

CRRESCENDO: FEASIBILITY STUDY

POLYGENERATION CONCEPTS FOR VILADECANS (SPAIN)

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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 historic 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 above-mentioned 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.

INTRODUCTION TO CRRESCENDO VILADECANS

The municipality of Viladecans takes part in the EU cRRescendo project. The objective of cRRescendo is to showcase the integration of energy saving concepts and renewable energy concept into a large number of eco-buildings.

As part of this cRRescendo project in Viladecans a poli-generation plant is planned in the new residential zone of Llevant (~2.200 apartments). This plant will consist of a combined heat and power (CHP) installation and a peak boiler, producing both heat and electricity at a central location close to the residential area.



PROJECT DESCRIPTION

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 (Llevant) 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 m²;
- 6 kWp PV-system on each building (342 kW);
- Passive solar design;

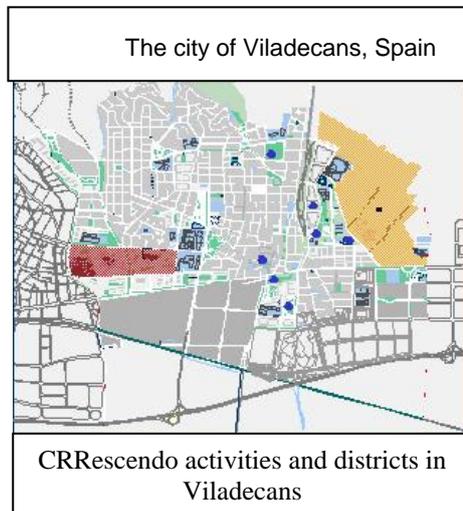


Energy efficiency in buildings (RUE)

- 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%.

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 CO₂ per year.



Specific Innovations

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

Biofuels Polygeneration Plant

By applying at least 25% renewable (bio) fuels the in cRRescendo required CO₂ emission reduction will be realized. Bio-fuels exist in many forms like forest

residues, wood chips, bio gas or bio-oil. Each type of fuel puts different requirements on the energy installation, which affects the investment and maintenance costs.

In this study the feasibility of five different concepts of a plant combined with a district heating grid have been studied by Ecofys. Main characteristics of these five concepts are summarized in the table below.

These concepts have been selected based on experience with this type of systems in Northern Europe and in consultation with the local project partners.

RESULTS

In consultation with the local cRRescendo project team, concept 4 was selected as the most promising one, meeting the project requirements and economical expectations.

	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5
District heating grid concept					
	<ul style="list-style-type: none"> High temperature (70°) Space heating only 	<ul style="list-style-type: none"> High temperature (70°C) Space heating and hot tap water 	<ul style="list-style-type: none"> Low temperature (40°C) Space heating only 	<ul style="list-style-type: none"> High temperature (70°C) Space heating and hot tap water 	<ul style="list-style-type: none"> High temperature (70°C) Space heating and hot tap water
Power station concept					
CHP	1 MWth 0,2 MWe Solid biomass	1 MWth 0,2 MWe Solid biomass	1 MWth 0,2 MWe Solid biomass	1 MWth 0,9 MWe Natural gas	1 MWth 0,9 MWe Natural gas
Peak boiler	6 MWth Bio-oil	6 MWth Bio-oil	6 MWth Bio-oil	6 MWth Bio-oil	6 MWth Biomass
% renewable	100%	100%	100%	25%	25%

NEXT STEPS

- Sorting out legal and administrative aspects for the integration of the system in the overall development plan of the area Llevant.
- Setting up a tender procedure for construction and operation
- Realisation of the system