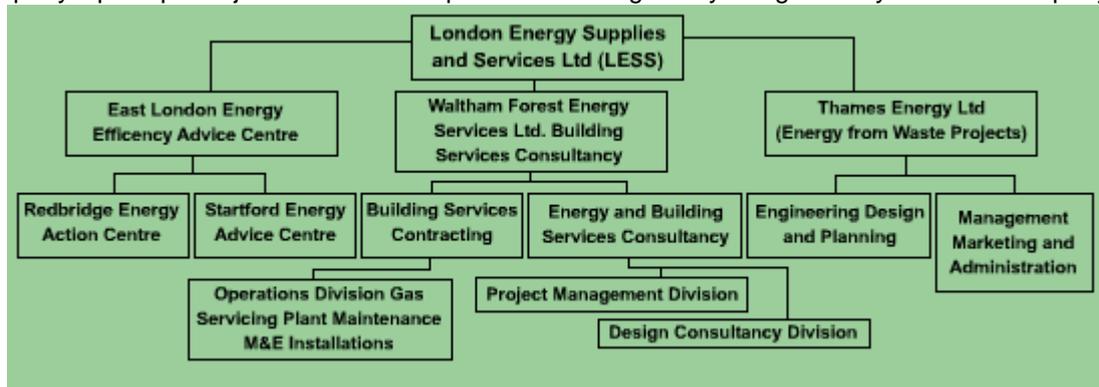
The Company's *raison d'être* was to ensure the efficient operation of the heating systems in Council property using modern monitoring techniques and by upgrading equipment with a resultant reduction in energy costs. It was expected to cover its operating costs, without financial support from the Local Authority. They have pursued a separate management and staffing policy although the staff conditions of service are modelled on those in local government.

The company was established in a separate building from the main council offices near the centre of Walthamstow – the largest commercial centre in the Borough. The building provides both offices and an energy advice centre for the local population. The company received support for this activity from the publicly owned regional electricity board (which a few years later became a private company) and this helped financing in the early years. A specialist staff was appointed which has grown as the activity of the company has expanded. It was 65 in January 2000 and is still increasing

There is no large-scale district heating in the area (indeed city-wide networks are almost unknown in the United Kingdom). However in Waltham Forest there are a significant number of high rise housing estates which have communal heating systems in need of refurbishment. Initially the principal activity of WFES was to manage the production and sale of electricity and heat to council owned buildings such as these, specialising in the installation of new small-scale cogeneration units. They pioneered the development of small-scale units that sell both electricity and heat direct to clients at a time when there were no legal provisions for liberalisation and were able to significantly reduce both heat and electricity bills to the tenants.

It was also envisaged that this service could be extended to other public and private buildings at appropriate times and rapidly the Company's activities expanded to include a capability for the design of building services including electrical, mechanical and other allied services, the provision of energy advice to the general public and of energy training to specific groups. Initially it was felt difficult in legal terms to provide services to private property owners because of the potential competition with private companies. From 1991 their services expanded to other local authorities. In due course however a number of private clients have been served.

With the expansion of private financing in the local authority sector and the liberalisation of energy markets the Company's principal objective has developed to becoming a fully-fledged utility services company.



The company has three subsidiaries under a holding company, providing energy advice, building services and energy from waste (see above). The building services subsidiary provides a complete service including the design, installation and management of energy in domestic, industrial and commercial markets. This includes fuel purchasing, technical design and contract energy management. This role is provided by action under four main categories:

- Engineering design and project management covering all types of mechanical, electrical, health and safety works. This is the lead element in their activities. It is a role that in many local authorities is carried out in house as part of the property services or architectural function but it has tended to be contracted out in recent years as part of the increase in competitive tendering. This can include both supply and demand side solutions, with a particular attention being given to upgrading insulation levels. There is a concentration on low-income housing where this affects the ability to supply affordable comfort. This role finishes when the project installation has been completed.

- Operations, installation and maintenance management often following on from improvements installed by the company. Unlike most design consultancies the company is also responsible for maintenance and therefore considers issues of maintenance at the design/construction and planning stage to ensure a long and economic life. This gives the company a long term involvement in projects and a connection with and incentive to ensure the success of the schemes they carry out.
- Energy advisory services including energy surveys, energy audits, the energy labelling scheme, computerised energy monitoring and targeting, assessment of the National Homes Energy Rating, an energy efficiency scheme for private homes linked to the obligation placed on UK local authorities to reduce energy consumption in the housing sector by 30%, tariff analysis for energy purchasing etc.
- Contract energy management including the purchase of energy, energy using equipment and maintenance and management services over a period of years in such a way that the client pays for improvements over a number of years out of savings in energy costs.

### **Typical projects carried out which sell energy direct to tenants of social housing: Bakers' Almshouses, Waltham Forest**

The Bakers' Almshouses project was a pioneering small development which demonstrated the possibility of selling power direct to tenants. The Bakers' Almshouses are a nineteenth century development of social housing that was in need of refurbishment. The tenants in the 52 separate units, a series of terraced houses around an open green, are mainly elderly people and needed a consistent and regular supply of heat all day for much of the year and hot water all year round.

At the time when the refurbishment was proposed, there was no right of tenants to choose their electricity supplier and there was still a monopoly on the sale and distribution of current. The local electricity company, London Electricity, was approached and asked whether they would consider permitting a CHP project where the current was sold direct to the tenants as a demonstration pilot project and they agreed.

A small 26kW CHP was installed. Both the heating and electrical system were replaced during the refurbishment and this enabled the supply to be managed separately. The CHP unit supplies electricity, space heating and hot water to the tenants – with electricity being supplied on a prepayment basis. The unit is located in an outhouse and there is no problem with noise. The heating and electricity cost was reduced to the tenants by approximately 30% and at the same time there was a reduction in the CO<sub>2</sub> emissions due to the inherent efficiency of CHP. It has proved very popular with the tenants and paid a regular annual profit that was recycled to other Waltham Forest Projects.

The project was indeed such a success that, besides being one of its smallest projects, it became a flagship for WFES and one of its most profitable projects as well as the one where the tenants gained most savings. This was in part because the conditions were particularly appropriate, the elderly tenants needing a consistent supply of heat due to their being in residence all day.

The project was managed on a comprehensive 10 year energy management contract with the local authority which covered in total 7 sites, including Beaumont Road (see below). At the end of the term, the contract was awarded to a different firm for 3 years, after which the contract was again awarded to WFES.

Before liberalisation, all such projects needed the approval of the local supplier and no further approval was granted after this pilot. However since liberalisation other projects have been established such as Langdon Hills (below), which make use of the lessons learned at Bakers Almshouses.

### **Beaumont Road Estate**

WFES designed and manages this scheme on behalf of Waltham Forest Council. The site is managed as part of the same comprehensive contract as Bakers' Almshouses. The opportunity was taken to renovate the buildings in 1993/4 as part of a Government promoted demonstration project. The tenants mainly had electric storage heating, was difficult to heat and had condensation problems. A consultation process was held and following this the heating system for 686 dwellings in three tower blocks, four and six storey blocks and some individual houses was adapted to a community heating scheme. WFES proposed a renovation based on two gas fired CHP units each of 408kW capacity, with total renovation cost about £ 4800 per dwelling. The company acts on behalf of the Council to purchase fuel, sell electricity and heat to the tenants

and to a nearby leisure centre, and maintain the whole system including the residential heating systems. Heat to tenants is sold on a fixed charge basis to ensure these social tenants have properly heated homes. The energy use and CO<sub>2</sub> emissions were down by approx 50% and heating costs by 39%. When this scheme was constructed in 1992/3 the electricity distribution company was no longer willing to consent to further schemes for resale to tenants following the successful experience with the Baker's Almshouses. Surplus electricity was therefore sold to the local electricity company. (Resale is now possible following full liberalisation of the market in 1998).

### **Langdon Hills Estate, Basildon**

This project was designed to renovate the heating on a housing estate of 556 dwellings including 124 flats and 432 houses for Basildon District Council. These had a total floor area of 46 000m<sup>2</sup> and were served by a community heating circuit. There were three existing 1.4MW heating boilers supplying the network.

The project involved renovating the heating systems in the houses, installing new heat meters and prepayment electricity meters, installing two new 210kWe CHP units and extending the heating network to a primary school.

The system operates at full capacity about 5700 hours per year and 42kw of the electricity produced by the system is used by the local authority, 270kW is sold direct to the tenants via the local distribution system (use of system being charged at 2.4 eurocents/kWh), with the remainder being sold to the local utility.

Part of the equipment for the project was financed by the local authority and part by contract energy management – the investment being repaid from the profits from energy savings. The company has also taken on the role of an energy trader and has generated significant savings from reselling the electricity directly to the end users, thereby getting the benefit of retail prices. A vital element in this has been the ability to use the local distribution network via third party access. The electricity and heating costs to the residents are reduced by about 20%.

## **LESSONS LEARNED**

The resale of electricity to tenants is now becoming more frequent in the UK, a process pioneered by Waltham Forest. A number of other schemes make use of this provision. In many examples however the operation is carried out by a committed building owner. An example is the St Pancras Housing Association scheme in London which has purchased and refurbished all the internal electricity distribution network and where all the billing and management is done in house. The Scheme in Woking (see case study) has set up a complete private wire network in parallel with the utility network. The potential scale for such schemes is getting smaller and smaller – for instance two Senertech Dachs 5kW cogeneration units have been installed in Elizabeth House, an old peoples home owned by the private social landlord Mhs Homes, in Rochester, Kent. The key driver is heat and the electricity is not sold but only used for public areas. However the potential to sell one's own energy to tenants remains. The key point however is that for the maximum savings, and therefore the most economic CHP scheme, it is desirable to own the electricity network directly and this can easily be set up and organised by a company specialising in this formula, like Waltham Forest. This is logical since most networks charge on a "postage stamp" basis and so one is paying for the long distance transport of electricity when the precise benefit of distributed generation is that this is not necessary. This can be small scale within an enterprise or building (as in these examples) or wider connecting a number of sites (as in Woking). An alternative chosen in a number of circumstances is for the local authority to use the electricity directly in its own buildings – using the public network where suitable. This can be profitable where there is a suitable large consuming unit such as a leisure centre so reducing administration, but this may not provide the other benefits of providing savings to fuel poor clients (a major political motor in the UK).

The benefits are significant and there should be potential for a committed local authority, local authority company or consortium to provide a service setting up and managing such arrangements for the vast majority of local authority clients and others who are not interested in the complications of setting up such a scheme but are happy to reap the economic and political benefits from any savings provided to themselves and tenants.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

There is a major advantage in promoting energy efficiency via such distributed generation, and there is to consider the best policy means of promoting such schemes. A number of barriers can be placed in the path of such schemes by utility companies who lose clients. One is by demanding prohibitive prices for purchase of the network (Woking circumvented this by constructing their network from new). Another is through prohibitive balancing charges (although competition to supply top up electricity should sort this out in due course). A vital consideration is whether it is legal to transmit via privately owned networks. In some countries, e.g. Sweden, the law effectively limits the transmission of current to third parties to the monopoly utility.

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## Private wire systems for delivering electricity to tenants

## Woking (UK)

### GENERAL ASPECTS

Woking (pop approx 100 000) is a relatively prosperous commuter town to the south west of London.



### BACKGROUND

Woking Borough Council is responsible for about 10% of the housing stock in the district, but has adopted a policy of reducing energy consumption in all the housing stock since adopting its energy policy in 1990. They reduced the energy consumption of council property by 20% in four years following adoption of their energy policy and then set a target of a further 20% reduction. In ten years they have reduced their CO<sub>2</sub> emissions by 66%. They set up an energy efficiency rolling fund to fund energy efficiency work in council property. These improvements have been delivered both through its own energy efficiency initiatives and through advice provided via the Energy Efficiency Advice Centre. In time it became clear that they were reaching a limit of what they could achieve by improving end use of electricity, and to progress further they needed to reduce inefficiency in the production and distribution of electricity.

### ACTION UNDERTAKEN

It was decided that distributed generation coupled with CHP could offer the greatest opportunities to deliver further savings. A number of CHP private wire networks were therefore proposed. These had the advantage that a small network reduces distribution losses (which represent around 6-10% on a typical national system). They also avoid all the charges for connection to a grid network, plus the charges levied by the transport system and distribution network since there is provision in the UK legislation for an exemption from the need to obtain licences for generation, supply and distribution. (The exemptions are complex, but currently include generators who produce less than 100MW, and suppliers and distributors who supply or distribute less than 5MW (provided that they do not sell more than 1MW of their own generation to domestic customers)). Not having to participate in the licensing regime has certain benefits, in particular for supply and distribution. Before 2001 the limit was 500kW, the size of what is now a quite small wind turbine, and this meant that for instance local authorities that operate CHP plants at one location, for instance, a swimming pool, could not supply other premises they own without a licence. The need to hold a distribution licence meant, for example, that local authorities supplying a large social housing estate would have to establish a range of administrative services that are appropriate for the national network, such as a meter point administration service; provide an infrastructure capable of supporting competition in electricity supply; and adhere to a range of accounting requirements from the regulatory regime. Alternatively the person would

have to arrange for the network to be taken over by another licensee - if that were possible. All of this would be an onerous obligation on a local authority.

Woking had already set up a number of traditional small community heating networks coupled based on its own sheltered housing facilities. By 2002 there were 7 such schemes with electrical output varying between 20kW and 50kW and they were being added to at one scheme per year. These supplied the tenants with electricity and heat from the cogeneration unit, purchasing top-up electricity at bulk rates from the grid. In practice the system is designed to run with 80% of the electricity used in house and 20% sold as 'spill' to the public system, thus cancelling out standby and top up charges. This used a profiled consumption and tenants paid an estimated rate each month, with the total reconciled with actual consumption measured during service visits. The old public electricity service cables were left and could be reconnected by anyone who wanted to go back to the national public supply. None have done so. The residents have saved between €110 and €180 per year depending on the size of the house and so there is no real incentive.



Other small schemes had other innovations. In Brockhill a small scheme had a combination of 30kWe CHP and 81kWe of PV. More recently a 67.7kW PV system has been announced for Prior's Croft to complement the CHP there. The complementary generation profiles mean that the system has the prospect of being self sufficient in electricity. They have also installed free standing solar parking meters and solar/wind lighting on a rural footpath.

Clearly prior to 2001 the maximum possible size of such networks was quite small and determined by the licensing requirement. The recent increase of the thresholds has given them considerably more freedom.

With the success of their small schemes in the background, Woking decided to investigate the setting up of a company to manage their energy services. The setting up of local authority action which could compete with the private sector is a legal minefield in the UK with none of the facility found in countries like Germany or France where such structures are widespread. Woking commissioned a study with a Government grant to investigate the securest legal framework to establish an ESCO. Following on from this they set up an Environmental and Energy Services Company (EESCO) Thamesway Ltd. in 1999 as a wholly municipally owned non-profit making company and this delivers the local authority's fuel poverty and environmental services and can themselves enter into partnerships to deliver energy services to customers. In particular Thamesway delivers the following on behalf of the Council:

- Free energy efficiency advice,
- A council scheme giving grants for loft and wall insulation and draughtproofing,
- A council scheme which tops up government grants for the fuel poor,
- A condensing boiler discount scheme.

To do this Thamesway set up a subsidiary, Thamesway Energy Ltd. in 2000 in which it holds a 19% share. The remaining 81% is held by a Danish company, ESCO International A/S, which is owned by Miljø-Sam Holding APS. This in turn is owned by a Danish pension fund and Hedeselskab, a foundation committed to environmental projects which is owner of a Danish green energy company. This balance of ownership was necessary since the capital expenditure of any company that is owned 20% or more by a local authority is automatically added to that of the local authority, so limiting the local authority's expenditure.

Thamesway Energy Ltd then prepared a total energy scheme for the centre of Woking. This scheme serves the civic offices, two hotels, a conference and events centre, a leisure complex, a night club and a multi-storey car park. The system has included 1.46 Mwe of conventional CHP, 163 m<sup>3</sup> of thermal storage and 1.4MW of absorption cooling, supplied to the clients by separate heat and chilled water pipes and both high and low voltage private wire networks. The system runs a permanent surplus which in total amounts to about 30%, and which is exported to the Council's other sites. Since it never needs back up, the system operates in island mode and can supply all the needs of the properties connected to the system. They provide energy on an energy services contract basis covering all energy and maintenance costs for the clients. Now a further PV system is to be installed on the roof of an extra floor to be added to the multi storey car park which will feed into the City Centre network.



Woking Energy Centre at night

For their second scheme, Thameswey Energy has installed a fuel cell in Woking Park leisure centre which operates the heating cooling and electrical system in the pool and adjacent leisure centre. Thameswey Energy, unlike most European municipal companies, is not restricted to operating within the boundaries of the municipality. It can operate in adjoining local authorities and sees this as a means of disseminating its message.

In the long term it is Woking's intention that Thameswey will install CHP or other green energy in all local authority property within seven years from establishment.

## LESSONS LEARNED

None of Woking's projects are unique, many of their initiatives (ESCOs, private wires) having been pioneered by Waltham Forest ten years previously. However Waltham Forest withdrew from direct involvement with its progeny ESCO while Woking goes from strength to strength. Small district heating schemes are widespread on the continent. However the combination in Woking is something quite special. In effect Woking have said, "If the liberalised utility is not interested in our priorities for distributed generation, then we had better do it ourselves". And a deregulated system with exemptions for small networks enables them to reclaim the role of utility which had been lost in the UK many years before.

This is an interesting example. It could model a way for the future with local authorities developing their own small utility systems parallel to the public system, so forcing the distributor to take a more sympathetic view of the distributed generator. (All three elements of the traditional system stand to lose out here – generators, distributors and suppliers and be consigned to a simple role of back-up of last resort). Or it could prove to be an ephemeral diversion from the large utilities which doesn't get to a sufficient scale to worry any of the established interests. There is some reason to think that this type of small unit may be the way forward for the future. Southampton's district heating system, based on a single geothermal well, has expanded in steps with additional small CHP units added on. Small community heating schemes are becoming a new fashion and when the time comes maybe they will even start to deliver to private households in residential suburbs.

It is useless to predict whether this will be a trot developing into a gallop or not. However Woking's example demonstrates that small mini-utility energy schemes are possible, can operate effectively without problems for the client or the stand-by utility and can lead the local community in promoting sustainable forms of energy.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

Woking's model only works because it is possible for anyone to establish themselves as a generator, distributor or supplier in the UK market. In Sweden or the Netherlands for instance it is not possible to construct a private distribution network for your tenants unless they are in one building or cadastral plot – the distribution network is the subject of an exclusive concession and only the concessionaire can lay service pipes in the public domain. In the UK any utility can lay pipes or cables in the public highway – there is no contract of exclusivity.

If governments wish to promote CHP and distributed generation, it might be worth their while considering whether to liberalise also their attitude to private wire (and pipe) networks. For at present the local distribution networks act as a brake on distributed generation with difficulties of connection and expensive transmission for small quantities. If there was the possibility and development of competition, at least in small local areas (which is what counts for distributed generation), then the situation might change. There is nothing like the threat of competition to make a monopolist review their position, and that still applies to the existing monopolies of the distribution grids.

## FURTHER INFORMATION

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# The aggregation of power demand

# Northern Ohio Massachusetts California (USA)

## GENERAL ASPECTS

Cape Cod and the island of Martha's Vineyard are two relatively prosperous areas in the far East of Massachusetts with an emerging high-tech community.

Northern Ohio lies in the Midwest in the corn belt and also has many industrial centres.

California is America's most populous state. It was a pioneer of liberalisation, a liberalisation that went disastrously wrong.



A. HOUIOT - Aix-Marseille

## BACKGROUND

### Community Choice and Aggregation

The individual domestic and commercial consumer is a weak animal when it comes to fighting in the deregulation battlefield, a battlefield where size equates to power. With the liberalisation of energy markets it has become apparent that the opportunities for market manipulation are legion, and the expected savings have often not materialized for the small consumer. In general the number of consumers switching supplier has been very disappointing. However it had been suggested that local authorities could aggregate demand as an intermediary on behalf of their communities, thus obtaining better terms and being able to lobby for the supply of more environmentally sustainable power. The Local Power organisation, based in Oakland California has been an important lobbyist for such laws and helped a group of local authorities in the Cape Cod area to draft a law passed in Massachusetts in 1997. This permitted consumer aggregation subject to approval in a local referendum. An important clause in this law was that consumers had to opt out of membership rather than opt in. Since this date similar community choice laws have been passed in Ohio in 1999 and a further refined one in California came on the statute book in 2002.

## ACTION UNDERTAKEN

### Action in Massachusetts

#### The pioneer

Massachusetts liberalised its electricity supply in 1998 but generally few retail customers have entered the retail marketplace, only 0.5% of customers have changed supplier, mainly large industrial and commercial clients. The Electric Utility Restructuring Act of 1997 included provisions to allow communities establishing a public aggregation program to recover funds being paid to their local distribution company (Commonwealth Electric/NStar) for energy efficiency programs. The law also allows municipalities that have agreed to municipal aggregation to assume that all residents who do not opt out are part of their aggregation unit. The

municipality then negotiates on behalf of their residents and passes on the savings it makes to them. The energy efficiency funds can then be utilized in locally-designed programmes approved by the towns and state regulators.

## Setting up the Compact

### Origin

In 1993-94, a broad range of Cape organisations, businesses and individuals participated in the production of the Barnstable County Energy Management Plan. The Barnstable County Commissioners adopted twelve recommendations from the Energy Management Plan, one of which was to establish the County Energy Management Committee. A consortium applied for a federal grant to study local powers related to electric franchises in a competitive environment. The Commissioners, as lead agency, received U.S. Department of Energy ("DOE") funding in October 1995 and produced the *Community Franchise Study: An Option for Local Governments Facing the Challenge of Electric Utility Industry Restructuring* in December 1996. In 1995 the State Department had identified options for providing customer choice including "...a structure whereby entities would compete to provide services to customers in a specific geographic area (e.g. a municipality, or group of municipalities), sometimes referred to as "Competitive Franchise."

In May and June of 1996, members of the Barnstable County Energy Committee submitted a Resolution to their Boards of Selectmen which authorized the County to explore market prices for electric power and services on behalf of the towns. Following lobbying of the State, the model rules issued in December 1996 an option for consumers to aggregate under their municipal governments. Nine towns set up a committee to prepare a proposal for a "Compact" in February 1997.

The Compact agreement was formally signed in 1998, at the time of liberalisation, following two years of study and town meeting and town council votes. Cape and Islands Self Reliance Corporation based in Waquoit in Eastern Massachusetts runs the Cape Light Compact. This is an inter-governmental organisation of all 21 Cape Cod and Martha's Vineyard towns and Barnstable and Duke counties with a governing board and executive office.

The purpose of the Compact is to protect and represent consumer interests in emerging competitive markets for electricity and it represents 187 000 individual customers. Its does this by:

- Providing the basis for aggregation of all consumers on a non-discriminatory basis,
- Acquiring the best market rate for electricity,
- Providing and enhancing consumer protection and options for service under contract provisions and allowing consumers who choose not to participate to opt out.

In addition, the Agreement includes goals relating to quality of service, environmental protection, renewable energy development, demand side management and energy efficiency.

### Energy Purchase

Putting out energy supply in bulk has been subject to many regulatory hurdles – it cannot be said that the utilities have demonstrated fulsome support. The market in Massachusetts remained stagnant until the end of 2001 with very few consumers receiving offers of competitive supply, and those who did were primarily large commercial and industrial customers. The State has protection of standard offer contracts in their liberalised market which will expire in 2005, but in the meantime little benefits were being seen by residential consumers. However, with new State initiatives the outlook began to change in 2002.

In 1999, the Compact established a supply contract with the HEFA Power Options programme for member municipalities and a natural gas supply for the schools on Cape Cod. In March 2000 a landmark agreement was made with Select Energy, Inc. for a power supply contract to serve all the customers on Cape Cod and Martha's Vineyard. The contract was approved by each member town and the Compact's public aggregation programme was the first to be approved by the Massachusetts Department of Telecommunications and Energy.

The market was very volatile however during 2000-1 and little progress was made. In 2001 the Compact also gained state approval for a Pilot Project (DTE 01-63) designed to obtain cost reductions for 45,000 customers paying high rates on the default service. This Pilot was the first of its type in Massachusetts and was designed as a stepping stone for lower cost competitive power supply for all 193,000 Cape and Vineyard consumers. The electricity supply agreement negotiated with the Mirant Corporation applies to consumers receiving NSTAR Electric Default Service in the Compact's municipalities. NSTAR Electric will

continue to provide network services, reading meters, sending out bills, and maintaining distribution wires but there will be a 11-22% saving in the supply price charged by Mirant.

The Compact is also developing green energy supply by introducing three green energy prices:

- **New Green** which includes a 1c/kWh contribution to the Compact's fund to promote new local renewable capacity,
- **Blue-Green** includes 50% renewable in the supply and a 0.5c contribution to the Compact's investment in new renewable capacity in the area,
- **Deep Green** includes 100% renewable supply and a 0.5c contribution to the Compact's investment in new renewable capacity in the area.

This provided a successful model for other communities where market conditions were more favourable. A group of 95 communities in Northeastern Ohio for instance secured a contract for 350,000 residential consumers in early 2001 working with the same industry professionals who work for the Compact and based on the Compact's model.

### Energy Efficiency

In July 2001 the Compact launched a landmark Energy Efficiency programme (DTE 01-47-C), the first of its type in the US. The Massachusetts Utility Restructuring Act in 1997 allowed local aggregators to prepare an Energy Efficiency Plan which had to be approved by the constituent Town authorities, and the State Department of Telecommunications and energy for certification. As a result they may receive the state subsidies derived from public benefit funds that local consumers are required to pay for energy efficiency. In the case of the Compact this ensured that \$5.4M of funding came back to the local area in 2001-2. It is anticipated that this will produce savings of \$9.4M. The programme helps to reduce a consumer's total bill and enhance comfort at the same time by promoting new technologies and increasing savings. This Energy Efficiency programme is regarded by the Compact as providing "the cornerstone of the region's energy future".

The Cape Light Compact Energy Efficiency Programme serves all their customers residential, commercial, and governmental. The first phase adopted in 2001 largely continues measures from the previous distributor, and included:

- Aid to consumers who want to switch from electric heating to a high efficiency system,
- Generous rebates for lighting and energy efficient appliances,
- Free reviews of electric energy use,
- Builder and homeowner rebates for constructing an Energy Star home,
- A subsidy for retrofit of lighting,
- Controls and refrigeration systems for businesses,
- Grants to replace motors with more energy efficient models,
- Grants for replacing HVAC equipment,
- An incentive program for new commercial developments including an energy analysis,
- A local education and marketing programme.

The Compact selected Honeywell DMC to manage the day-to-day operations of the programme following competitive selection. The company coordinates specially-trained vendors who deliver the services. The Energy Efficiency programme ran an 18-month transition phase and was fully funded from January 2003. During this transition the Compact will recover and utilise approximately \$4.7 million of public benefits funds. This investment is expected to produce consumer savings and enhance job creation in the region. During its first 6 months the programme had serviced over 5,500 participants; achieving energy savings of over 1,200,000 kWh. It achieved over 126% of the planned kWh savings goal within budget and participated in other regional and joint action.

It is planned to widen these activities, in particular to encourage peak shaving. A draft of a revised energy efficiency programme was published in March 2003 which included new measures.

### Renewables and policy issues

The Compact prepared agreements and plans for local government in the area and prepared the first ever assessment of energy use in the participating municipalities. It is also acting as a consumer interest lobby in negotiations on energy issues such as the conditions in the competitive market and obtained resources from the State regulator resulting from the sale of an energy plant which could be applied to local consumers.

The Compact supported the purchase of street lighting in the area by local authorities, and indeed a number of systems with a backlog of replacement work were taken over free of charge. This has major energy efficiency implications – an Energie-Cites coordinated project in 1996-9 demonstrated much higher efficiency in systems owned by the municipal consumer than in those run by the electric utility.

In 2001 the Compact won funding from the Massachusetts Renewable Energy Trust Fund for a major study of renewable energy and distributed generation in the region local on-site generation using fuel cells, solar photovoltaic panels, micro-turbines, wind turbines, etc). This will propose a policy plan following local public hearings.

## Action in Northern Ohio

### Gathering momentum

The impact of the Massachusetts law did not go unnoticed. In 1999 the State of Ohio passed its own Consumer Choice Law. Following local lobbying based on the experience of Massachusetts, it was also proposed that customers not wishing to participate opt out of aggregation rather than opting in. As in other states, the communities wishing to participate had to put a proposed ordinance to a local ballot of voters where an absolute majority was required.

### Setting up NOPEC

#### Origin

Within three years over 190 communities in Ohio had passed aggregation ordinances. A cooperative, Northern Ohio Public Energy Council (NOPEC) was established in November 2000 which brought together over 100 of these into a large buying unit acting on behalf of approximately 600 000 electricity consumers. NOPEC put the supply out to tender and received two competing bids from Green Mountain of Texas and American Electric Power. NOPEC chose Green Mountain and negotiated a 6 year contract with Green Mountain Energy of Texas on behalf of its members which was signed in 2001. By September 2002, 94 municipalities plus 65 townships were participating in the contract. With time the NOPEC Board was able to renegotiate the savings so that there was a staggered introduction for customers, first to 4% later to 6%. In addition the energy purchased was of higher environmental quality, switching from 60%coal/40% nuclear power to 98% natural gas/2% renewable energy and so having a CO<sub>2</sub> component one third smaller than traditional electricity.

Green Mountain announced that they intended to build a wind turbine facility in Ohio, and would install photovoltaics on at least one school building in each of the eight NOPEC counties in the Cleveland area: Cuyahoga, Geauga, Lake, Portage, Summit, Lorain, Ashtabula, and Medina. This contract represented a major expansion for Green Mountain, expanding from 100 000 customers to approx 550 000 in one fell swoop.

The switch was not without its own problems however. The former monopoly announced that it would charge a \$5 switching fee on customers. Once the NOPEC contract was finalised, local customers would be notified of the terms and then there would be a 21 day period in which they could opt out, either to stay with the existing providers Ohio Edison or Cleveland Electric Illuminating Co. or to shop round for a better deal themselves. NOPEC knew that the \$5 fee would discourage participation and it was a condition of the deal with Green Mountain that they pay this fee on the customer's behalf.

In 2001 a separate bill was placed before the State legislature proposing liberalisation of the gas market. The original bill proposed limits on the size of aggregation group that could participate. NOPEC lobbied against these proposals and eventually the State Senate, by a large majority, voted to amend the draft bill to remove these limits. Where approved by a vote of residents, opt out aggregation is permitted.

In June 2002 a contract was also signed for gas with Interstate Gas Supply, Inc. of Dublin, Ohio. This will serve the 90 Ohio municipalities where opt out aggregation was approved in a referendum. They will supply gas at 5% lower than the GCR(Gas Cost Recovery) rates approved by the regulator.

## LESSONS LEARNED

The Cooperative structure of the Massachusetts Compact has developed interests far beyond the straight benefits of consumer aggregation. It has built up a reputation for its work on energy services and as a protector of the interests of consumers in the region.

The establishment of this cooperative body has proved exceptionally profitable for local consumers. Ignoring the windfall \$25M benefit from the sale of the energy plant, the consumers obtained benefits exceeding costs in the ratio of 3:1.

This programme is exceptional in that it returns the funds for energy efficiency directly to the local level to promote local action, and it ties energy efficiency and best buys in energy purchase together as two parallel objectives. Indeed the community nature of the cooperative ensures that the customer's interests are put to the forefront. Being a liberal, affluent community, the objectives in Cape Cod and Martha's Vineyard are quite ambitious.

Ohio however has shown how the law can be applied on a wider scale, both acting to improve energy efficiency on the supply side and operating to battle with the attempts of vested interests to protect their market. The development of large aggregated groups gives local political leaders a better negotiating platform to fight for a better deal with the power of the bulk purchaser, and later to renegotiate rates if the conditions allow. A particular issue are exit fees charged by existing suppliers to transfer to another supplier. Similar fees are proposed by Pacific Gas and Electric in California. These are clearly an attempt to limit competition and maintain monopoly. It remains to be seen how the California law develops in practice. This is the most refined so far devised by Local Power and will be used in their own back yard. In view of the general environmental interest of California's local authorities, it may be anticipated that many local authorities serviced by the major utilities are likely to take up this option.

Local Power has waged an admirable campaign that has resulted in these consumer choice laws. However they compare the U.S.'s individual choice markets to the UK's market, calling them the "British" model. This is unjust, probably highly coloured by the failure of their local California market and may prevent them from learning useful lessons from the development of the British market. While it is certainly not perfect, in the British market competition has penetrated down to the retail level, with up to 30% of customers switching supplier, and switching permitted at 28 days notice. Bankrupt suppliers have usually gone bankrupt (e.g. Independent Energy) unless of course they happen to supply nuclear energy and are seen as strategic. Suppliers cannot afford to ignore the need to compete on price. In Britain there were no caps on the retail price to protect the consumer as in California and as a result the consumer has fared better! Regulation got more and more stringent to prevent market power, in particular on monopoly elements such as distribution prices. Indeed British companies, prevented from buying up and downstream or using the nuclear dismantling fund to gain a strong market position by purchases of other utilities, competed at a disadvantage compared with continental utilities where such practices were the norm. A better model of US markets is the German market where, under weak or self regulation, the large players effectively managed to manipulate the market and prevent competition at the retail level, at least in the early years. In addition the large players in Germany have gone on a buying spree by amalgamations and mergers to develop new near monopolies both at home and abroad.

Liberalised markets in some European countries are also more successful in selling green energy than those in the US. High rates of participation have been noted in the Netherlands and Switzerland (although the British market for green energy still needs a great deal of development). Indeed the Netherlands market for green energy was so successful, using mainly imported green energy, that the new conservative government cancelled "green" energy's exemption from the green levy to discourage its further development.

However aggregation does offer major benefits which could well be applied in other liberalised markets, even those that operate more efficiently than US markets.

Firstly it allows the aggregator to "purchase" and deliver energy efficiency and clean energy benefits for their customers in a far more effective way than an individual could. They are natural intermediaries for applying public good levies to action in local populations. The energy agency network could provide a natural structure for applying this in some areas. These are likely to be very major advantages.

Secondly a large aggregator will certainly obtain a better price than an individual customer and is better able to evaluate offers. Electricity and gas offers are at best complicated, at worst murky and extremely difficult to understand. In the same way that consortia obtain a better deal for UK local authorities themselves, so aggregators obtain better deals for their residents. In time too one can envisage enterprising aggregators developing their own capacity (renewable or small CHP for example) and/or wires businesses, rather in the way that the Central Buying Consortium is sponsoring the development of a major wind farm and Woking has built its own independent wires network. It would seem therefore that the possibility for aggregation by opt out is a facility which should be encouraged by public policy.

## IMPLICATIONS FOR GOVERNMENT POLICY MAKERS

In principle aggregation is already permissible in the individual choice markets in Europe, but it is always opt-in. Therefore it hasn't developed to the same extent as the US. American experience is quite clear. With opt-in aggregation is a minor feature, with opt out it is a major player. Therefore the US model for allowing opt-out aggregation is very much worthy of examination. Relatively simple to administer, it allows individual consumers to get the benefits of communal buying power and individual aggregators can set higher minimum renewable or cogeneration components than those applied in some national markets. This service could be carried out perfectly well by a private company under contract to a local authority (as is initially the case with the Compact) or alternatively by a municipal company (In Sweden all buying for local authorities is carried out under contract by a specialist purchaser under the aegis of the Association of Swedish Municipalities).

However in an opt in market, aggregation is effectively duplicating a service already provided by energy traders and the environmental perks that typify the Massachusetts and Ohio regimes would be unlikely to develop –everything is then likely to depend on price.

It can be argued with some justification that the liberalised market penalises the individual consumer since he or she has not got sufficient negotiating power. The European Union might well consider this point. In this sense it is a distortion of the competitive market and aggregation could be seen as a remedy to this. So perhaps it ought to be reviewed as a potential topic for consideration in a European Directive.

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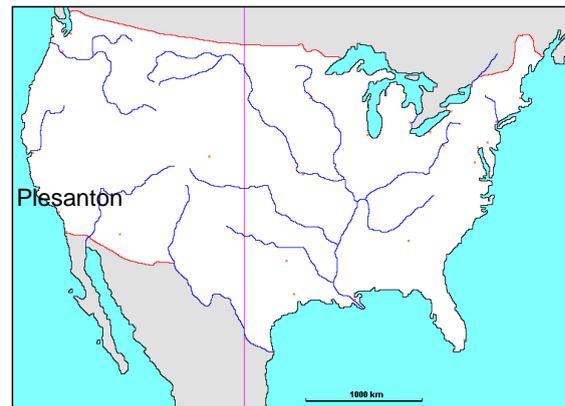
# Preparing an energy plan

# Pleasanton (USA)

## GENERAL ASPECTS

Pleasanton is a town on the edge of the Bay area conurbation in California.

Very leafy and generally affluent, the town takes a great interest in environment and quality of life issues. It has a "technically sophisticated and highly educated population" which is an asset in planning issues like energy.



A. HOUOT - Aix-Marseille

## BACKGROUND

In 1999 the Enron Corporation proposed building a 49MW peaking generator in Pleasanton that provoked widespread opposition. In the event the plant was not built but the power blackouts of the California energy crisis of 2000 and the threat of this plant encouraged the Town Council to ask their Deputy Director of Public Works to prepare an Energy Plan. The Mayor of the town, Tom Pico, is very active on the board of the Local Government Commission (a California NGO advising local government on energy and planning issues), and also on the United States Conference of Mayors Energy Sub-committee. The council rated energy conservation, reliable sources of electric power and renewable power generation among its top priorities.

The municipality has already been active in promoting energy efficiency in the design of the burgeoning new development in the municipality. They have been leaders in the region in developing urban growth boundaries, designed to combat suburban sprawl.

Because the City has no debt and an ever-increasing tax base due to rapid expansion of business parks, it is in excellent shape to be a leader on energy matters. The community is blessed with an affluent, highly educated and technically sophisticated population. With Lawrence Berkeley Laboratories, a Pacific Gas & Electric Energy Center and the Electric Power Research Institute all located nearby, there is an exceptional pool of local expertise for a city of this size.

The City of Pleasanton has also taken advantage of the Local Government Energy Efficiency Program (LGEEP) run by the local utility, Pacific Gas and Electric (PG&E). Working with the Local Government Commission and Energy Solutions, LGEEP helped develop a local energy efficiency "tool lending library," a directory of grant programs for the City web site, and specific energy efficiency language for its draft update of its planning guidance on housing.

## ACTION UNDERTAKEN

Before starting on the Plan the Municipality had already adopted a "green" building ordinance that applies to commercial buildings 20,000 square feet and larger, and are developing similar regulations for residential projects (they currently follow the guidelines developed by Alameda County). This integrates green building measures into new project approvals, relying upon the Leadership in Energy and Environmental Design (LEED) standards developed by the US Green Building Council. These integrate energy performance over the whole life cycle of the building. They also require certain new buildings to be adapted for the later installation of solar PV units and are hoping to attract major developers of "green" residential units. A construction and demolition debris ordinance, which would require that half of the waste generated by new development be diverted from local landfills, has also been proposed.

The town set up Energy Advisory Group in 2001 and held a number of brainstorming sessions to see who was interested. "We tried to put together a plan that identifies key elements in the community as areas that ought to be addressed in an energy plan," Baker said. There were initially 70 participants in the group but these were rapidly whittled down to a core group of 16 including a few members who work for the local distribution utility, Pacific Gas & Electric (P.G. & E.) They met twice monthly to consider policy options on energy issues. The debate went back and forth and, based on a guidebook produced by the Rocky Mountain Institute, *Community Energy Work Book: A Guide to Building a Sustainable Economy*, they undertook a series of workshops to ensure that they obtained an end product. These workshops determined what they could and could not control in the municipality and prepared a list of projects that the group voted upon. Interest was shown both in renewable energy and in action on the demand side, in both the residential and business sectors. They wished to promote local generation such as installing distributed cogeneration in the largest business parks separate from PG & E. The idea was to promote small and medium generation across all uses.

The rate structure for households is generally a fixed rate whatever the time of day, but there is a debate as to whether to go for real time metering. Residential users can already get time of use metering and if the house has solar panels, it is advisable to do so (generation coincides with peak demand).

The conclusion of the people participating in the debate was that many things are beyond their control. Distribution is still controlled and regulated but they cannot do much on the supply side and the real opportunities are on the demand side and with distributed generation. P.G. and E. already ran a municipal programme but this concentrated on municipal facilities, in particular pumping stations.

A primary element in the strategy is therefore energy saving and education on energy efficiency. Standards change and for instance, they can now reduce the number of lighting fixtures since people now accept less light. They would like to develop programmes like that in Berkeley and San Francisco and promote bulk buying of energy efficient equipment.

There are a number of grants to customers from public sources (called rebates in the US) but the problem is how to inform the customer of their availability. There is need for central coordination of this to promote them. In particular there is too much demand for small generation units and not enough for the larger sites that are more economic. So it was suggested that they issue a revenue bond to cover solar PV electricity as has been agreed in San Francisco.

When the worst of the California energy crisis arrived, the plan proved valuable as a guide. In 2001 the town achieved a 7% reduction in energy use in reaction to the power cuts and 25% of the population was actively saving energy – these people saved a great deal. In addition there was some action from business. This was effective in part due to the economic downturn coupled with rising energy prices which elicited a price response. The town is buying in plug meters to show people how much energy they use. These will be loaned out and this will tie in with a sales drive to promote energy efficient equipment.

However it was identified that the main action that is really needed to reduce demand is to reduce the use of air conditioners and other equipment that can wait should not be turned on before 7 p.m.

An eight page plan ordinance aimed at reducing energy demand and encouraging energy and water conservation throughout the community was prepared in response to the comments of the core group. This was presented to Committee for review in September 2002 and formally approved in December 2002.

## The Plan's Proposals

The primary provisions of the draft energy plan include:

- Educating the public about energy saving techniques and programmes,
- Promoting and developing energy conservation strategies and programmes,
- Installing environmentally benign, renewable energy facilities,
- Participating in alliances with businesses and other agencies, and,
- Reviewing local control and public-power opportunities.

As part of the energy saving proposals the plan makes specific provision to encourage local residents to:

- Reduce travel by car, both in distance and in the number of vehicle trips,
- Use pool covers and solar heating systems in place of conventional methods for heating pools,
- Install energy-saving roofing materials. Since the major demand is air-conditioning, colouring the roof white saves a significant amount of electricity. It has since become obligatory to install such roofs in new development throughout California,
- Install photovoltaic panels and renewable power generation to the maximum extent feasible.

The energy advisory group proposed an educational program about energy conservation and renewable energy sources including, for example materials produced for schools, demonstration projects and workshops for local builders, architects, homeowners and the business community. They suggested that the Council investigate the introduction of an ordinance that would encourage homeowners to improve the efficiency of buildings when they are put up for sale. Pleasanton was requested to develop plans, with incentives, to exceed the state energy and water efficiency standards and to modify the city's lighting standards to discourage excessive lighting.

Following acceptance of the plan it has been agreed to carry out one of its main recommendations, to form a permanent energy committee with the members of the group who prepared the plan plus five additional members appointed by the Council. Members will be appointed for four years and will meet monthly. They will act like a Commission and will be able to hold public hearings and make further recommendations to the Council.

The plan proposes the adoption of specific energy regulations in the General Plan called the Energy Element, (a similar special section on housing had already been adopted). This will include sections providing guidelines for conservation and efficiency, renewable energy, conventional power generation, heat loads and transportation. At the same time, the EAG asked city officials to support and facilitate the implementation of a proposed Green Building ordinance. Finally, not forgetting the original motivation for the work, the committee has also developed a generating siting ordinance to deal with any future peaker plant or other generator-type facility or equipment.

## LESSONS LEARNED

With sufficient motivation and commitment, the local community can be actively involved in energy planning. Liberalisation needs more regulation not less if a level playing field is to be maintained and public environmental and social objectives are to be met. Such regulation can be applied at local level to meet wider objectives and the energy plan is an essential framework through which to do it. As municipalities move away from production of energy and more towards this regulatory role, it is to be expected that energy plans will move away from the supply side towards an emphasis on regulation, energy efficiency and renewables. Municipalities throughout the world could well apply this model.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

Energy planning has been rather a Cinderella of local planning policies. Energy plans have mainly been introduced to help municipal utilities to supply their local population and energy efficiency has been viewed from a supply perspective.

Pleasanton's approach is an integrated one covering renewables, distributed generation and energy efficiency. The method of involving a local committee of interested parties is worth copying (although with some caution since such self appointed groups do present the risk of being commandeered by groups with more extreme viewpoints). In some ways it is easier to prepare a broad integrated plan if one is NOT directly responsible for energy supply. In many European countries such planning is devolved to the utility – be it

state, private or municipal. In all these situations the plan will have a supply perspective and, indeed, such a supply-centred plan will of course be necessary. However it should not be regarded as an integrated energy plan but rather as a business development plan. Where such a plan is tightly specified by the local authority (e.g. Heidelberg) then it may work at utility level. However the advantage of carrying out or commissioning this responsibility directly by the municipality is that a wider perspective can be obtained with real public legitimacy.

Again this is a matter for regulation at government level. A number of states have placed the preparation of energy plans among the duties of local authorities. There are few obligations to provide a plan covering energy efficiency or renewables although this can be a topic under Agenda 21. ( There is an obligation on municipalities in the UK to prepare plans for energy efficiency in the residential sector under the Home Energy Conservation Act 1995). The imposition of such an obligation might not be a bad target for governments, which could capitalize on the widespread public support for these topics.

## FURTHER INFORMATION

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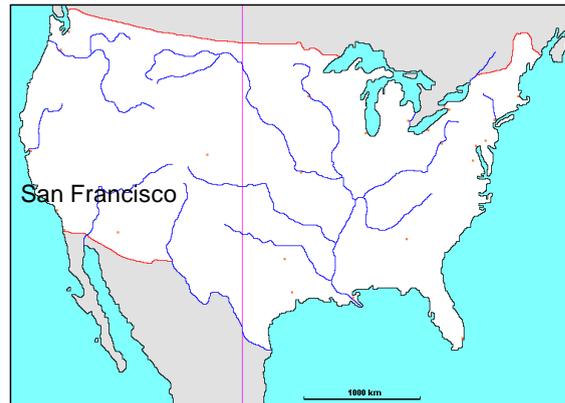


## Energy efficiency in small businesses. Revenue Bonds

## San Francisco Berkeley (USA)

### GENERAL ASPECTS

San Francisco is the most European of West Coast Cities situated on a headland adjoining the Pacific Ocean. The climate is cooler than the rest of California since the town is regularly enveloped with fog caused by cold offshore currents. It is a liberated, vibrant city. Berkeley by contrast is a wealthy, intellectual community further inland, base of one of California's premier universities.



A. HOUBOT - Aix-Marseille

### BACKGROUND

The City of San Francisco has an uneven history of funding energy work in its own stock, primarily financed by their Public Utilities Commission, moving staff and units between Departments for political reasons. Currently energy efficiency is divided between two Departments, Property for work in their own stock and Environment for outreach work, including commercial energy efficiency. The city has its own municipal public utility to provide power for its own stock and which has its own generating capacity, transmission lines and which used the power generated in its own buildings and equipment. However as far as the private sector is concerned, they rely on public benefit funds distributed by the local utilities under California's liberalisation legislation. They had identified that 10% of energy use was by small business and that this was an important sector to tackle. The City had made a \$250 000 proposal to P.G and E in 2000 which was refused.

The energy crisis changed perceptions. In 2002 the California Public Utilities Commission administered part of the funds directly and this was used for local action. They allocated \$10M for demonstration programmes directed at small businesses. In the past there had been a lighting programme for business, but most went to large corporations. Most of the need was in small enterprises and the new programme gave the opportunity to address this problem. The problem was transactional in that small businesses do not have the time to consider this issue nor knowledge on which organisations working in the field are trustworthy.

Luck was this time on San Francisco's side. The member of staff responsible for this sector in the Commission arrived two weeks before the deadline for proposals with nothing planned, and had to distribute these funds rapidly. This type of timescale is takes no account of local authority approval procedures. San Francisco was alerted and managed to submit their proposal by the deadline in cooperation with the municipalities of Berkeley and Oakland within the Bay Area conurbation who had already developed a lighting project and had a suitable body with the expertise to run it. With little competition, this was successful, and so instead of \$0.25M, the three municipalities found themselves with the full \$10M which had to be spent within 18 months!

# ACTION UNDERTAKEN

## Small business programme

The programme is administered by the Community Energy Services Corporation (CESC), an NGO based in Berkeley that had already run a successful programme on lighting in small business, the largest load in the tertiary sector. CESC was established by the municipality of Berkeley in 1985 to promote energy conservation and renewable energy, manage the municipality's energy efficiency services, carry out audits for municipal ordinances on energy efficiency, and run a five year \$1.3M energy efficiency programme financed by the "Rebuild America" programme.

The Corporation already runs the Smart Lights Programme and they are using the same software for this programme. They had a target number of installations to be completed during the programme which finished in June 2003. The potential for energy savings in business by improved lighting is significant. It is estimated that carrying out improvements can reduce energy consumption by 25-50% with a payback time of 1-2 years. The new programme includes two elements, one on education that is non-quantifiable and one with kWh targets.

The project provides a comprehensive, professional service which provides expert assessment of the business' specific lighting needs, negotiated discounts with qualified installation contractors, a prompt installation schedule and quality control inspection and comprehensive assistance to minimize the impact on the manager's valuable time.

CESC originally approached retail stores through small business organisations but these organisations have very few meetings, and there were no real organisations that would really provide the links needed. So they hired students to visit businesses and give out information. This way they identified those businesses needing help and followed up with contacts. One contractor specialises in this field and was working through the city. The project has a deal with this company which does this work over the whole US and specialises in fluorescent lighting, although they have now also expanded to deal with all lighting types and lighting controls.

In San Francisco there were more small retail stores and the incentive, based on kWh saved plus a fixed sum per enterprise, was less than in Berkeley. The kWh saved per business was less and as the project progressed they were meeting their sales targets but not their kWh saved targets. So they have adapted their programme to also look at larger businesses such as hotels and motels.

The programme approached 6000 San Francisco businesses out of a total of approximately 40 000 business locations, this representing about 10-15% of the business locations. The retail market was saturated with student surveyors. A \$2 incentive payment was given to the student for every energy bill brought back for appraisal and they achieved 2-3/hour.

Office buildings were a different market and the tenants needed to be treated differently. If the building owner is approached, he needs to see how he can recover his investment. Each site has proved different but once one gets a deal, there is a rapid and large return. The key is that if a small business develops, it will look at the total cost including the lease and then it is interested in the energy cost.

The programme provides an immediate discount on the installation of high quality, energy-efficient lighting. Grant aid will pay 30% to 60% of the project's costs dependent on the estimated energy savings, and for small improvements costing less than \$500 the whole cost may be refunded. In addition the paperwork is dealt with by the contractors etc, so limiting the administration load on the small business. In Berkeley/Oakland most stores, offices and manufacturers occupying spaces that are less than 1 000 m<sup>2</sup> can take advantage of this service.

The savings are based on a calculated saving based on engineering calculations which is relatively easy with lighting. The incentive is generally split with 50% being allocated on a kWh basis and 50% on a fixed sum per site basis.

## Revenue Bonds and solar energy

In the US, the local voter can put a request to the electorate to permit the local authority to issue revenue bonds. These allow cheap long term loans to finance public investment and which will be paid back out of income. These have significant tax advantages.

San Francisco has consent for two bonds altogether totalling \$100M to finance energy efficiency and solar power. They are currently debating how to use these, but since San Francisco has its own utility to provide the municipal services with electricity so that they can finance investment on their own property and transmit the current generated on their own lines to other buildings. Such a bond can also finance investment by householders and the private sector for public benefit purposes. However when an owner occupier extends his mortgage, he gets tax relief which is more beneficial. Householders can use this option directly because net metering is allowed in California for small distributed generators.

Berkeley by contrast has no network of its own and so is forced to use electricity generated by solar power investments directly on site. They therefore have to design their sites below continuous use level. They finance their own investments rather than using a bond.

## LESSONS LEARNED

There is a big problem with this type of approach to funding a project. Due to its short timescale, the electrical contractors are not interested in developing the business on a permanent basis. Once the project has finished there is nothing for them. Therefore the project is desperate to find continuing funding to maintain action and a market. Furthermore, the funding procedures had been the subject of a judicial decision which ensured that all the funds will pass via the utilities. If this proves to be the case in the long term, this type of funding to local authority managed projects will not continue. Utilities will use the resources for their own marketing and will subsidise their own administrative costs for marketing out of the budget.

The partners completed the programme, serving 4059 businesses and saving 6.1MW of power, slightly over their target. The project won an award from the United States Environmental Protection Agency. However doing work in small businesses is difficult and to reduce administration CESC aggregated clients in groups of 5-10. It is still difficult to maintain control over the contractors. The project limited the administration charge to 15% of the total, with 85% for the incentives. This is fine in principle but marketing is very important and is very expensive. The ideal balance is 30-35% for marketing and administration.

The split between site funding and kWh funding is not universally satisfactory. CESC would like to modify the current system to make it easier to fund smaller sites, since if one concentrates purely on the kWh contribution one will concentrate purely on the large sites and the small sites will be ignored.

CESC feel that it is important that the project is actually implemented via an NGO since this gives the project credibility with the client. A private company could not have the same relationship since it has its own agenda and is unlikely to be as responsive to the client's needs and doesn't understand the nuances, the NGO by contrast gets to understand the clients. The motivation for the NGO is client satisfaction rather than sales. The incentive must therefore improve the lighting service as well as saving kWh.

Not having the marketing money, CESC made an advantage out of necessity – and developed new publicity programmes. It became essential to go from door to door making direct contact and also to develop business networks etc.

The funds for the following year were all reserved for utilities, and San Francisco could only do a project as a subcontractor to them. CESC feels that the current system whereby money from an utility passes via a contract to a local authority is not efficient and needs to be revised. CESC supports the establishment of Regional Energy Offices as a response to this problem. One has already been developed in San Diego and another is planned in the Bay area. From July 2003 legislation requires the CPUC to provide protocols allowing other agencies than the utilities (including local authorities) to run "public good" charge funded programmes. So in 2004 funds will again be available to local authorities and another bid is planned to tackle a further 4000 businesses.

## IMPLICATIONS FOR PUBLIC POLICY MAKERS

The lobbying power of utilities in trying to keep control of the spending of public interest monies for energy efficiency and renewables is very effective in all countries where such provision has been introduced. This makes no sense.

One role of Government in a democracy is to resist unwarranted vested interests by responding to a balance of interests, but in this case the consumer interest is weak and cannot compete with the opposing power of major utilities. Utilities exist to make profits and supply energy and it is cloud cuckoo land to think that their managements will act by any other altruism than their shareholders' interest. It will require a real dedication of governments to resist this but it is apparent that if environmental and social targets are to be met, this will not come through relying on utility-led programmes.

The development of programmes which are directed at small players, such as the admirable one outlined here, is a major objective that has to be tackled at local level. They are labour intensive requiring "direct selling" to the customer but this is no handicap when employment is a major consideration. They develop a direct interest in energy saving which also saves money.

So Government policies should review clearly how they apply the element of their public interest levies used to do work with small and medium consumers. There should clearly be a local element. There are various formulae – here the funding identified by the local authority is passed from the local authority to a specialised locally-based NGO, a formula used successfully elsewhere (e.g. Denmark). Elsewhere this funding is used directly by the local authority. It can be subcontracted successfully back to the services arm of a local utility (as happens at Umea in Sweden or in Heidelberg). In each case there is a need to ensure transparency and ensure that the vested interests of the actors as far as possible coincide with those of public policy. The key factor for success is that the specification is carried out by local actors whose prime interest is the delivery of a service to small consumers in the locality rather than business positioning.

### FURTHER INFORMATION

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# IEA Demand-Side Management Programme

The International Energy Agency (IEA) was established in 1974 as an autonomous agency within the framework of the Economic Cooperation and Development (OECD) to carry out a comprehensive programme of energy cooperation among its 25 Member countries and the Commission of the European Communities.

An important part of the Agency's programme involves collaboration in the research, development and demonstration of new energy technologies to reduce excessive reliance on imported oil, increase long-term energy security and reduce greenhouse gas emissions. The IEA's R&D activities are headed by the Committee on Energy Research and Technology (CERT) and supported by a small Secretariat staff, with its headquarters in Paris. In addition, three Working Parties are responsible for monitoring the various collaborative energy agreements, identifying new areas for cooperation and advising the CERT on policy matters.

Collaborative programmes in the various energy technology areas are conducted under Implementing Agreements, which are signed by contracting parties (government agencies or entities designated by them). There are currently 40 Implementing Agreements covering fossil fuel technologies, renewable energy technologies, efficient energy end-use technologies, nuclear fusion science and technology and energy technology information centres.

The Demand-Side Management Programme is a relatively recent collaboration. The 17 Member countries and the European Commission have been working since 1993 to clarify and promote opportunities for DSM.

Australia	France	Spain
Austria	Greece	Sweden
Belgium	Italy	United Kingdom
Canada	Japan	United States
Denmark	Korea	
European Commission	Netherlands	
Finland	Norway	

A total of 10 Tasks have been initiated, 4 of which have been completed. Each Task is managed by an Operating Agent from one of the participating countries. Overall control of the programme rests with an Executive Committee comprising one representative from each contracting party to the Implementing Agreement. In addition, a number of special ad hoc activities--conferences and workshops--have been organised. The Tasks of the IEA Demand-Side Management Programme, both current and completed, are as follows:

## Tasks

Task I	International Database on Demand-Side Management
Task II	Communications Technologies for Demand-Side Management
Task III*	Cooperative Procurement of Innovative Technologies for Demand-Side Management
Task IV*	Development of Improved Methods for Integrating Demand-Side Management
Task V*	Investigation of Techniques for Implementation of Demand-Side Management Technology in the Marketplace
Task VI*	DSM and Energy Efficiency in Changing Electricity Business Environments
Task VII	International Collaboration on Market Transformation
Task VIII	Demand Side Bidding in a Competitive Electricity Market

Task IX Municipalities and Energy Efficiency in a Liberalised System

Task X: Performance Contracting

\* *completed Task*

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