



Project Acronym: cRRescendo  
REF EC: FP6-513563  
Deliverable number: D0.1p  
Deliverable name:  
Lead participant:

Document name:  
Document REF.:  
Report  
Public  
Participant:

## D0.1p cRRescendo P4 summary

### **CONCERTO INITIATIVE cRRescendo**

### **Combined Rational and Renewable Energy Strategies in Cities, for Existing and New Dwellings and Optimal quality of life**

Instrument: Integrated Project  
Thematic Priority: Integrating and Strengthening the  
European Research Area (2002-2006), Sustainable  
Energy Systems

Date: December 2009  
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Revision:



CONCERTO is co-funded by the European Commission

# **1. PUBLISHABLE EXECUTIVE SUMMARY**

## **cRRescendo P4: 2008-2009**

### **1.1. VISION AND GLOBAL OBJECTIVE OF cRRescendo**

By the end of 2011, far over 10,000 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 first three cities are new-towns close to a capital (Amsterdam, London and Barcelona respectively, while Ajaccio is the historic capital of the isle of Corsica.

cRRescendo aims to integrate a major share of sustainability into over 3,150 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 cooperation between the cities within the EU Concerto programme will not only showcase the successful integration of poly-generation 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.

After some delay in the start of the project, the cRRescendo project was well on its way to be on track in the second year. At the end of the second year though it became clear that the crisis in the American mortgage market, was also causing project developers to be cautious in Europe. Nevertheless first promising realizations in Almere and Milton Keynes had started in the second project year P2.

In P3 cRRescendo developments and preparations were continued in all four cities.

In Almere in P3 all major demonstration activities arrived in the realization phase, while 100's of Eco-houses had been delivered in NoorderPlassen-West and the building of first Solar-Houses in Columbuskwartier had started. In Milton Keynes the CHP had been realized. In Ajaccio the building of houses was delayed, but the project in P3 became ready to enter the realization phase. In Viladecans the Daycare Centre was at the last stage of realization. The building of houses was delayed, but it became clear that only a very limited part of the originally planned houses will be built.

Just in the beginning of this 4<sup>th</sup> reporting period, in August 2008 the housing market crisis had a deeper impact on the demo's in UK, than thought before. Then since September 2008 the housing crisis became a global financial crisis, with substantial consequences for cRRescendo.

Due to the financial crisis especially the demonstrations of ecobuildings in Milton Keynes and Viladecans are strongly affected. It was promising that realizations of ecobuildings in Almere and preparation of renovation activities in Ajaccio nevertheless have continued more or less as planned.

During our PCC meeting in November 2008, the city coordinators and work package leaders were convinced that with intensive re-planning of actions it is still possible to realize much of the original ambitions.

In principle cRRescendo brought the level of activities in several work packages down during the third year and spread these activities out over two years. At the same time an amendment was proposed and accepted to have a prolongation of the project with one year to accommodate this delay. In the meantime in P3 and P4 alternative opportunities were developed in the cities to compensate for the possible loss of ambition in the original project due to the consequences of the mortgage crisis.

The demonstrations that are briefly described below will be combined with extensive research, training and dissemination activities.

## 1.2.DEMONSTRATION ACTIONS

<b>Almere (NL)</b>	reduction in conventional energy consumption: 48%
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Almere, a fast growing new town with 180,000 inhabitants east of Amsterdam, is since long committed to sustainable development. The two major new communities in cRRescendo will comprise over 2,200 Eco-homes and a number of commercial and public buildings and affect 5,000 people. The measures will save half of the conventional energy in a well-balanced mix of:

- Renewable energy supply by means of a Solar Island of more than 1.5 hectares with almost 7000 m<sup>2</sup> of solar collectors and 550 kW PV systems;
- Energy efficiency in buildings in the form of 2200 Eco-houses and certified 'Solar Houses', and increasing energy awareness of occupants;
- Poly-generation by connecting all buildings in NoorderPlassen-West to district heating fed by an existing CHP and the Solar Island, feeding this district heating infrastructure;
- Poly-generation by connecting all buildings in Columbuskwartier to a new district heating infrastructure and CHP of the Diemen Power plant with 100% of the electricity used in Columbuskwartier being produced by renewable sources (green electricity).

Special attention is given to specific innovations, such as:

- 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.

*Objectives fourth year, work performed and results achieved*

- Noorderplassen-West

- cRRescendo strategy has been continuously promoted for Private house builders on three special events for candidate house builders (one event to sell/buy lots; and two events where candidate private house builders can meet their neighbours);
- all ground and infrastructural work for the Solar Island was finished by the municipality;
- In the key areas 2X6a-2X6g in total 214 Ecohouses have been delivered and handed over to the house owners or renters in P4. A Commissioning report will be written in P5.

- Columbuskwartier

- In P4 45 Solar houses with special Certificate "Zonnewoning" (BEST Table 4 +PV) have been handed over, while a Commissioning Report has been written;
- In P4 36 apartments (BEST Table 2) and 130 houses (BEST Table 4) with equal energy qualifications as Solar houses have been delivered, while Commissioning Reports have been written;
- In total 211 houses and almost 28,000 m<sup>2</sup> have been built and commissioned to be according to cRRescendo standards. The majority of cRRescendo houses (Ecohouses and Solar houses) are under construction now;
- For the Passive Houses the Final Design has been approved, while the start of the building is planned just after summer break 2009;
- For Private house builders see above;
- For the "International School" the Final Design has been submitted, to be approved in P5.

**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. This is exemplified through its participation in the cRRescendo project.

Integrated design and construction of environmentally responsive buildings with RES and EE measures in Milton Keynes have been ensured and will lead to projected savings of up to 33% on CO<sub>2</sub> emissions per year in the Milton Keynes community.

Renewable energy supply (RES) and Energy efficiency in buildings (RUE)

The project will comprise of apartment blocks with in total 441 dwellings, with retail and community facilities at ground floor on main frontages. Each building will have improved insulation, air-tightness and ventilation systems to reduce heat demand giving significant energy savings against the national standard. In addition, water conserving fittings throughout will reduce demand for hot water. To supply renewable energy to the buildings, they will be fitted with 165 kWp of PV.

Poly-generation

Poly-generation in the Milton Keynes community involves a gas-fired CHP system (3.0 MWe and 3.2 MWth currently being extended) with a private wire electricity distribution network. Current studies are examining the practicality of including a proposed off-site anaerobic digestion (AD) plant, (fuelled by kitchen and garden waste) to produce biogas for the CHP unit.

Innovation

Specific innovation within the context of the UK industry includes the integration of an AD plant, (bio) gas-fired CHP, and PV to serve a city centre community. In addition, intelligent management systems are being developed to optimise the energy consumption on both the supply and demand sides.

*Objectives fourth year, work performed and results achieved*

The objectives for the fourth period included:

- Completion of the extension to the gas fired CHP system.
- Start of construction of the B4 Phase 1 development (to provide high performance ecobuildings and RES).
- Finalise the new contract and programme with the EC and consortium partners.

The extension to the CHP system was completed.

During the year, the worst effects of the global financial crisis were experienced by this project when the construction programme for the B4 Phase 1 development was suspended indefinitely.

Consequently, work on the new programme that was being finalised at the beginning of the year stopped. In order for the Concerto project to continue a new project had to be found and agreed. After much research and consideration this was achieved and the Milton Keynes project now comprises:

- The 6MW gas fired CHP system and its extended network.
- C4.1 residential development.
- B3.2 commercial development.
- Up to 165 kWp PV arrays.

This package forms the basis of the new Amendment presented to the Commission in July 2009.

**Ajaccio (FR)****reduction in conventional energy consumption: 20%**

Ajaccio, the ancient capital of Corsica with 60,000 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, 10,000 people will be affected through energy-conscious refurbishment of 419 apartments of which 5 are part of the protected historic centre of this medieval town. A new block with 8 apartments will be built in the historic centre, as well as a new public services building outside the old city centre. 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 735 m<sup>2</sup>);
- An 6 kW urban turbine on top of the office building;
- Solar ventilation systems (the locally developed CASA system) in the apartment buildings with a total of 163 kW PV.

Energy efficiency in buildings (RUE)

- Construction of two High Environmental Quality (HQE) new buildings: one building with 8 apartments and one new public service office building;
- Implementation of double-glazing with thermo-coating in all 432 dwellings;
- Improvement of the insulation of walls, roofs and ground floors.

Poly-generation

- Heat pump for heating and cooling (75 kWth) in the office building.

Integration of RES and RUE

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

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.

*Objectives fourth year, work performed and results achieved*

In this reporting period a lot of the preparing work was done for the actual demonstration buildings in Ajaccio:

- The final permits were granted to the new apartments in the old city centre and the final design was approved. Demolition of the old site will commence December 2009.
- The tender to design the new public office building was prepared and council has agreed to the site and ambition of the project.
- Builders and social owners are contracted to renovate the social homes in the new areas.
- Monitoring of reference buildings has been executed.

Due to these achievements the delay has been contained to the extra year of 2011 before all buildings will be finished, monitoring will continue even after the project ends.

**Viladecans (ES)****reduction in conventional energy consumption: 56%**

The CONCERTO demonstration community of Viladecans within the cRRescendo project is part of the complex regional metropolitan area of Barcelona in Spain. The following measures will save more than half of the conventional energy.

Renewable energy supply (RES)

In this community solar water heaters will be installed on each new dwelling and public buildings. Each building will be equipped with 6kWp PV systems on each building.

- Solar water heaters for each new dwelling and 5 non residential buildings makes a total of 191 m<sup>2</sup>;
- With 6 kWp PV-system on each building a total of 342 kWp PV will be installed;
- Passive solar design.

#### Energy efficiency in buildings (RUE)

Furthermore 60 new dwellings will be built, with extra insulation in structures, such as, walls, roofs, floors, windows together with better air-tightness results in energy savings of up to 50% on heating demand in Viladecans. This impressive saving is augmented through the application of passive cooling and high efficiency air-conditioners, which results in energy savings about 80% for the involved areas in Viladecans.

- 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%.

#### 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 236 Tonnes CO<sub>2</sub> per year.
- Specific innovation involves the balanced integration of eco-building and renewable energy supplies in new development areas with extensive public dissemination of all activities.

#### *Objectives fourth year*

According to the Detailed Implementation Plan M27-M54 accepted by the EC on 12/03/2009, during the fourth year, the objectives were the following:

- Existing buildings renovation project for Llevant area was expected to begin by January 2008 and to take 4 years, so it was expected to finish by December 2011.
- Urbanisation works of Llevant were expected to begin by June 2009.
- Viladecans was planning a dissemination campaign.
- A specific Ponent Office (existing district) was under creation for executing, managing, assessing and also disseminating the Ponent refurbishment.

#### *Work performed*

- 9 workshops about energy for Viladecans schools during the course 2008-2009
- Viladecans is elaborating its Action Plan for the Climate Change Mitigation.
- 330 interview to citizens about their energy consumption behaviour and their knowledge and awareness about energy saving and Climate Change.
- BEST Table A; New Residential Building J.V. Foix provisionally approved by the Plenary Meeting of Viladecans Municipality.
- BEST Table B; Day Care Centre La Pineda – Campreciós / Torre Roja. Classes started on 1<sup>st</sup> October 2008.
- BEST table C; Cultural centre for young people Can Xic was inaugurated on 8<sup>th</sup> May 2009.
- BEST Table D; Sport Facilities Building works ongoing
- BEST Table E; Cultural Centre Ca n'Amat. Building project initially approved on 13/07/09 by the Cabinet Meeting of Viladecans City Council.
- Installation procedure for 114.84 kW of PV panels are being carried out.
- Can Calderon – department for Economic Promotion of Viladecans City Council started to design the training courses for the last two periods of the project.

#### *Results achieved*

- 9 training workshops
- 330 interviews
- 2 ecobuildings delivered

### **1.3. RESEARCH ACTIONS**

Standardised 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.

#### *Objectives fourth year, work performed and results achieved*

In the cities the monitoring has started. Especially in Ajaccio where renovations take place and reference monitoring is performed on the non-refurbished apartments, data are starting to be collected.

Testing of the web based software for inhabitants in Almere has also started and shows that a lot has to be done to get the data that are necessary.

### **1.4. 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 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.

#### *Objectives fourth year, work performed and results achieved*

All four cities have executed many dissemination activities. This includes presentations on relevant events, articles in relevant magazines. Also the cities and project has been represented at all Concerto+ events.

## **1.5. TRAINING ACTIONS**

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,* such as 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.

*Objectives fourth year, work performed and results achieved*

Due to a restart with the observing communities there was little training of the observer cities.

At local level only in Viladecans training took place during this reporting period.

## **1.6. PROJECT COORDINATOR**

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