1. Project summary

In connection to the European Green Cities co-operation, tools like Optibuild and Green Build focusing on ”lifecycle costs optimisation” and calculation of ”energy and environmental points” for best practice RUE and RES technologies in buildings are now available on the Internet for everybody to use.

The idea of the Green Catalogue project is to couple the use of these tools together with identification of performance recommendations/requirements and quality check systems for RUE and RES best practice technologies in buildings. It is the idea to do this by help of a strong co-operation between 10 leading European specialist organisations and local stakeholders, like producers, cities, builders, energy companies and energy offices in 10 different European countries in the area of practical use of best practice RUE and RES in buildings.

After a definition of performance requirements/recommendations and check systems, they will be presented in a common workshop. Before this a questionnaire will be filled out by the local stakeholders, who will again give a feed back later in the process.

The involved partners are from Denmark, France, Germany, Italy, Austria, Poland, Finland, and the UK. Besides a partner from Spain is involved as a sub-contractor.

Both a local and a European version of a Green Catalogue with performance require-ments/recommendations and quality check systems for RUE and RES best practice technologies will be developed. A system with 3 different quality levels for each best practice technology will be made for the European Green Catalogue. Something, which can also be a benefit for the implementation of the EU building directive.

Furthermore the developed Green Catalogue will be tested by the involved partners in connection to best practice building projects together with the above mentioned Optibuild and Green Build tools.

A strong dissemination plan concerning the project results will include local seminars in co-operation with the above mentioned stakeholders, a common workshop where agreements on the quality levels are made and presentation of both the local and European Green Catalogues in web sites, brochures and reports.

Besides, an evaluation concerning the actual implementation of the Green Catalogue within the participating countries will also be included in the proposed project.

2. Objectives

It is proposed in the ”Green catalogue” project (where Green is also an acronym of global renewable energy efficient neighbourhoods) to develop a catalogue or manual with a definition of performance indicators and performance requirements/ recommendations for best practice technologies in the area of Rational Use of Energy (RUE) and Renewable Energy Systems (RES) in buildings. It is intended to let a working group of experienced partners concerning practical use of RUE and RES in buildings receive a feedback concerning this from 180-200 producers, builders, cities, energy offices and energy companies in 10 different EU-countries.

The idea is that the working group should first define a status for approx. 25 best practice technologies and then agree on which indicators are important to be able to check the quality of the technologies.

Also a suggestion concerning performance requirements and recommendations should be made for each of the involved countries, so a range of levels can be defined for each technology. A proposal of appropriate ”check” methods for each of the technologies should also be defined.

To be able to develop the catalogue in the best way, it is intended to involve producers, builders, cities, energy offices and energy companies in the countries to give a feedback on the suggested performance indicators, requirements/recommendations and check methods and even typical costs. It is aimed that at least two producers of each of the best practice technologies will give an input to the project. As a whole it is aimed that at least 20 organisations from each country will give an input to the project, an input that at the same time will ensure that they will have an influence on the results.

It is also proposed to introduce a direct link between the ”Green catalogue” and the Green Build tool. At the same time, use of the existing Optibuild tool can also make more correct total economy calculations concerning the balance between investment and operation and maintenance costs

The RES and RUE best practice technologies that are in focus in the proposed project are the following:

Buildings

1. Insulation, DE
2. Energy windows (glass and frame), DE
3. Constructions without cold bridges, AU
4. Air tight constructions, DE
5. Constructions with low-energy content, DK
6. Double facades and glazed areas, GR
7. Environmental correct building materials, AU
8. Advanced glazing, GR
9. Pre-fabricated building systems, GR

Installations

10. Heat recovery ventilation with low electricity use, DK
11. Natural, hybrid and PV assisted ventilation, DK
12. Low temperature heating systems
13. Low effect heating systems, DK
14. Communal DHW systems
15. Water savings, DK
16. Energy meters and energy survey systems, IT
17. Energy efficient appliances, FI
18. Cooling systems, GR

Energy supply

19. Bio mass and bio gas heating systems, AU
20. Condensing gas heating systems (individual and common), IT
21. District heating systems with low losses, FI
22. Combined heat and power, FI
23. Heat pumps, PO

Building projects

24. Daylight and energy efficient lighting, FI
25. Buildings with life cycle costs optimisation, DK
26. Buildings with holistic sustainable building approaches, DK
27. Optimised indoor air climate

Solar energy

28. Solar DHW heating systems, FR
29. Solar wall constructions and air solar collectors, IT
30. PV installations, DE
31. Solar assisted cooling systems, FR
32. Bio climatic components, GR

An important activity in the ”Green catalogue” project is to test the developed ”Green catalogue” in connection to best practice projects that will be realised in the involved countries, including calculations and assessments with the Optibuild and Green Build tools. Based on this the final proposed requirements/recommendations can be agreed by the involved partners.

The proposed work will be very relevant in connection to the coming EU building directive where a common methodology will be introduced, e.g. for building regulations in the EU countries. In the ”Green catalogue” different quality levels are introduced for a large number of best practice technologies and these can then in connection to the new building regulations be used as input for implementation and creation of a market for energy efficient building.

It is not the intention to compete with already initiated and expected energy efficiency labelling initiatives from e.g. Energy Agencies in the EU, but it is the aim to get an overview of the status and what performance requirements are reasonable for a large number of best practice technologies when you see it from the users point of view and to do this also with a useful input from e.g. producers of the technologies.

At the same time it is the idea to organise the project in co-operation with a number of partners who have useful practical experiences from realised solar low-energy demonstration projects in Europe, e.g. in connection to the European Green Cities co-operation.

In Denmark local energy saving boards are being established at the moment as part of a new ”energy saving” legislation. Also in connection to this the proposed ”Green catalogue” could be of great value and at the same time the results have also an interest for local energy offices both in Denmark and Europe.

As an example it can be mentioned that in Italy the idea is to involve the Italian producers of the selected best practice technologies in order to verify the performance of their products and to check the quality of the technologies.
The intention is to define the most important performance indicators and performance requirements and recommendations co-operating with the other European partners in the project.

The choice of technologies is in connection to the actual development of the Italian market and actual Italian energy policies. In Italy it is very important to ensure that proposed energy saving technologies are used in an optimised way, so the best energy saving results are obtained. It’s important to ensure a high quality of the used technologies and this can be obtained involving the producers in order to

verify and optimise the performance of their technologies, also referring to already existing applications.

2.1 Background

In Denmark there is a widespread interest in introducing energy savings and use of renewable energy in connection to both new built and retrofit building projects. As parts of Agenda 21 work, a large number of municipalities aim at realising sustainable building projects that include focus on this.

It is, however, at the same time the fact that such an approach is only seldom used; so most building projects are only realised with an energy saving standard at the same level as required in the building regulations.

In connection to a large scale targeted demonstration project in the building sector "The European Green Cities" project which had Cenergia as technical co-ordinator and a follow-up project, "Green Solar Regions", an "energy and environmental" point system, "Green Build" has been developed. The idea is that builders, cities and regions that want to promote use of rational use of energy (RUE), renewable energy sources (RES) and sustainable building can develop demands for a minimum number of "points" for these areas in connection to building projects. In addition to this it is even possible to develop financing models that improves the economy for a builder depending on the number of "points" that he will obtain for a given building project.

An example, which has shown that this is an approach that works, is from one of the "Green Cities" partners, "The Salzburg Region" in Austria. Here an "energy points" system has been in operation for all new built building projects since 1994. One will get an improved financing of 200 ATS per m^2 housing area for each point obtained; based on governmental guaranteed loans.

This system, where one can obtain 4 points by e.g. investing in a solar DHW system, has resulted in an increase of this technology from around 6-7% in 1994 to 49% in 1999.

In the municipality of Glostrup in Denmark, the above mentioned Green Build energy and environmental point system was used as a questionnaire in connection to the sale of land for 200 new dwellings. The potential builders where informed that they would be judged based on 3 things, the offered price for the land, the proposed project and the filled-in questionnaire. In this way a competition to realise sustainable solar low energy building was introduced. An interactive version of the above mentioned Green Build tool can be found in the website: www.greenglobal21.com.

If the above mentioned approach is going to be developed into a useful concept to promote RUE and RES in buildings then it is very important to ensure that the proposed energy designs are used in an optimised way based on the actual best available technologies and optimised so the best possible energy saving package is used. At the same time it is also very important to ensure a high quality of the used technologies. This can be obtained by help of the performance optimisation and the performance verification concept which has been proposed in connection to the before mentioned "Green Cities" work. But one draw back here is that there are neither well defined performance requirements in connection to most best practice technologies in the building area nor an easy overview of these from country to country.

As regards "performance optimisation" it is relevant to mention that it is now possible to make total economic calculations and optimisation of lifecycle costs over 30 years using the "Optibuild" tool,

which can be downloaded from the Internet from www.ecobuilding.dk or from Cenergia's website: www.cenergia.dk.

3. Expected results and potential impacts of the proposed action

The following 3 phases and 8 activities are proposed for the green Catalogue project.

Phase 1. Initial development work concerning "Green Catalogue" and feedback from 20 organisations in 8 countries.	A1: Adaptation to local situation. A2: Workshop. Agreement of proposed indicators and check systems for RUE and RES technologies. A3: Initial Green Catalogue tools made and European Green Catalogue tool proposed (GCE). A4: Feedback from target groups, 20 organisations per country.
Phase 2. Test of Green Catalogue in connection to local building projects.	A5: Link to Green Build tool and test of GC tools in practical building projects. A6: Revised local GC tools and GCE tool.
Phase 3. Dissemination, production and agreement on developed local and European Green Catalogue tools.	A7: Dissemination of results e.g. in local seminars and production and agreement on tools. A8: Final conclusions based on documentation of practical implementation of Green Catalogue.
	Project co-ordination, reporting, etc. by Cenergia.

The direct outcome of the Green Catalogue project is the development and test of a quality-oriented tool concerning performance indicator recommendations/requirements and check systems for 25 different best practice RUE and RES technologies in the building area. A tool that will be available both in the form of a local oriented tool in 10 different European Countries (DK, FR, D, IT, AU, GR, PO, FI, UK and ES) and in the form of a European Green Catalogue, which based on this information identifies 3 different levels for performance/recommendation and requirements concerning the involved RUE and RES best practice technologies.

The results of the Green Catalogue project will be based on the direct involvement of 20 different organisations in 10 different EU-countries including a large number of producers of best practice technologies together with representatives from cities, builders, energy companies and energy offices and besides it is also the idea to get a feedback from leading architect and engineering companies.

The Green Catalogue approach will make it possible to ensure a quality-oriented implementation of building projects with best practice technologies, and it is the idea that it will be a useful supplement to already developed tools like the Optibuild and Green Build tools. Optibuild is used for lifecycle cost optimisation of building projects where a positive list of the most cost-effective best practice technologies is identified in an energy saving package. The Green Build tool works as an energy and environmental "point" system that can be used as a checklist concerning sustainable and energy efficient building, as well as a system for improved financing of best practice technologies. In addition to focus on RUE and RES, it is also the aim of the Green Catalogue to focus on energy supply and together with the Optibuild tool it will be possible to ensure a demand and supply optimisation for energy use in buildings.

The work on the Green Catalogue project can also be seen as an effort that builds on the results of the European Green Cities co-operation and results of the European Green Cities Thermie targeted project in the building sector, which was finalised in year 2000. An important result of this work was that it is possible to utilise the positive attitude in European cities and regions towards sustainability, energy efficiency and Agenda 21 work as a driving force for the development of a global renewable energy and environmental development. It has been documented that large energy savings, like 50% energy use reduction for heating and DHW, were possible when RUE and RES are combined in the most optimised way, e.g. using total economic optimisation.

At the same time it can also be concluded that although a large number of demonstration projects, using best practice technologies in the building sector, have been realised and documents that it is possible to use these technologies in practice, there are still many barriers against use of RUE and RES in buildings. The most important conclusion is that it is crucial to ensure the quality of RUE and RES best available technologies by identifying performance indicators and performance recommendations/requirements including check methods. An approach which is very much in line with the Green Catalogue proposal.

To ensure that the Green Catalogue really is a useful tool for European buildings projects it is the idea to test the Green Catalogue in connection to practical best practice buildings projects in 8 different European countries where also tools like Optibuild and Green Build are used.

Before the developed Green Catalogue is tested in connection to local best practice building projects, there will be support from Cenergia concerning the Optibuild tool so it can be more adapted to local criteria concerning costs of energy saving measures in the involved countries and for the Green Build tool, local agreements concerning energy and environmental points will be made.

The results from the tests will be used to revise both local versions of the Green Catalogue and the European version with 3 different quality levels. As regards dissemination, local seminars directed towards the stakeholders of the projects will be held and at a European workshop the final version of the European Green Catalogue will be agreed. The results will be presented in local web sites, in a common web site and in different European Green Cities web sites like www.ecobuilding.dk or www.greenglobal21.com.

The potential impact of the Green Catalogue project is that it becomes possible to form the basis of an improved European energy efficient and sustainable building practice especially when the Green Catalogue is used together with tools like Optibuild (concerning total economy optimisation) and Green Build (as an energy and environmental point system).

The Green Catalogue can also have an important impact in connection with the coming European Building Directive.

With special focus on the performance and the quality of best practice RUE and RES technologies it should then be possible to create a European market which is based on the best possible quality instead of national restrictions, etc.

4. The target groups of the Green Catalogue project are:

- Decision makers in the building industry;
- Producers of RUE and RES best practice technologies;
- European Cities;
- Builders like housing associations, developers, contractors, etc;
- Utilities and energy offices;
- Architects and Engineers.

The contractors of the project will work together with at least 20 organisations of the target groups in 10 countries, from producers, cities, architects, builders, energy companies and energy offices.

5. Project work plan, methodology and approach

5.1 Introduction

The work programme is divided into the following 3 different phases and in each of these phases there are several activities.

Phase 1:
Initial development work concerning ”Green Catalogue” and feedback from 20 organisations in 8 countries.

Phase 2:
Test of the ”Green Catalogue” in local building projects.

Phase 3 :
Dissemination, production and agreements on developed local and European Green Catalogue tools.

To ensure an efficient management of the project it is proposed to let 3 partners, Cenergia, Ecofys and CRES be involved in a management team. Each of the participants in the management team could e.g. here take care of the correspondence with 3-4 partners.

5.2 Detailed description of proposed action

The following table gives an overview of the proposed actions.

Phases	**Activities**	**Description**
Phase 1. Initial development work concerning ”Green Catalogue” and feedback from 20 organisations in 8 countries.	A1: Adaptation of the Green Catalogue to the local situation, incl. relation to local initiatives with indicators, quality seals, etc.	The local partners will work on the ideas concerning the “Green Catalogue” in connection to the situation in their own country and a comparison to local initiatives will be made in a report to the partners.
	A2: Workshop. Agreement of proposed indicators and check methods for best practice RUE and RES technologies in buildings, incl. first suggestions on requirements.	A first workshop will be held, where the project will be organised. Before this each partner will be responsible for 2-4 best practice technologies, and will propose indicators and check methods as basis of a first discussion of these. And a first agreement concerning indicators and check methods will be made, including first suggestions on reasonable recommendations and requirements. This information will also form the basis for a questionnaire concerning the “Green Catalogue” by each partner.
	A3: Initial local Green Catalogue tools (GCL) have been made and compiled by Cenergia as basis of proposing a	After the workshop each partner is going to use the questionnaire in a first communication with local stakeholders and based on this make a suggestion for the initial local Green Catalogue (GCL) and send this information to

Phases	Activities	Description
	European tool with 3 different levels for each best practice technology.	Cenergia, where these will be compiled. Cenergia will then make a first suggestion for 3 different European levels for best practice technologies (GCE).
	A4: Feedback from the target group.	Communication with minimum 20 organisations in each country (including at least 10 producers) will be made to get local feedback on the proposed Green Catalogue. Feedback will be collected and documented in written form.
Phase 2. Test of the ”Green Catalogue” in connection to local building projects.	A5: Link to the Green Build tool and test of Green Catalogue tools in practical building projects.	- Cenergia will in co-operation with SolarVent provide a first proposal for a link between the Green Catalogue and the Green Build tool, and also general information about the Optibuild tool. - Based on feedback from the target group, the Green Catalogue tools will be revised and tested in connection to local best practice building projects, including use of the Green Build and Optibuild tools.
	A6: Revised local and European Green Catalogue tools	Based on the results, another revision will be made concerning the local Green Catalogue and this will be sent to Cenergia, who in co-operation with SolarVent will make a revised European Green Catalogue, including a revision of the link to the Green Build tool. At the same time an initiative towards the involved organisations to sign a convenant will be made.
Phase 3. Dissemination, production and agreements on developed local and European Green Catalogue tools.	A7: Dissemination of results e.g. in local seminars, production of local Green Catalogue tools and agreement of a European Green Catalogue tool at a final workshop.	Dissemination of results locally and in Europe, including use of web sites. Final production of local Green Catalogue tools. - Local seminars arranged, where local stakeholders like cities, builders and energy offices will learn about the Green Catalogue tool as basis of definition of local implementation campaigns. - Presentation of project results at a final workshop where an agreement concerning the revised European Green Catalogue should be made, e.g. also as input concerning the European Building Directive.
	A8: Final conclusions based on documentation concerning practical implementation of the Green Catalogue.	- Final conclusions concerning examples of practical implementation in the partner countries will be made.

As it is very important to actually test the developed Green Catalogue system in connection to practical building projects there is a quite high amount of subcontracting (approx. 40% shown in the

budget for partners like Empower (FI), SIR (AU), Metec (IT) and Ecofys (D). The actual subcontractors will be determined later in the process.

The justification for these subcontracting costs is that it is necessary to use and test the Green Catalogue in a prototype phase for the involved designers and construction companies as an added activity to ensure improved quality and more energy efficient building projects.

At the same time Cenergia has a quite high amount of subcontracting (approx.) due to the wish of the Spanish partner to be included in the project as a subcontractor (38,500 Euro for this) and in addition to this dissemination costs for brochures, translation and work on the Optibuild tool (Rotator). Furthermore, projecting equipment will be used as a promotion feature in the project in connection to conferences/workshops and general promotion of the project results (3,200 Euro). SolarVent has 29% of subcontracting for multimedia work concerning the Green Catalogue and Green Build tools (Rotator and Glud & Jensen).

5.3 Dissemination of project results

Dissemination and communication are integrated parts of the Green Catalogue project. First the local versions of the Green Catalogue is made, based on the local situation and communication with producers, cities and other organisations. Based on this a European Green Catalogue will be made, where 3 different levels of performance requirements are identified for each RUE and RES best practice technology. These tools will again be improved after communication with the target groups of the project and in relation to the realisation of the actual building projects.

After this, sessions will take place with both local seminars and a common workshop where the final results will be discussed before the project is finished and both local and a European Green Catalogue will actually exist.

In relation to the realisation of the projects, there will be a close co-operation with energy offices, energy utilities, cities and builders who are the local actors that can implement the use of the Green Catalogue in relation to future projects in Europe. In connection to this co-operation it is aimed to make a convenant between the involved organisations to actually focus on implementation of the Green Catalogue in practice.

5.4 Measures of performance of the action

It is the practical use of the Green Catalogue and implementation of this that will be a proof of the success of the project.

It is aimed to include in the project an assessment of implementation plans where the Green Catalogue is or will be used in practice. In Denmark there are already a large number of both new-built and retrofit building projects where tools like Optibuild or Green Build have been used as part of a sustainable building policy. Already today where we do not have a Green Catalogue with performance requirements and check methods, approaches concerning this are being made from case to case but not in a real consistent way. It is expected that when there is a Green Catalogue it can be a future demand by cities or builder to use this together with the Optibuild and Green Build tools and there is no reason why this could not also be a European practice.

6. Project management

A project consortium has been made for the successful implementation of this project. The project partners have all been involved in international projects for energy efficiency for several years and are among the best companies in Europe dealing with RUE and RES. The partners covers the European Union from north to south and from east to west. The project will be co-ordinated by Cenergia Energy Consultants from Denmark.

It is planned to have a steering group for the project, where all partners are represented.

It is also the idea to have a day-to-day oriented management team with 3 partners, Cenergia, Ecofys and CRES to ensure an efficient management of the project.

The project management can be illustrated as this: