

Design guidelines for the efficient integration of Renewable Energy Sources in new-built Settlements

Project Summary

The aim of the project is to study and propose global strategies, tools and guidelines that will promote the effective integrated implementation of Renewable Energy Sources system and techniques in new-built settlements around Europe. The specific objectives of the project include the combination and adaptation of scientific and technological knowledge with best engineering and architectural practice in order to study, develop, propose and disseminate global actions on the integration of RES systems and techniques in new-built settlements. The considered techniques will involve actions aiming:

- To improve the local microclimate.
- To improve building design and implement the use of passive and active RES systems and techniques in them.
- To study the potential of centralized cooling and heating systems operated with the use of RES.
- To study the potential and the applicability to specific Demand Side management actions managing and controlling the energy requirements of the developed settlements.
- To develop tools for best practice and economic efficient development and management of new-built settlements and their environment as well as of the used remote energy systems, integrating the broad use of RES in all levels.
- To study the existing legislative framework on the implementation of advanced RES systems and techniques in settlements, identify possible barriers and contribute to the development of appropriate national and European codes and standards.
- To study a number of real case studies around Europe, applying the proposed design guidelines and tools to settlements actually planned to be constructed, thus evaluating on one hand the efficiency and applicability of the proposed guidelines and on the other hand the potential benefits due to the use of an integrated RES strategy to new-built settlements.
- To integrate the results and conclusions from above into a set of design guidelines for managers and designers of settlements, urban sites and utilities proposing appropriate interventions, techniques and methodologies for the energy, environmental and economic efficient integration of RES in new-built settlements.

Description of the work

In order to fulfill the above mentioned objectives, it is required that from each involved country, except the participating scientific/technical institute or organisation, a local partner planning to develop a new settlement in due time (i.e construction companies, housing associations, local authorities, etc.) should be involved in the project either as a contractor or by providing information on the examined case study. The project team will achieve the objectives presented above, through the implementation of eight phases. The total duration of the project is 24 months. Various phases and activities will run in parallel. The actions

planned for achieving the objectives, the final deliverables that will be produced in each phase and the dissemination strategy given below.

The overall work will be divided and carried out in the following phases:

- Collection and documentation of the input data required to carry out the study
- Development and assessment of methodologies to improve local microclimate with the use of RES techniques
- Development and assessment of the potential of the methodologies to improve the design and performance of the buildings constructed within the settlements by implementing the use of passive and active RES systems and techniques.
- Study to the characteristics, design and applicability of RES based district heating and cooling systems and Demand Side Management techniques when used in the context of new-build settlements.
- Development and assessment of specific global scenarios of RES integration in new-build settlements for a number of real case studies in Europe.
- Development of the Reference Manual - Design Guidelines Handbook.
- Testing of the manual in a series of European workshop held in each one of the participating countries.
- Finalization and dissemination of the final products and delivery to Commission.

To disseminate the results of the project a specific dissemination plan has been designed. The dissemination policy will include: To disseminate the results of the project a specific dissemination plan has been designed. The dissemination policy will include:

- Through the scheduled workshops all results will be communicated to a large audience related with the development of new settlements.
- Development and maintenance of a new web site especially devoted to the project, presenting its objectives and results.
- Articles will be published in specialized journals for building professionals and announcements are going to be made during international conferences, in order to communicate to the target audience, the results of the this project and provide information on the availability of the developed material.
- A newsletter will be edited and published by the proposers. The newsletter will report all major developments and findings of the program and will be addressed to building professionals, urban planners, construction companies, housing associations, local authorities, etc. Two issues will be published in English language. The first issue will be published during the 4th month of the project and will report on the objectives of the project, the adopted methodology and the expected results. The final issue will be published at the very end of the project and will report its final results.
- The main final products of the program will be made available to the educational bodies of all Member States as well as to the main professional bodies in Europe. All final products will be available to all other interested bodies.
- The results of the project as well as the whole progress will be communicated to the existing SAVE Networks in order to inform their members.
- REHVA, the major European Professional Association on air conditioning and ventilation will disseminate the results of the project to its members. These members are European national Associations, representing more than 85000 practicing engineers all over Europe. REHVA publishes a quarterly Journal which is distributed to all members and will be used as a dissemination vector. In addition seminars will be

organized and booklets and leaflets will be produced, informing the building professionals for the programme's results and its final products.

Expected results

The final deliverable of the present project will be a global and integrated plan for the implementation of RES systems and techniques in all aspects related with the development of new settlements, aiming to provide design tools and support to a wide range of professionals, to consumers and to public authorities. It will include:

- A Reference Manual - Design Guidelines Handbook, presenting globally design guidelines, performance criteria and methodologies for best practice implementation of RES systems and techniques in new-build settlements, and in particular:
- of techniques to improve local microclimate
- of techniques to improve the building performance
- of RES based district heating/cooling techniques and DSM methods.

A complete technical, financial and environmental assessment of the potential for energy conservation and of the above mentioned groups of RES interventions when applied to new-build settlements. The assessments will consider different climatic, operational, energy and environmental criteria and characteristics.

- A series of extended brochures presenting results from the performed case studies, where global scenarios to integrate RES systems and techniques during all phases of development of a new-build settlement will be developed and applied theoretically. The scenarios will assess the potential for energy conservation and financial and environmental benefits due to the extensive use of RES techniques.
- The conclusions and results of the organized workshops on the global integration of RES in new-build settlements.

Regarding the application of RES and energy conservation measures and techniques in buildings and settlements, some of the primary benefits are:

- Energy savings: the resulting savings in primary energy can be considerable and in some cases can reach 100% for specific uses.
- Reduced strain on national grids by reducing the peak electric demand, especially during summer period.
- Environmental benefits: There are important environmental benefits associated with the reduction of the emission of CO₂, CFCs and the reduction of pollution caused by the production of electricity
- Improvement of quality of the indoor environment and occupant's health.
- Cost savings: These will include savings in capital, maintenance and running costs.

Potential annual energy savings are calculated close to 70-100 Mtoe, which could lead to the reduction of CO₂ emissions from the building sector up to 15-20% annually and contribute to save up to 20 GEuros per year. Efficient provision of support to professionals on the use of RES in new developed settlements, can contribute to a large extent in the application of energy efficient technologies and thus to a significant cover of the above mentioned energy saving potential.