

EUROPEAN GREEN CITIES

INSPIRATION guide



New identity for urban area

A VIEW INTO LOW ENERGY HOUSE BUILDING IN EUROPE

{ 11 PROJECTS }



*High-tech preservation
of architectural heritage*



*Low-income housing
with reduced energy costs*



*Introduction of
local district heating in Spain*



*Renewable energy supply
to a "Green Region"*



Ecology pays back in lowering rents



*Tenants' influence
and CO₂ reduction*



*A new "tune up"
of innovative technologies*



*Energy efficient technology
to control costs of modern architecture*



*Improving efficiency
of urban energy supply systems*



*Low-flow showers to meet
rapidly increasing water prices*

The European Green Cities project has been supported by the EU Thermie programme in 1996 as a target project in the building sector. After EU approval in July 1996 the actual project period runs 4 years from 01.09.1996 until 31.12.2000. During this period many of the involved people from city administrations and from the building



project teams will meet and exchange experiences obtained from the individual projects. The main purpose is to inspire each other to more low energy and environmentally sound house building in the 11 cities. From these cities inspiration will be spread to other European cities.



AUSTRIA - RADSTADT

New identity for urban area

GSWB Housing Association is the builder of 36 solar low-energy dwellings in Radstadt near Salzburg. One primary aim is to minimise the total energy consumption for both construction and operation of the buildings. Therefore an exact calculation of the life cycle costs of the construction were completed, and their impact on the environment was analysed. The domestic hot water is solar heated, rainwater is collected and reused and the air ventilation works with heat recovery. Project Manager Mr. Franz Loidl from GSWB expects that such a demonstration project will stimulate the ecological improvement of other housing projects.

The 36 solar low-energy dwellings will be the start of "Radstadt West" - a model residential area for a renewal process comprising an older part of Radstadt located between the city centre and the outskirts of Radstadt. Often this part of a city has a somehow diffuse character - and therefore giving new identity can be the beginning of an improved

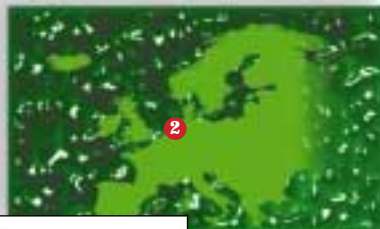
quality of life for the local inhabitants. Here the attraction will be environmentally sound dwellings based on ecological materials and minimised energy consumption for the buildings' total life cycle. Mayor of the city of Radstadt Mr. Alois Winkler states that "the project will form a new identity for this part of Radstadt".



Project Manager
Mr. Franz Loidl
phone: +43-662433181
fax: +43-66243318161



Mayor
Mr. Alois Winkler
phone: +43-64524292
fax: +43-6452429219



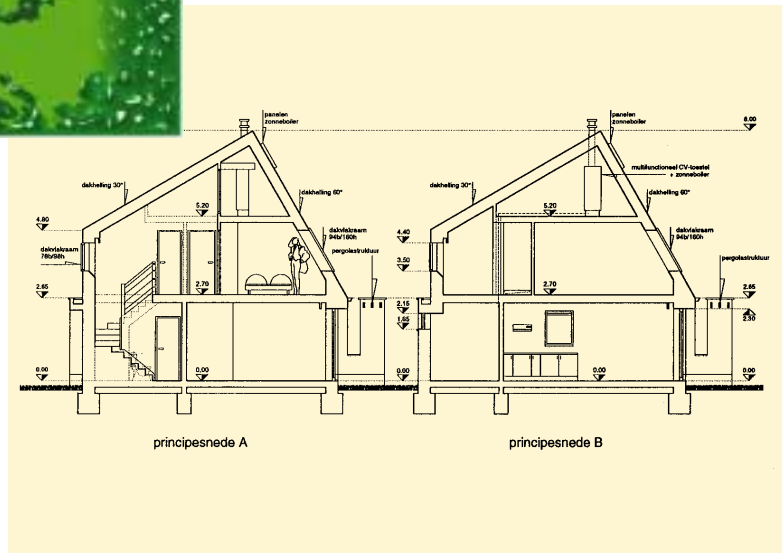
BELGIUM - HOUTVENNE

Low-income housing with reduced energy costs

Social housing company Zonnige Kempen has a general objective of building houses for low income people at reasonable costs. On a tight family budget reduced energy costs are even more important than in general, so therefore achieved results will be implemented afterwards in many other dwellings. Director Luc Stijnen explains that "energy efficient social houses are an essential part of a social housing policy".

The 23 new energy efficient social housing units located in Houtvenne near Antwerp will be a demonstration project for introducing energy efficient design and construction in Belgium - and for promoting technology for energy efficiency in housing, which until now has had considerable high costs because of a low general interest. Total energy consumption for heating amounts to 220 kWh/m² for a standard house

in Belgium. The project aims at a reduction to 50 kWh/m². The Province of Antwerpen, which is a shareholder in Zonnige Kempen, is very interested in disseminating project results for implementation in the entire region. Provincial Deputy Mr. Ludo Helsen states that "regional and local authorities have to create favourable conditions for energy efficient building".



Director
Mr. Luc Stijnen
phone: +32-14541941
fax: +32-14541951



Provincial Deputy
Mr. Ludo Helsen
phone: +32-32405243
fax: +32-32405274





DENMARK - HERNING

Ecology pays back in lowering rents

Director Mr. Erik Lund, Herning Housing Association, has already seen tenants' interest growing in ecological considerations when the housing association mid 1996 completed 48 new apartments in Herning. Because of energy and water saving installations etc. the rent was approx 10% lower than usual. This really speeded up the interest for renting "ecological apartments" - so therefore this new project has met with a similar big interest even before starting construction.



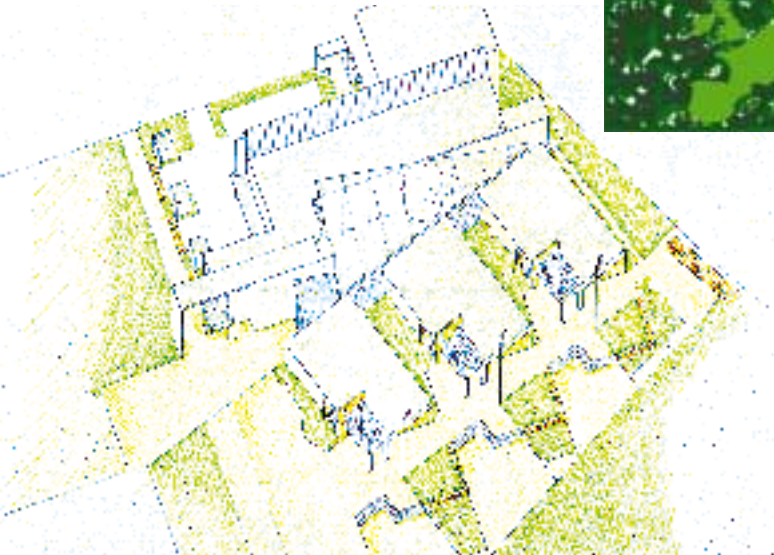
Director
Mr. Erik Lund
phone: +45-97125822
fax: +45-97127522



Urban Planning Chief
Mr. Lars Dalsgaard Hansen
phone: +45-97212000
fax: +45-97126791

The 50 youth apartments will be located in the southern part of the city of Herning, which over the next 10-15 years will be converted from an old industrial area to a residential area using general ecological approaches for the construction and operation of buildings. This area is already a demonstration project for environmentally correct project

planning as part of an overall Danish national project supported by the Environmental Protection Agency. Urban Planning Chief Mr. Lars Dalsgaard Hansen, Herning Municipality, mentions that "urban renewal must include ecologically balanced planning in order to improve everyday living conditions in the city".



FINLAND - KUOPIO

Energy efficient technology to control costs of modern architecture

The city of Kuopio has built one new school per year, during the last 20 years, and renovates one or two existing schools per year. Builder and city representative, Construction Manager Mr. Asko Kauppinen wants to implement project results into future school projects in Kuopio. One reason for the project is that school buildings represent by volume about one third of all public buildings. Advanced and integrated control technologies shall handle rising costs due to modern architecture in new public buildings, increasing electrical devices and rising demand of lighting and indoor air quality and comfort.



Headmaster
Mr. Esko Parkkinen
phone: +358-17184000
fax: +358-17184210



Construction Manager
Mr. Asko Kauppinen
phone: +358-17185601
fax: +358-17185010

The new school project of Pirtti Elementary School in Kuopio will demonstrate an advanced energy efficient design and energy saving technologies and products implemented in modern architecture, durable and low emission materials, energy efficient building services systems and advanced control technologies applied in a comprehensive school building project.

The project will be carried out by applying common Green City Action Plans given by the main frame project. "The aim is to plan and construct the most energy-efficient education building in Finland", states headmaster Mr. Esko Parkkinen.



SPAIN - VILANOVA I LA GELTRU

Introduction of local district heating in Spain

"Qualitat promocions" is a building developer making considerable effort to introduce an innovative, energy efficient approach to the traditional sector of residential development: collective building heating supply using efficient natural gas boilers. This solution does not currently exist in Spain. Qualitat will be responsible not only for supervising general design specifications but also for ensuring that the final price of the homes built is within Spanish limits for social housing.

The solar low energy building project with 80 apartments is located in Vilanova i la Geltrú, 60 km south of Barcelona. It forms part of a new development that will include up to 1332 homes. The apartments are of "official protection" status which means that maximum limits are placed on their sales price/m² to ensure the provision of affordable housing. According to Director Eduard Brull Ortiz "the project aims at showing that high standards of environmental quality and rational energy use can be incorporated into such housing".

In the past experiments with collective heating to one or several buildings proved unpopular with users due to lack of individual control and suitable metering arrangements. Control technology has improved to the point where these problems need not arise. "Thermie projects in Spain have already successfully demonstrated the value of low-energy, bioclimatic design. Now the time has come to do the same with natural gas fuelled district heating", states Mayor E. Orriols.



Director
Mr. Eduard Brull Ortiz
phone: +34-38142960
fax: +34-38141875



Mayor
Mr. Esteve Orriols Sendra
phone: +34-38140000
fax: +34-38142425



DENMARK - COPENHAGEN

Tenants' influence and CO₂ reduction

The "Hedebygade" building block is situated at Vesterbro in Copenhagen and it comprises 350 apartments from around 1888. The block of flats will go through a rehabilitation process as part of an urban renewal project with a total budget of DKK 233 million. From preliminary meetings on the block's renewal, the tenants of the block have already attached importance to giving resource saving solutions of any sort a high priority, states Head of Department Ms. Lisbet Sloth.

A part of this vast project comprises the retrofit of 96 dwellings. For 84 apartments it is the aim to reduce the energy use for heating and DHW by 50-60%, and at the same time obtain 20-40% saving on electricity and water use. These figures are compared to the situation before the renovation. "The city of Copenhagen can use the results to define improved energy and environmental standards e.g. as part of

Copenhagen CO₂ saving plans for the year 2005" explains Director of International Relations Mr. Peter Skat Nielsen. In the Copenhagen project there is also an activity towards energy efficient one family houses. For 12 one-family houses the aim is saving 60% on heating and 20-35% savings on electricity and water.



Head of Department
Ms. Lisbet Sloth
phone: +45-33122177
fax: +45-33154031



Director of International Relations
Mr. Peter Skat Nielsen
phone: +45-33662508
fax: +45-33667097





FRANCE - GRENOBLE

Improving efficiency of urban energy supply systems

This project will implement the most important solar installation in France with 800 m² of water solar collectors and 100 m² of photovoltaic modules. According to Assistant General Manager Mr. Guy Granier from OPAC 38 "the energy consumption is remarkably high, because 75% of the existing building stocks were built before the energy crises. Therefore OPAC 38 expects a very short pay-back period for the energy saving installations. The project results will furthermore be utilised in future renovation in many of the about 20,000 apartments".



*Assistant General Manager
Mr. Guy Granier
phone: +33-476205050
fax: +33-476205147*

The project comprises low-energy retrofit of 122 apartments and solar domestic hot water systems for 505 apartments in total. The demonstration project is part of a Social Quarter Programme for renovating 1,246 apartments in an area named "Suri-eux" situated in the inner suburb of Grenoble called Echirolles. The objective is to integrate low-energy

and environmental criteria into the future design of urban areas. The main interest in this project is to improve the efficiency in Grenoble's district heating system and thereby reduce energy losses and costs.



GREECE - VOLOS

High-tech preservation of architectural heritage

This project is part of a broader programme for urban rehabilitation in the old neighbourhood "Palaia" in Volos. Director Mr. Christos Bessas from Volos Municipal Enterprise for Urban Studies, Innovation and Development (DEMEKAV), explains that "the aim of the demonstration project is to restore two abandoned industrial complexes of remarkable architectural significance, by introducing new uses and financial activities and integrating innovative solar and energy saving technologies. Tsalapatas Brickworks will be transformed into an exhibition centre and industrial museum, while the former disinfestation unit will house the newly established Regional Energy Centre of Thessalia".



*Director
Mr. Christos Bessas
phone: +30-42133639
fax: +30-42121272*

"For the City of Volos the demonstration project is seen as a pilot case to help establish low energy consumption standards at competitive costs for industrial buildings,

which form an important part of the architectural heritage in Greece and throughout Europe as well", states Mayor Mr. Dimitios Pitsioris.



*Mayor
Mr. Dimitios Pitsioris
phone: +30-42133639
fax: +30-42121272*



ITALY - ABRUZZO

Renewable energy supply to a "Green Region"

A project for renovating two buildings from the 1970's in Avezzano town is part of the "Abruzzo Green Region of Europe" plan. Doctor U. Lepidi from IACP Housing Association mentions that "introducing rational use of energy and integration of renewable energy supply can be an inspiration to continue renovating many of IACP's 8,000 apartments and further on give guidelines for renewal among the total of 28,000 apartments in the mountain area in the Abruzzo Region".

The project involves a solar low-energy retrofit project for 54 apartments in two buildings, which are typical for old social buildings in small towns in the Abruzzo Region. The project foresees a combination of both renewable energy utilisation and traditional maintenance interventions in order to obtain energy savings with low costs. The buildings are not insulated and the present heating system is composed

of radiators and separate boilers for each apartment. "The demonstration project involves a new highly efficient central heating plant and also installation of water solar collectors and photovoltaic modules, which both will make the project a showcase in Italy", states Mr. F. Manasseri from Abruzzo Region.



Public Responsible for Regional Department
Mr. F. Manasseri
phone: +39-862413165
fax: 39-86224091



Doctor
Mr. U. Lepidi
phone: +39-862279228
fax: +39-862279240



ITALY - BRESCIA

A new "tune up" of innovative technologies

The residential quarter, where the demonstration project is located, was built in the 1970's and was originally meant for the use of innovative technologies and materials. But the present inefficient conditions require a refurbishment. General Director Mr. Angelo Bettoni from builder IACP Brescia Housing Association explains that "the main economical and technical problems are bound to the domestic hot water production. New local storage and heat exchangers in each apartment will reduce the energy consumption to domestic hot water by 75%".

The project comprises the solar low-energy retrofit of 72 apartments in three buildings from 1980 in Brescia's "S. Polo" quarter, which has grown up to 5,000 apartments. Most of these buildings need a refurbishment, and the involved local and regional authorities want to demonstrate how huge energy savings are possible with simple changes in building practice. "Be-

sides energy savings and making Brescia "greener" the project also aims at improving winter thermal comfort and avoid summer overheating" states Mayor Mr. Martinazzoli.



General Director
Mr. Angelo Bettoni
phone: +39-302005511
fax: +39-302006423



Mayor
Mr. Fermo Martinazzoli
phone: +39-3029771
fax: +39-302400732





UNITED KINGDOM - PORTSMOUTH

Low-flow showers to meet rapidly increasing water prices

The high rise block of flats where the demonstration project will be implemented is located close to the city centre. Portsmouth City Council's project contact person is the Planned Maintenance Manager, Mr. John Wellington. He states that "external cladding to improve the energy performance provides an opportunity to update the look of the block, bringing it more into harmony with its surroundings. Instead of the existing flat roof a new pitched roof allowing a high level of insulation will be implemented".



*Planned Maintenance Manager
Mr. John Wellington
phone: +44-1705834785
fax: +44-1705834855*



*Head of Housing Service
Mr. Jeffrey Wellings
phone: +44-1705834454
fax: +44-1705834855*

The project involves the solar low-energy retrofit for 136 flats in the tower block together with a new combined heat and power station and district heating. The demonstration project is part of large plans for energy and environmental "green" retrofits in Portsmouth. Head of Housing Service Mr. Jeffrey Wellings states that "a significant issue for UK householders is that water

costs have increased in recent years due to the fact that true costs of supplying fresh water and purifying waste water are having to be passed on to the consumer by privatised water companies. To reduce water use the retrofit will therefore also provide flow restrictions and aerating taps on wash basins as well as low flow shower heads".



FIRST PROJECT SEMINAR

**Copenhagen
20-22 May 1997**

All builders and city representatives with their consultants met in Copenhagen with the purpose of initiating co-operation and getting to know each other.

Mayor of Housing & Traffic in the City of Copenhagen Ms. Bente Frost opened the three days' session. She introduced the project participants to environmental initiatives and results over many years within the Greater Copenhagen region.

The Mayor underlined the extensive focus on quality of life aspects within recent implemented urban ecology projects in Copenhagen, an example being urban renewal and renovation of old squares, thus linking to the objective for the present low energy housing project.

It is of primary concern for the established "European Green Cities Network" to involve city aspects in these 11 building projects, thereby improving the development towards urban environmental sustainability. Ms. Mayor Bente Frost, City of Copenhagen, was elected first chairman of the network, the secretariat of which it was decided to situate at Green City Denmark. A "Partners Agreement" was signed on 20 May 1997 at the Copenhagen City Hall, the main objective of which is to state the responsibilities for all project participants and contract partners for the next 4 years' co-operation. Other objectives are to implement low energy housing demonstration projects and develop city low energy housing policies, guide-lines, training, education, capacity building and institutional strengthening.



Project participants gathered around Mayor Bente Frost after signing the Partners Agreement



PROJECT OBJECTIVE

Objective

The objective of the European Green Cities, Integrated Quality Target Project is to introduce an integrated sustainable global solar low energy design using best available technologies in new build and retrofit building projects based on energy and environmental assessment together with a total energy and total economy approach, e.g. using new energy saving measures as the background for creating a realistic market for sustainable and energy efficient building. To ensure that the most cost effective solutions are selected, early price calculations will be performed in co-operation with

contractors for all projects. It is proposed to develop guidelines and establish an early state education process together with leading institutions in Europe, the target group being city authorities, builders and consultants focusing at five different selected target action areas:

- Sustainable and healthy building design
- Energy and environmental assessment incl. total economy assessment
- Optimised energy and water supply systems
- Building integrated solar energy design
- Sustainable urban planning

Based on this, working groups will be established to define improved energy and environmental standards for sustainable and energy efficient building including energy supply systems. Buildings, which meet a certain standard can, based on this, obtain a “green cities” certificate.

A co-operation with the city of Gdansk and other East and Central European cities is also foreseen in the project in an attempt to transfer project results to East and Central European countries.

Energy optimisation

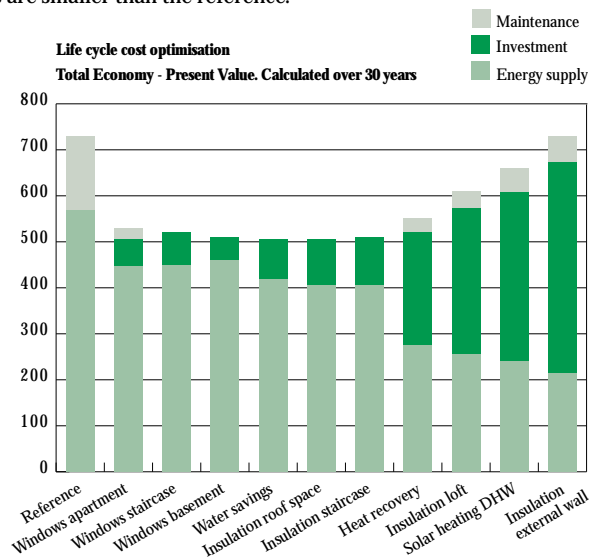
For all projects work will continue on a total energy optimisation by means of a newly developed design tool, “optibuild” which is based on “present value” optimisation.

The optimisation process starts with a calculation of the life-cycle cost of a reference building. Then the same calculation is repeated by introducing all possible energy saving measure one by one. The calculation with the lowest life-cycle cost is chosen as the most profitable energy saving measure. The process continues until all the possible energy saving measures have been chosen.

The calculation results in the figure to the right from a retrofit housing project in Copenhagen shows that the operation cost decreases when

introducing new energy saving measures. At the same time the investment and the maintenance cost increases, but together the total costs are smaller than the reference.

That means that it will in this case be profitable for the builder to introduce all the proposed energy-saving measures.



Environmental assessment

A sustainable building design should always include an environmental assessment. An environmental assessment is foreseen for several of the European Green Cities projects.

A full environmental assessment should focus on the following four subjects:

- Internal, local and global environmental aspects
- Environmental assessment of building materials
- Embodied energy of building materials

- Reduced CO₂ emissions during operation of the building

During 1997 it will be possible to use the computer programme BE²AM (Building, Energy and Environmental Assessment Model) for an energy and environmental assessment.



PROJECT OBJECTIVE

Indoor climate

To design and construct buildings with a healthy and comfortable indoor environment is an obvious aim. However, until recently, it was by no means clear how this should be done in practice. It was frustrating for engineers, architects and building owners to receive numerous complaints about the indoor air quality in buildings where existing standards were being met. Practice demonstrated that compliance with existing ventilation standards did not guarantee good indoor air quality.

A major fault was that, directly or indirectly, these standards assumed that the occupants were the only polluters in the building. But numerous recent studies have docu-

mented that the building in itself is often a major source of air pollution. The pollution sources in the building may comprise building materials, furnishing and carpeting, as well as components in the ventilation system. This fact is now acknowledged in "Guidelines for Ventilation Requirements in Buildings" published by the European concerted Action on Indoor Air Quality and Its Impact on Man. In these guidelines the required ventilation is proportional to the total pollution load on the building.

The energy consumption in buildings is closely related to the ventilation requirements. When source control is applied, reduced energy consumption can be achieved by decreasing ventilation without jeopardising indoor air quality. Source

control reflects the general philosophy of environmental protection: preventing rather than curing. The obvious way of reducing the ventilation requirement for acceptable air quality is to reduce indoor pollution sources.

Development of low-emitting products is a key issue. The research project "European Data Base on Indoor Air Pollution in Buildings", supported by the European Commission through the Joule II programme deals with this issue. The project involves 14 research institutions in 11 European countries. Experiences from this project will be presented to the participants of the European Green Cities project by the Institute for Heating and Air Conditioning in Denmark.

Energy Supply

Use of optimised and energy efficient energy supply systems is also an important part of the European Green Cities target project.

For individual heating systems

focus will be towards condensing boilers and optimised combinations with solar heating systems for hot water. For large heating systems focus will be towards optimised district heating design with low return temperatures and also use of combined heat and power, CHP.

The European Institute of Environmental Energy (EIEE) in Herning, Denmark will help facilitate the dissemination of the latest knowledge in the district heating area to the involved cities and builders.

Previous EU Thermie project inspiration

Skotteparken in Ballerup, Denmark is a research and demonstration project with 100 good and attractive dwellings.

The monitoring campaign shows that the energy consumption for heating and hot water is limited to 40% by means of i.e. added insulation, low-emission glass in the windows, added glass houses, heat recovery on ventilating air, solar heating of both domestic hot water and heating of the dwellings, local combined heat and

power plant and an advanced EMS control system. The electricity and water consumption is also distinctly lower than usual.





EUROPEAN GREEN CITIES - LOW ENERGY TECHNOLOGIES

Best available solar low-energy technologies	Austria Radstadt	Belgium Houtvenne	Denmark Herning	Finland Kuopio	Spain Vilanova i la Geltrú	Denmark Copenhagen	France Grenoble	Greece Volos	Italy Abruzzo	Italy Brescia	UK Portsmouth
1. Extra insulation	•	•	•	•	•	•	•	•	•	•	•
2a. Low energy windows	•		•		•	•	•	•	•	•	•
2b. Super low energy windows		•		•		•					
3. Air tight construction in combination with optimised ventilation design	•	•	•	•	•	•	•	•	•	•	•
4. Counter flow heat recovery of ventilation air	•	•	•	•		•					•
5. Use of healthy building materials with low emissions		•		•		•	•		•		
6. Solar heating for domestic hot water and PV-operated pumps	•	•	•		•	•	•	•	•	•	•
7. Passive solar design	•			•	•	•	•	•		•	
8. Solar wall facades for preheating of ventilation air			•	•		•					
9. PV-systems for continuous electricity use, like fans			•	•		•		•			•
10. Low temperature heating systems	•	•	•	•		•	•		•	•	•
11. Low temperature district heating	•		•	•		•	•				•
12. Condensing gasboilers		•			•			•	•	•	
13. Combined heat and power, CHP			•			•					•
14. Optimised lighting systems and daylight				•		•		•			
15. Individual meters for heating, electricity and water	•	•	•		•	•	•		•	•	•
16. EMS survey	•	•	•	•	•	•	•	•	•	•	•
17. Solar protection		•		•	•			•		•	
18. Advanced cooling system				•				•			
19. Water and electricity savings		•	•	•	•	•	•	•	•	•	•
20. Total energy, environmental and economic optimised design	•	•	•	•	•	•	•	•	•	•	•
21. 40-50% savings on electricity for lighting	•	•	•	•	•	•	•	•	•	•	•
22. 20-30% saving target for municipal electricity use	•	•	•	•	•	•	•	•	•	•	•
23. 40% saving on water use	•	•	•	•	•	•	•	•	•	•	•
24. 50-60% solar for DHW	•	•	•	•	•	•	•	•	•	•	•
25. 40-60% saving on energy for heating and DHW	40%	60%	60%	60%	60%	60%	40%	70%	60%	60%	60%

New-build project
 Retrofit project



EUROPEAN GREEN CITIES - TRAINING INSTITUTES

European Institute of Environmental Energy

Consultant on energy supply systems

The European Institute of Environmental Energy (EIEE) was established in 1990 as a private, independent trade and industry foundation with the aim of disseminating knowledge and know-how on energy and environmental issues within the international energy sector. The main fields of activity are district heating and renewable energy.

The infrastructure of the Institute comprises a permanent core of staff and a comprehensive global network of associated partners. These partners include industrial enterprises as well as public and private bodies.

EIEE offers a complete education and training programme for key personnel within the energy sector with focus on managerial training and modern technology.

Director Jeanne Møller states that "EIEE has an intense and continuing interest in this project because it emphasises the positive benefits of integrated planning. Only by considering all aspects of energy generation, distribution and use of the planning stage can overall energy policy be made to complement the concept and aims of sustainable development".



*Director
Ms. Jeanne Møller
phone: +45-99268380
fax: +45-99268370*

ETSU - Solar Group

Consultant on building integrated solar design

ETSU has more than 20 years of experience of providing technical management and consultancy services within energy, environment, transport and industry.

Concerning buildings, ETSU - Solar Group manages the UK Government renewable energy programme which includes a solar energy programme. This programme includes integration of passive solar design, active solar heating, photovoltaics and building energy efficiency.

Senior Consultant Mr. Julian Wilczek states that "buildings are expensive and have a long life. It is no wonder therefore that designers are reluctant to experiment - mistakes can be costly. Demonstrations in both new and retrofit building projects have tremendous value in both educational and confidence building terms. ETSU's experience in this field through UK national and international projects will provide a sound foundation for the dissemination routes for the experience gained from this project".



*Senior Consultant
Mr. Julian Wilczek
phone: +44-1235433147
fax: +44-1235432331*

Technical University of Denmark (DTU)

Consultant on indoor climate and healthy building design

The Technical University of Denmark (DTU) founded in 1829, is currently Denmark's leading centre for engineering education and research. One of the twelve so-called focus areas in which DTU's research is of specifically high quality and social relevance is urban ecology and environmentally sound building materials and constructions. Within the university the Institute for Heating and Air Conditioning is specialist on indoor climate and healthy building design based on low emission materials.

Head of Research Mr. Geo Clausen states that "ventilation of building accounts for a substantial part of the total energy consumption in Europe. Lowering the ventilation requirements without compromising the health and comfort of the buildings occupants probably represents the biggest energy saving potential in the building sector today. This potential may be reached by source control in the form of systematic selection of low-polluting building materials and processes indoors. I expect that this project will be an important way of creating a greater awareness of the importance of proper source control".



*Head of Research
Mr. Geo Clausen
phone: +45-45254025
fax: +45-45932166*



EUROPEAN GREEN CITIES - MANAGEMENT TEAM

Institut Cerdà

Institut Cerdà is a private non-profit organisation, situated in Barcelona, which carries out applied research work in four different areas: telecommunications, logistics, environment and energy.

Within the energy area, the work during the last eight years has focused on the building sector, both in the management and control field (domotics) as well as in the low energy and environmental impact field. Within this field, Institut Cerdà has lead a multi-client project called Hiades that has been funded by 10 public and private Spanish organisations. Project Hiades has focused on the development for the Spanish market of three main energy and environmental assessment methods:

- energy and environmental labeling for new-built housing and office building
- environmental preferences of materials
- building life cycle analysis tool to calculate both energy demand and emissions produced

Director of the energy area Mr. José Luis Rovira states that "the work done under Hiades is nowadays producing the first drafts of new norms and schemes that incorporate energy and environmental criteria, which is non-existent, particularly those related to environmental impact".



INSTITUT CERDÀ

Institut Cerdà
Numancia 185
E-08034 Barcelona
Phone: +34-32802323
Fax: +34-32801166
E-mail: ic_aee@compuserve.com

Metec Engineering

Metec Engineering situated in Torino works in the field of technological plant design and it treats research and development activity with own or customers ideas.

The main activities are:

- technological plant design in the civil industrial field
- energy consultancy services including monitoring on building energy consumption
- research and development of low energy building design.

General Director Mr. Salvatore Cali Quaglia expects that "results from the European Green Cities project will be implemented afterwards in a number of Italian cities to improve comfort and general energy saving efforts".



METEC

ENGINEERING
Metec Engineering
Corso Quintino Sella 20
I-10131 Torino
Phone: +39-118195761
Fax: +39-118196007
E-mail: metec@ns.sinet.it

Cenergia Energy Consultants - technical co-ordinator

Cenergia Energy Consultants are consulting engineers specialised in energy saving technologies for building and utilisation of solar energy. Cenergia has initiated several major building projects in Denmark, demonstrating total energy designs with combined use of energy conservation, solar energy utilisation and energy efficient heat supply systems. Cenergia also works with research and development, and demonstration projects within international and national programmes such as the EU programmes: Thermie, Joule, Altener, Save, the IEA Solar Programme and the Danish programmes EFP and UVE.

Cenergia was initiator and technical co-ordinator of the EU-Thermie target projects with EHEN (European Housing Ecology Network) from 1993 and the present European Green Cities Network project.

Cenergia also develops computer programmes for calculation and optimisation of the energy consumption and thermal comfort within buildings, solar thermal systems and combined heat and power (CHP) generation.



Cenergia Energy Consultants
4 Sct. Jacobsvej . DK-2750 Ballerup
Phone: +45-44660099
Fax: +45-44660136
E-mail: cenergia@compuserve.com

Green City Denmark A/S - administrative co-ordinator

The Danish Ministry of Industry in co-operation with the Ministry of Energy and Environment initiated project "Green City Denmark" to establish a showcase for Danish expertise within energy and environment - based on 20 years of environmental legislation and the connected environmental improvement, research & development, education etc. Green City Denmark is organised as a limited liability company with at present 222 shareholding companies, municipalities, counties, institutions etc. from all over Denmark.

Throughout the last 3 years Green City Denmark has arranged over 170 visiting programmes for delegations from most EU countries visiting Danish reference plants, cities, projects, companies etc. to establish co-operation within the field of energy and environment. Many of these reference plants are also available in the Green City electronic brochure/database.

Technical Director Jens Frendrup has noticed a rapidly growing interest for the "Green City" approach of public-private co-operation for environmentally more sustainable solutions within industrial production as well as within urban management and house building practice.



GREEN CITY DENMARK A/S
Merkurvej 910
DK-7400 Herning
Phone: +45-97216400
Fax: +45-97217421
E-mail: gcd@euroconnect.dk

CONTACT PERSONS:

Institut Cerdà:
Director of
the energy area
José Luis Rovira



Metec:
General Director
Salvatore Cali Quaglia



Cenergia:
Director
Peder Vejsig Pedersen



Green City Denmark:
Technical Director
Jens Frendrup
(chief editor)



For more details about the target projects, or about the Thermie programme, please contact Mr. A. Landabaso,
Directorate-General for Energy (DG XVII), Commission of the European Communities, Rue de la Loi 200, B-1049 Brussels, Fax: +32-22966017