




ReRina

NEWSLETTER

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The RERINA Project

The RERINA project, "Integration of Renewable Energy Technologies in Rural Insular Areas", runs for a period of two years, January 2006 - December 2007. The project is supported by the programme "Intelligent Energy – Europe", of the European Commission - Directorate-General Energy and Transport.

Intelligent Energy  Europe

The RERINA project has come to its completion. This last issue will present the two sustainable communities of Aphrodite Hills in Cyprus and Armenous in Crete, Greece. The third sustainable community of Cabras, Sardinia was presented in Newsletter no. 4.

This newsletter will also present a short introduction to the final project result, the Sustainable Energy Plan (SEP) Guide which will be published shortly.

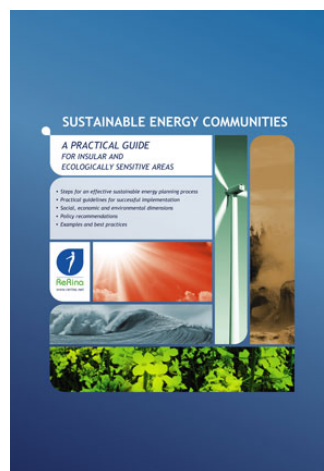
For more information, please visit the RERINA project website: www.rerina.net The website will be operational for at least two years after the completion of the project,

PROJECT NEWS

SUSTAINABLE ENERGY COMMUNITIES A practical guide for insular and ecologically sensitive areas

One of the expected outcomes of the RERINA project is the development of a "Practical Guide for Sustainable Energy Communities (SEC) Planers". This guide will mostly address insular

and ecologically sensitive areas. However, most of the principles and guidelines apply to any community that would wish to develop and implement sustainable energy plans.



SUMMARY

The Practical Guide provides both background material and a step-by-step approach, aiming to support insular and ecologically sensitive areas in developing an effective sustainable energy planning process and managing successfully their long-term energy use. It contains practical and easy to understand information and guidelines; it outlines the critical issues and main steps that are required in order to build insular Sustainable Energy Communities. It also provides successful examples and best practices in order to assist readers to select the most appropriate renewable energy technologies for their community needs, according to the local socio-economic and environmental conditions. As European islands have a high renewable energy potential, more emphasis has been placed on the rational use of local resources.

SUSTAINABLE ENERGY PLAN (SEP) APHRODITE HILLS - CYPRUS

CHARACTERISTICS

The Aphrodite Hills resort is a project still under development. It currently comprises an 18-hole championship standard golf course, a tennis academy, the Retreat spa, a village square with shops and restaurants, detached houses and apartments and the first InterContinental Resort Hotel in Europe. The area is surrounded by archaeological sites from the Roman, Greek and early Christian eras.

It covers 234 hectares of land most of which is the golf course. 15% is the share of ecologically sensitive (protected) area and only 8% is the build-up area. Currently the total (maximum at any time) number of inhabitants in the insular area is 4000.



As Cyprus' first fully integrated resort, it combines approximately 500 exclusive low rise residential properties (three small villages, Zephyros Village, Helios Heights Village and Orpheus Village) and a 290 room five-star hotel with 4 restaurants and 3 bars.

In general terms less than 40% of the development is finished and is now owned by individuals. The rest of the project is still under development and it remains the property of Lanitis Development Company. Some of the new houses are still on the drawing and design phase and some others are already under construction.

The part of the community that is already functioning is already utilising the sun energy for the supply of domestic hot water by using traditional flat plate solar thermal collectors. More information on the existing penetration of renewables and also the efforts that were made for sustainable development are included in the next chapter of the report.

It was clear from the beginning that much more can be done for the new buildings that are yet to be built. The integrations of RES and Energy Saving

technologies will be much easier and it will cost less. The result on the outside appearance is always better and the resulting combined system efficiencies are always higher. The acceptance by the inhabitants will come easy since the systems will already be in place before the inhabitants arrive to occupy the spaces, hence they will not constitute a change, they will simply be there, ready to be used and ready to offer their immediate and long term benefits.



ENERGY NEEDS

The maximum electrical load of the area is currently of the order of 2000 to 3000 KVA. Electricity consumption for space heating and cooling is currently 11406 KWh/day and is expected to increase to 14750 KWh/day (29,3% increase) in the near future.

The current consumption of diesel for space heating is 60 tons per annum and is expected to increase to 96 tons per annum. The Current Petrol and diesel used for transportation in the Aphrodite Hills area is 800 tons per annum.



Analysis of the current situation

During the design phase of the Aphrodite Hills a lot of effort was given in ensuring that the engineers had to work with in certain environmental and other constraints. Lanitis Development, the owner of Aphrodite Hills is the only Co in Cyprus employing an Environmental Manager dedicated to the control and enforcement of all the constraints. Some of them are listed below:

- Respect the natural landscape and the existing ecosystems
- The design of the dwellings takes advantage of the natural sea breezes and solar energy.
- In many cases bioclimatic architecture was used in order to minimize energy consumption
- Buildings are designed around the atmosphere of traditional Cyprus dwellings.
- Extensive use of local stone in building retaining/feature walls within the landscape design
- All grey water from within the resort is recycled and used for irrigation. (more than 1,000,000m³ per year)
- All existing site features including lime-kilns, stone walls, rock outcrops have been preserved.
- Existing tree vegetation within developments has been transplanted with a success rate of over 90%.



Renewable Energy Sources (currently used)

For the moment the only renewable energy systems used in the area are:

- Small domestic size solar thermal systems for hot water production for sanitary use
- Ground source heat pumps for space heating in some houses
- Penetration of new Renewable Energy Systems and Energy Savings Technologies in the Community

There are two kinds of communities, the ones that are already built and the ones that are under construction or still only on drawings. The integration of RES and Energy Saving technologies in the already built ones is much more difficult and costs a lot of money.

Biomass

Already built area: Modification of current fire places to high efficiency wood boilers that look like an open fireplace but offers up to four times more energy than the conventional one. Household owner that do not have a fireplace can install a new high efficiency wood burner that can

supply both heat for space heating and hot water for sanitary use.

Area still on drawings: Provisions for high efficiency fireplaces that can work in combination with existing fossil fuel burners and supply both heat for space heating and hot water for sanitary use.

Solar Technologies

Solar energy is one of the most promising choices for a sustainable development. The favorable weather conditions of Cyprus make solar technology installations ideal. According to the Cyprus Meteorological Authority, only three days per year on average can be said as having no sunshine at all.

Solar Thermal Systems

Already built area: For residential hot water production the number of panels required is small, hence the effect on the outside appearance of the buildings is minimal. Most of the houses have installed this kind of systems.

Area still on drawings: The integration of solar thermal systems on the buildings is much easier because they can be designed in order to minimize the intrusion to the extent that the character of the area/community is not affected by the addition of glass surfaces on the roofs. There can be provisions for solar thermal systems for space heating in order to be integrated within the buildings' envelopes. The average solar radiation in Cyprus is about 5,1 KWh/m² on a horizontal surface and solar systems is estimated that can contribute up to 35-40 % to the total heating needs of each house.

Photovoltaic Systems

Already built area: Photovoltaic Systems need a lot of square meters of installed panels. This makes the integration of PVS to the already built houses extremely difficult. For the already built area, photovoltaic systems can be used for street lighting and also for the electric cars that are used for the residents' transportation and also from the golf players.

Area still on drawings: The integration of photovoltaic systems on these buildings is much easier. The designer can make provisions on the roofs of the buildings such as available space on the site which is not visible from the road etc. Of course there can be also installed PVS for street lighting of the new areas and also on the new electric cars.

Ground Source Heat Pumps (GSHP)

Already built area: A few houses use GSHP's for space heating. The installation of GSHP's to the

rest of the existing houses is very difficult due to the difficulties of this kind of installations (eg. dig in the ground).

Area still on drawings: The installation of GSHP's to these buildings is much easier. There can be made provisions for all of the houses. This technology does not change the building's appearance, has low noise and very low operating and maintenance cost and seems to be ideal for the area.

Energy efficiency applications

Already built area: A lot of things can be done in this case. Some examples are: additional Insulation, addition of interior movable shades, replace energy consuming appliances with more efficient ones, installation of Ceiling Fans, replace incandescent light bulbs with energy efficient ones, ensure the rational operation of the building and its systems, correct use of windows, rational use of appliances etc.

Area still on drawings: All of the actions mentioned for the already built area can be done also for the area that is still on drawings. Also in these buildings can be much easier to: design of bioclimatic buildings, select of low consumption electric equipment and install of automation and control systems.

Combined Heat & Power / District Heating / cooling. Combination of systems, Solar in combination with conventional sources (Hybrid systems)

Only for Area still on drawings: District heating can be designed for the production and supply of hot water and/or heat to the new villages/buildings. The production can be made either from Central Solar Systems, Biomass or large Ground Source Heat Pumps installations. The Intercontinental resort can install Combined Heat and Power system to produce heat and electricity for the hotel's needs.

Stakeholders – Local Working Group

The main stakeholders are the local residents and citizens, local and regional cultural, technical, trade and scientific associations, utilities, local authorities, local enterprises, public and private community institutions and the mass media.

Events - Workshops

The RERINA Cyprus Info Day was organized by the Cyprus Institute of Energy in March 2007 in order to implement the local targeted dissemination campaign of the project and to increase the awareness on energy savings and renewable energy sources usage, promote the identified RETs to the local community and identify the opportunities for funding and

exploitation of the implementation of RETs. The event took place at the Aphrodite Hills, one day after the 3rd RERINA partners' meeting which also took place in Cyprus. The following groups of people were invited:

1. RERINA partners
2. Members of the RERINA local working group
3. Colleagues working on the RERINA project
4. All residents of the Aphrodite Hills area
5. Local actors, the mayor, politicians etc.
6. Members of the Cyprus Renewable Energy Promotion Foundation,
7. Members of the Cyprus Federation of Solar Thermal Collector Manufacturers
8. Contractors, working on small and large projects, like the Aphrodite Hills
9. Other interested people, companies and organizations.

During the event, the two Foundations (6 and 7 above) were asked to organize a side event, using their own budget and recourses (small exhibitions), whereby their members had the opportunity to display their products and present to the participants, (especially the constructors), their new technologies, their capabilities and prices. There were 15 companies at the small exhibition all of which gave positive feedback to the organizers.

In November and December of 2007, Cyprus Institute of Energy is planning to organize one promoting and one training workshop.

SUSTAINABLE ENERGY PLAN (SEP) Koiliaris River Crete – Greece: a challenge for a better future

In 2006, the Municipality of Armenous joined the project "RERINA" in order to get the necessary help and guidance so as to develop and implement a sustainable energy plan for the area.



The RERINA project promotes a sustainable energy future and sustainable development in European Insular Areas, like the municipality of

Armenous. Armenous is located 15 km east of Chania. Its total population was 2250 people in 2001. It is a relatively small area, which represents 2.33% of the prefecture of Chania or 0.66% of the region of Crete. In this small area one finds many traditional rural characteristics and a beautiful nature, such as the river Koiliaris. Koiliaris is an ecologically sensitive area whose ecosystem will become endangered without proper planning. It is in this context the Municipality of Armenous joined the RERINA project in order to protect and promote the unique assets of the Koiliaris River through the development of a Sustainable Energy Plan.

The Koiliaris SEP examines all the aspects concerning the supply-demand and use of energy towards the goals of energy conservation, sustainable development and environmental protection (use of Renewable Energy Sources, use of new, non-polluting technologies (in the energy production stage etc)). The main objectives of the Koiliaris SEP are:

- To guide and help the Municipality of Armenous to advance and reach a sustainable high quality of life.
- To promote low-cost technologies for energy saving and use of local renewable resources in remote rural areas, such as the Koiliaris River.
- To protect and promote the natural beauty of the Koiliaris River.
- To develop measurements that will lead to a safe and affordable energy future in the area.
- To promote sustainable development.

The municipal corporation of the Municipality of Armenous first identified all local stakeholders that may be involved in or affected by the development of a SEP. It then organised local workshops in order to stimulate discussion regarding the SEP. In these workshops a Local Working Group (LWG) was created. The LWG is composed of representatives of the various participants. Its main objective is to provide a platform for the exchange of opinions and views



on the project, the discussion of the process and development of the SEP, the evaluation of the local energy resources and their possible uses in the area. In addition, the LWG set the common goals of the SEP and the necessary actions that need to be taken in order to inform the local population about the project and implement the work.

The main goals of the Koiliaris River SEP, as set by the LWG, are to:

- **Improve energy efficiency in the area by:** Better land-use planning and building design. Improvement in energy related standards in bulging design, cool roofs etc, will lead to a reduction in the energy consumption. It is vital for the community to increase the use of energy efficient equipment technologies, for example use of fluorescent light bulbs, solar water heaters etc. Changes in operational practices are necessary in order to reduce energy consumption. Opening of wells, better use of river water for irrigation by programmable irrigational systems, double panel windows, programmable thermostats, rearrangement of time schedule of street lights are also necessary. Moreover, the identification and use of local Renewable Energy Sources will lead to fossil fuel reduction.
- **Protect and place emphasis on the natural environment of the Koiliaris River by:** the improvement and enforcement of legislation (concerning littering, illegal construction and cesspools) and the replacement of fossil fuel with environmentally friendly energy sources. Another measurement that will reduce littering in the area is the placement of trash cans where needed. A decrease in energy consumption is necessary in order to protect the area. This can be achieved by the use of fluorescent light bulbs, the installation of double panel windows, the rearrangement of time schedule of street lights etc.
- **Improve transportation modes by:** Establishing new routes where necessary and improving the existing ones, in order to shorten the distances and to decrease the fuel consumption of vehicles that use these roads. Rearranging the schedule of public transportation with the aim to decreasing the number of cars used. In order to decrease gas emissions, it is proposed to use electric vehicles and to replace old public means of transportation with new ones, which would be more energy efficient and pollute less. In addition, it is proposed to close the road next to the Koiliaris River in order to protect the

area and encourage the development of sustainable tourism. The road can be replaced with a hikers' route, in which the local population and visitors would have the opportunity to hike and enjoy the nature.

- **Increase the use of Renewable Energy**

Sources: After many sessions, discussions and an extensive study of the data and the current legislation, the LWG decided that the most appropriate Renewable Energy Technologies (RETs) for the development of the Koiliaris River, which can satisfy the different energy needs of the area, are:

- Hydroelectricity generated from the river flow.
- Photovoltaic energy generated from the capture of solar energy, which is very high in the area.
- Biomass for space heating.

The reasons that led the LWG to this decision are:

- These sources are abundant in the area.
- These RETs are economically feasible to use.
- Their use may cause mild impacts or no impacts at all on the local environment, in comparison with the other RETs or the use fossil fuels.
- They can supply all the electrical devices that may be installed in the area of Koiliaris River.

- **Economic benefits:** The Armenous municipality is expecting to rip several economic benefits from the sustainable development of the area. Sustainable growth in tourism is expected, which will lead to job opportunities. The energy efficiency, especially during the summer months when energy demand is high will lead to a more stable grid and less energy consumption which will reduce the amount of money spent for electricity. Also the use of local energy sources will lead in cutbacks in fossil fuel consumption in the area and less energy consumption from the grid. The surplus of RES energy can be sold to the existing grid. Moreover, the hikers' route will be a tourist attraction and will contribute to the sustainable development of the area. The kiosk for recreational uses that is proposed to be constructed next to the river will operate with RES and will create job opportunities and the possibility of a revenue source for the municipality.

Work accomplished by the LWG

A Local Working Group was established at the beginning of the project. Its objectives are to discuss and decide about the SEP development. The members of the LWG are local stakeholders. The LWG has set the targets and goals of the SEP. In order to meet the other partners of the project, exchange opinions and views and discuss about the process and the progress of the SEPs, the municipal corporation of the municipality took part in the project meeting in Cyprus. On the 16th of May 2007 a public meeting ("info day") was organised at the Armenous town hall in order to introduce the RERINA project and the concept of the SEP of the Koiliaris River to the local community. All local stakeholders took part.

Dissemination activities

All interested parties were able to receive information regarding the RERINA project and its implementation in Armenous from the central office of the Municipal Corporation of the Municipality, which is located in the Armenous town. A series of actions have been taken for the dissemination of the project. For example, leaflets were available with the description of the project since the beginning of the work in the central offices of the Municipal Corporation of the Municipality. Local newspapers and newspapers from the capital of the prefecture of Chania showed great interest in the project and particularly during the info day. More precisely, the following newspapers had articles about the SEP and the info day:

- Haniotika nea (prefecture circulation)
- Rethimniotika nea (newspaper of the Prefecture of Rethymno, adjacent prefecture)
- O agonas tis Kritis (local circulation)
- Neos Kirikas (local circulation)

Also two local television channels of the prefecture of Chania showed great interest and interviewed the participants of the RERINA project. The info day clip and the interviews were shown in the "News" segment. These two channels cover the whole of the island of Crete, and as a result all the residents of Crete were able to watch the programme and be informed about the RERINA project. These Channels are:

- KYDON
- NEA TILEORASI

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