

## Extended Project Summary

By the end of 2009, over 15,000 people will live in modern, comfortable, healthy and energy-efficient homes due to the well-orchestrated sustainable developments of the metropolitan areas of Almere, Milton Keynes, Viladecans and Ajaccio, the medieval capital of the isle of Corsica. The harmonious cooperation between the cities within the EU Concerto programme will not only showcase the successful integration of polygeneration and renewable energy into a large number of ecobuildings, but will also provide the tools for a successful reprise in these towns, the associate communities and many other cities in Europe, in an ever swelling cRRescendo.

### cRRescendo's global objective

*Combined Rational and Renewable Energy Strategies in Cities, for Existing and New Dwellings to ensure Optimal quality of life*, is the full title of the project that is carried out by the four cities. It aims to integrate a major share of sustainability into more than 6,000 new and existing homes and their energy infrastructure in order to demonstrate the possibility, feasibility and most importantly to meet the citizens' wish to live in a comfortable energy efficient home in a healthy and clean environment. The demonstrations that are briefly described below will be combined with extensive research, training and dissemination activities.

### Demonstration actions

#### Almere (NL)

*reduction in conventional energy consumption: 48%*

Almere, a new town with 175,000 inhabitants situated east of Amsterdam, is expected to grow to 250,000 inhabitants by 2015 and maybe even 350,000 in 2030. From the start in 1975, the city committed itself to a sustainable development. This commitment is renewed with the Environmental Plan 2003-2007, targeting 20% CO<sub>2</sub> reduction within 6 years, 25% sustainable energy for housings by 2010 and inclusion of large-scale wind energy. The two major new communities targeted for cRRescendo will comprise 2,000 Ecohomes and a number of commercial and public buildings and affect 5,000 people. The measures will save 48% on conventional energy in a well-balanced mix of:

#### Renewable energy supply (RES)

- 100% electricity and 80% heat for 1,000 homes from a combined heat and power plant on biomass (total 2882 kW installed), augmented by PV systems (total of 99kW);
- 10% solar heat for 1,000 homes generated by a Solar Island of 1.5 hectares of solar collectors.

#### Energy efficiency in buildings (RUE)

- Building 1,100 certified Solar Homes – low energy houses with at least two solar options, eco-built, and using FSC-wood - and 900 other eco-houses in the range of 15-42% above standard;
- Increasing energy awareness of occupants.



Different districts of Almere with district heating (realized and planned):  
 1 Location of co-generation unit Almere City  
 2 Noorderplassen West district  
 3 Location of future biomass co-generation unit  
 4 Columbuskwartier district

### *Polygeneration*

- Connecting all buildings to district heating fed by an existing CHP, a new biomass CHP and the Solar Island.

### *Integration of RES and RUE*

- Combination of reduction of heat-demand and sustainable supply;
- Measures on buildings and infrastructure were integrated from the first city planners' sketches as part of the total development.

### *Specific Innovations*

- Integration of RES and RUE in city planning, area-development, public tendering, architecture and building;
- Architectural integration of PV in the built environment;
- Large-scale implementation of certification scheme for Solar Homes.



## **Milton Keynes (UK)**

*reduction in conventional energy consumption: 38%*

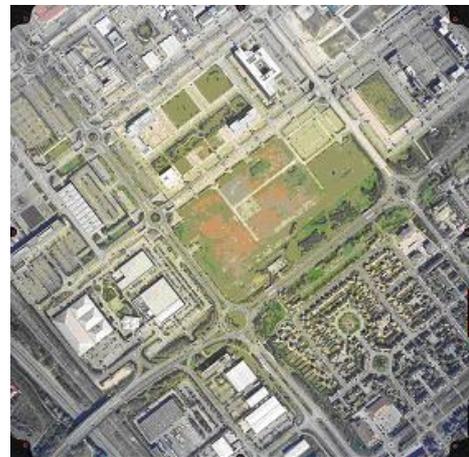
The long reputation for innovation in energy of Milton Keynes, a new town in the London area with 215,000 inhabitants, is connected to the vision to create a sustainable community with true integration of environment and socio-economic factors. In cRRescendo some 3,800 people in 1,800 homes in the new Sustainable Residential Quarter will benefit from a balanced combination of RUE and RES, saving 38% on conventional energy use. The measures implemented are:

### *Renewable energy supply (RES)*

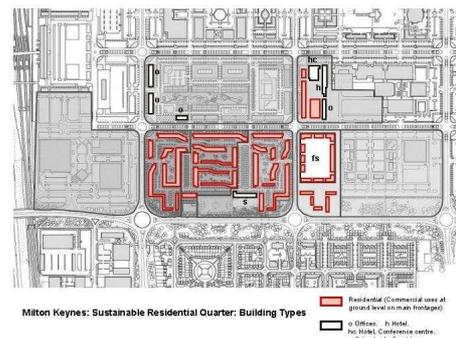
- Biofuel CHP plant (75 kWe/150 kWth);
- PV systems on 20% of the roof space (375 kW).

### *Energy efficiency in buildings (RUE)*

- 1790 apartments plus 8 tertiary buildings with improved insulation, air-tightness and ventilation with heat recovery to reduce heat demand with energy savings from 34-49% above standard;
- Water-conserving fittings to reduce domestic hot water consumption;
- Thermal system (heat recovery system from cooling to provide pre-heat for space heating in the dwellings above when cooling for base load purposes in the winter [e.g. server room or superstore cooling], or pre-heat for hot water throughout the year for use of reject heat from buildings with a cooling load);
- Ground source heat pumps expected to be 5 with combined capacity 4.7MWth for inter-seasonal storage.



Location of the Sustainable Residential District in Milton Keynes



The future Sustainable Residential District in Milton Keynes

### *Polygeneration*

- Biomass boiler (1080 kW) and small scale gas-fired CHP (1413kW<sub>e</sub>/1505kW<sub>th</sub>).

### *Integration of RES and RUE*

- Integrated design and construction of environmentally responsive buildings with integrated RES and RUE measures;
- Create Ecobuildings with integrated RUE/RES saving a further 27% CO<sub>2</sub> per year.

### *Specific Innovations*

- The operation of the renewable energy, Combined Heat and Power (CHP) \_this refers to the gas-fired CHP and biomass CHP\_ and ground source heat pumps will be conducted using and an Intelligent Energy Management System to optimise the energy consumption on both supply and demand sides;

## **Ajaccio (FR)**

*reduction in conventional energy consumption: 20%*

Ajaccio, the ancient capital of Corsica with 56,000 inhabitants, is facing the challenges of renewing the urban developments dating from the 1960's as well as renovating buildings in the historic centre. Since 2002, a significant urban renewal program was started by the City of Ajaccio in partnership with ADEME. In cRRescendo, 2,000 people will be affected through energy-conscious refurbishment of 250 apartments of which 50 are part of the protected historic centre of this medieval town; moreover 565 apartments will be the subject of energy efficiency and energy renewable. Furthermore a new office building and a new apartment building will be erected. To save 20% on energy consumption, the following measures will be applied:

### *Renewable energy supply (RES)*

- Solar domestic hot water in all apartments (in total 2040 m<sup>2</sup>);
- 70 Solar ventilation systems (the locally developed CASA system) in the apartment buildings with a total of 3 kW PV.

### *Energy efficiency in buildings (RUE)*

- Construction of two High Environmental Quality (HQE) new buildings: one building with 15 apartments and one new public service office building;
- Implementation of double-glazing with thermo-coating in all 250 apartments;
- Improvement of the insulation of walls, roofs and ground floors.

### *Polygeneration*

- Heat pump for heating and cooling (75 kW<sub>th</sub>) in the office building.

### *Integration of RES and RUE*

- Research into innovative methods to integrate solar water systems in the buildings of the historic centre.



The historic city of Ajaccio on Corsica



Districts and cRRescendo activities in Ajaccio

### *Specific Innovations*

- Eco-renovation in the old, historic and protected city centre;
- Use of the locally patented CASA solar ventilation system;
- Use of the HQE (High Environmental Quality) scheme in Corsica.

## **Viladecans (ES)**

*reduction in conventional energy consumption: 56%*

Viladecans with 61,000 inhabitants is part of the complex regional web that is the metropolitan area of Barcelona. Since the 1980's, a series of changes is taking place including the integration of the town centre and achieving a certain town consciousness. The cRRescendo project targets to develop 2100 apartments in 50 buildings and 7 non-residential buildings in a sustainable way, affecting about 6400 inhabitants. The following measures will be implemented to save 56% on conventional energy consumption:

### *Renewable energy supply (RES)*

- Solar water heaters for each new dwelling and 7 non-residential buildings, in total 4500 m<sup>2</sup>;
- 6 kWp PV-system on each building (342 kW);
- Passive solar design;

### *Energy efficiency in buildings (RUE)*

- Extra insulation (walls, roofs, floors, windows) and better air tightness, with energy savings of 50% on heating demand;
- Passive cooling and high efficiency air-conditioners with energy savings of 20%.

### *Polygeneration*

- CHP (1500 kWe + 1875 kWth) for 3000 dwellings. A total of 25% renewable energy (biomass and/or wind and/or solar) will be used.

### *Integration of RES and RUE*

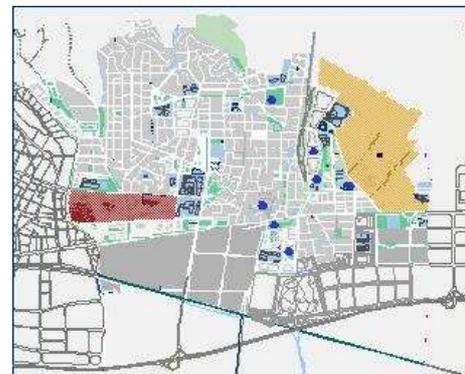
- Design and construction of the buildings with integrated RES and RUE measures;
- Create Eco-buildings with integrated RUE / RES saving 4000 Tonnes CO<sub>2</sub> per year.

### *Specific Innovations*

- Balanced integration of Eco-building and RES in new development area with extensive public dissemination.



The city of Viladecans, Spain



CRRescendo activities and districts in Viladecans

## **Research Actions**

Standardized methods will be developed by Ecofys and the University of Oxford to monitor the technical and non-technical issues of the project, in order to be able to improve future replications of the cRRescendo concept.

Technical parameters that will be investigated concern the efficient collection and monitoring of the main energy flows in the projects, such as the electricity, cooling and heating demands in the buildings, but also the electricity supply from each renewable electricity generator and renewable heating system.

The non-technical research activities have the objective to obtain a clear understanding of the socio-economic aspects connected to the sustainability measures in the cRRescendo communities and to deliver basic input for the transition to a sustainable future. Research items will include:

- Influence on occupant behaviour (to what extent does the project have effect on the energy consumption etc), attitude towards RUE en RES and perception of quality of life;
- Influence on local policy (to what extent has the target setting changed);
- Influence on local economy (how can the benefits be measured);
- Processes in decision making (what are the key arguments, actors);
- Marketability (sales time, buyers' interest, space rented) of ecobuildings;
- Cost reduction and added value of energy services

### **Dissemination Actions**

Both internal (between the four partner communities) and external (to associate communities and broad European level) dissemination will be organised. The four cities will work together with suitable umbrella organisations, including EcoMaires and the European New Towns Platform, to ensure broad dissemination to peer cities and other stakeholders. The main external activities will be:

- Project website, publicly accessible;
- Newsletter (2 per year);
- Visits of peer community representatives to all four project sites;
- Contributions to events and media focused on the target groups;
- Organisation of an expert seminar in Brussels (by subcontractor: New Towns Platform);
- Final conference for the target groups (authorities, researchers, builders, project developers, architects, etc.);
- Dissemination on citizens / inhabitants on energy conscious behaviour.

Specific attention will be given to the participation of members of female interest groups and the involvement of SME's.

### **Training**

Training activities within the project will take place at two levels:

*The EU level:*

- *Associate and peer communities:* Two training sessions will be included that will instruct workers in associate and peer communities how to establish sustainable communities in the Concerto spirit (both in a technical and in a political / process sense).
- *Actors in the building projects planning process,* like authorities, project developers, housing corporations and architects will be trained to apply sustainable measures and benefit from the lessons learned in organisation, policy and technology aspects;
- *Installers and constructors:* on technology aspects.

*The community level:* within the four demonstration sites, diverse types of activities are aiming at training of *parties involved in the implementation* of the demonstration work to master quality aspects and special technological aspects involved in the implementation of such projects.