

SARA is an energy demonstration project supported by the European Commission (DG TREN), 6th Framework Programme

Contract: TREN/04/FP6EN/S07.31838/503118

www.sara-project.net



CONTENTS

EU sets CO ₂ targets	1
News	1
Events	2
Kids Corner	2
Primary Health Care Center, Barcelona	3
Building updates	6
Last word	6

SARA PROJECT
COORDINATOR
Dr. Jordi Andreu
GESP
Universitat de Barcelona
Dep.† de física aplicada y
óptica
Av. Diagonal 647, 5è
08028 Barcelona

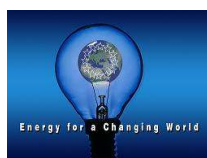
Coordination contact:
Mike Barker,
Universitat de Barcelona
Phone
+34 934 034 528
E-mail
mbarker@ub.edu



This publication reflects only the author's views, the European Community is not liable for any use that may be made of the information contained therein

EU sets firm CO₂ targets

The Presidency Conclusions for the Brussels European Council of March 8 and 9 demonstrate a firm support for ambitious renewable energy and energy efficiency goals, with a commitment to achieve at least a 20% reduction of greenhouse gas emissions by 2020 compared to 1990.



The future Energy Policy for Europe will be built on an Energy Action Plan that will include highly ambitious quantified targets on energy efficiency and renewable energies. Energy Technologies will play an important part in reaching the objectives.

The Commission has

launched a public consultation for the development of a European Strategic Energy Technology Plan (SET-Plan). The plan purpose is to reach a shared European vision on the role that technology could play in a sustainable energy future.

Conclusions

http://ec.europa.eu/energy/energy_policy/index_en.htm

SET-Plan Consultation

http://ec.europa.eu/energy/res/consultation/setplan_en.htm

What about Sara?

Ecobuilding projects play a vital role proving that ambitious energy efficiency targets can be met in new constructions.

The Sara ecobuildings, in their differing stages of

completion, are beginning to demonstrate through documented energy flows that integrating energy and material requirements into the design brief is a necessary way to contribute to the European energy efficiency and renewable energy objectives, and all the more important since the announcement of recent more ambitious targets.

Documenting energy flows is proving to be more complex than expected, and experience is proving the importance of regular communication between data system designer, operators, analysts and users. The strengths and benefits of collaborative work across Europe is proving valuable in getting efficient monitoring in place.

News

HEEPI

The UK Association of University Directors of Estates (AUDE) runs a Higher Education Environmental Performance Initiative (HEEPI) to improve the environmental performance of universities and colleges through environmental benchmarking and best practice, and shared information resources. On February 8th 2007 a HEEPI event on high performance

Buildings was held at the Southampton University SARA building. More information is available on the SARA web or from HEEPI.

<http://www.heepi.org.uk/>

Greenbuildings



The Barcelona SARA building is now a member of the GreenBuilding Programme.

This programme aims at

improving the energy efficiency and expanding the integration of renewable energy sources in non-residential buildings in Europe on a voluntary basis. The programme addresses owners of non-residential buildings to promote cost-effective measures which enhance the energy efficiency of their buildings in one or more technical disciplines.

<http://www.eu-greenbuilding.org/>



The latest Eco-building Common newsletter (December 2006) and a Poster publicising the 4 Eco-buildings projects are available for download from the common portal for four Eco-buildings demonstration projects:



http://www.ecobuildings.info/PDF/Ecobuildings_newsletter_3_dec_06.pdf



http://www.ecobuildings.info/PDF/poster_ecobuildings_C.pdf

Events

Sustainable Building and Construction (2007 Conferences)

<http://www.sb07.org/index.sp>

A series of international conferences on sustainable building in 2007 will be held around the world. These events will provide an important focus for sustainable building and serve as precursors to the global SB'08 conference to be held in Melbourne in November, 2008.

Some European SB07 Events

- Lisbon, Portugal September 12-14, 2007 www.portugalsb07.org
- Malmö, Sweden September 12-14, 2007 www.malmo.se/sustainablecity
- Prague, Czech Republic September 24-25, 2007 www.substance.cz/cesb07
- Torino, Italy June 5-7, 2007

Thermal protection of buildings 2007 (Slovakia)

10 - 11 May 2007

<http://www.intenziva.sk/page/index.php?id=219>

(Slovak, Czech & English with simultaneous interpretation)



Sustainable Regions and Municipalities 2007 6-10 May 2007 (Sweden)

Giving local and regional representatives an opportunity to discuss how to work towards sustainable regions and municipalities http://www.transporteko-so.se/pages/cgi-bin/PUB_Latest_Version.exe?allFrameset=1&pagelid=318&templateEnd=energy

2nd Passive and low energy cooling (Palenc) and the 28th Air Infiltration and Ventilation Centre (AIVC) (Crete, Greece)

27-29 September 2007. The Conference aims to focus on the advanced low energy cooling and ventilation technologies for buildings.

<http://palenc2007.conferences.gr/>

22nd European Photovoltaic Solar Energy Conference and Exhibition, Fiera Milano, Exhibition & Convention Centre, Milan, Italy from 3-7 September 2007.

<http://www.photovoltaic-conference.com/>

Managenergy Kids Corner

Kids Corner is a special section of the ManagEnergy web site that features energy and transport pages including games, downloads, animations, videos and other teaching resources aimed at 7-11 year olds, 12-16 year olds and their teachers.

It also includes energy-related educational materials in all twenty native languages.

<http://www.learn-energy.net>



Tour de Salvagny school kids in class

2007 ManagEnergy KidsCorner Drawing and Photo Competition

Running until the 30th July, the competition asks 12-15 year olds to submit a photograph illustrating sustainable energy, and 7-11 year olds to design a new character for one of the games in the KidsCorner website

Primary Health Care Centre, Barcelona – ten key facts

1. Specific Energy and Environmental criteria are included in New Catalan Health Service building projects.

The Primary Health Care Centre was included in SARA as there was a clear synergy of the EC Ecobuildings objectives for energy performance with those of the Catalan Health Service to incorporate environmental criteria in new building projects.

The Health Care Centre was the first to adopt a series of design criteria that aim to reduce the lifecycle environmental impact of buildings, reduce maintenance and operational costs and maintain or improve comfort standards all within the limits of a reasonable budget.



Building Façade and shading device

Based on the experience gained on the SARA building, the best results are now being included as standard practice for tender conditions and innovation is being pushed further to include, for example, the use of ground sourced heat pumps for heating and cooling, in the hospital now to be built in Mollet (Barcelona province).

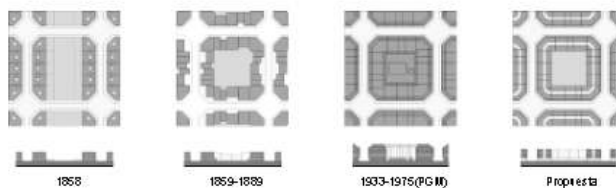
4. Lighting control

In comparison with a conventional building, the saving in electrical energy for illumination is expected to be 50% due to the combination of a reduced

need for electrical lighting due to more use of daylight, use of efficient fluorescent lighting systems and control of the artificial lighting as a function of daylight received.

2. Opportunities for Bioclimatic urban design in Barcelona's "Eixample" district

The Primary Health Care Centre has been built on a site formerly occupied by a two story building in the "Eixample" district of Barcelona – an area designed on a grid plan in the 19th Century that was orientated and laid out with wide separation of streets and buildings to permit daylight penetration and cross ventilation for all future buildings. Subsequent changes in planning criteria have eroded these bioclimatic possibilities in many plots of the Eixample but the architectural design of the SARA building aims to recover them by proposing a shallow floor plan with a central gallery and patio to ensure daylight penetration and a garden area with access for the general public.



Urban evolution in Barcelona ("Eixample")

3. Building envelope considerations



The thermal design specifications for the façade specified thermal transmittance of less than 0.5 W/m².K for the façade, 0.35 W/m².K for the roof and 1.38 W/m².K for glazing. Special attention was given to the avoidance of thermal bridges.

These specifications represented a significant improvement on the buildings standards at the time when the building

was designed and are still valid as a good practice example in the context of the recently introduced new Spanish building regulations and the Catalan Government's Decree on Eco-efficiency in Buildings.

The layout of the plan with a central patio and distribution of space to permit daylight penetration throughout the building determined the need for high performance glazing and attention to detail to optimise use of natural lighting and control of the thermal load in the building.

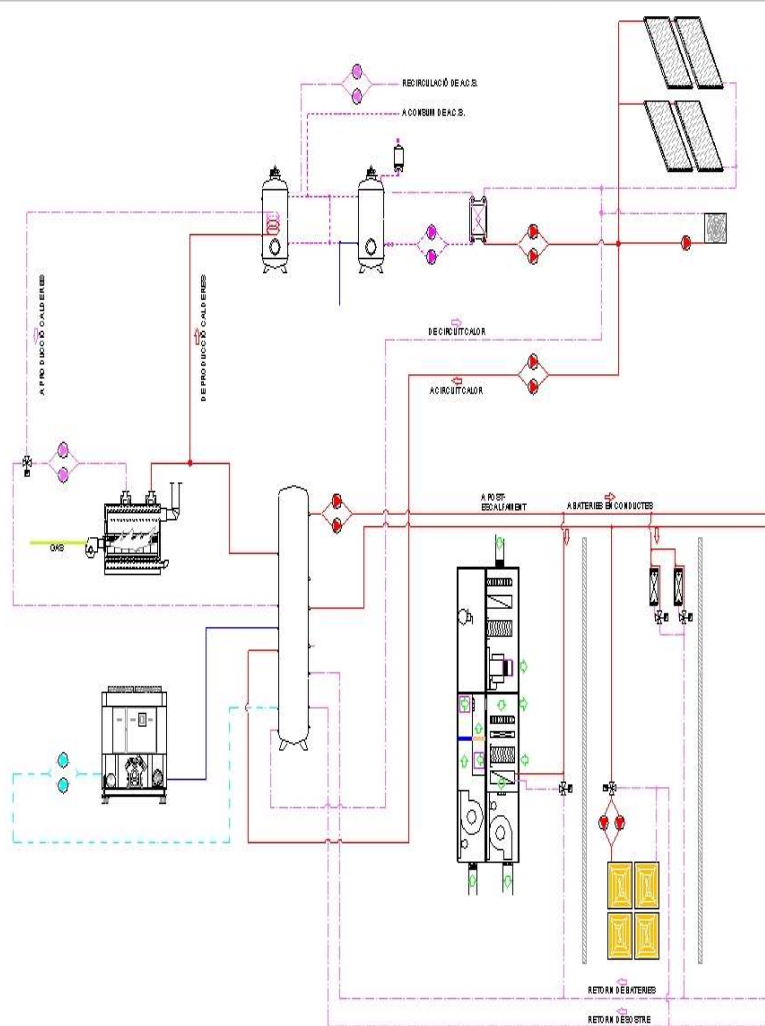
5. Heating and cooling installations

The heating and cooling system design is based on the use of a radiant ceiling. Due to the large thermal exchange surface involved, this system operates at temperatures closer to comfort temperatures than with conventional systems: 15 – 17 °C compared to 7 °C for cooling and 35 °C

compared to 50-70 °C for heating. The expected energy saving is 33 000 kWh/year or 25% compared to a conventional system.

This design solution influences the design and selection of other elements of the system. The 240kW compression chiller is designed for use at these

unusually high temperatures for a refrigeration system, the boiler is chosen to operate efficiently at low temperatures and the system design includes a large thermal inertia tank to enable these two systems and the solar thermal system to work effectively and efficiently in



combination.

The sole function of the ventilation system is to ensure indoor air quality, an important factor in a health service building. Thus incoming air is only heated or cooled to the specified comfort

temperature. In summer a dehumidification system is needed to ensure that there is no condensation on the cool ceiling. A hygroscopic, lithium chloride based, system has been chosen due to its high energy efficiency and long term operational benefits.

A system has been designed and built specifically for this project that include innovations involving free cooling, heat recovery and optimisation of the chemical versus mechanical dehumidification to increase its energy efficiency.

6. Embodied energy in materials

A design objective to reduce the energy and other environmental impacts related to the extraction, manufacturing and subsequent re-utilisation of the building's component materials led to the application of the criteria that are beyond the scope of the EC Ecobuildings programme which focuses on energy in use.

Specific solutions adopted as a result include the use of cork insulation throughout the building for its low environmental impact estimated to be 1/10th that of its competitors:

- Cork: 0.8 kgCO₂/m²
- Polystyrene: 8.9 kgCO₂/m²
- Rockwool: 7.2 kgCO₂/m²

The use of lacquered steel instead of aluminium window frames is also beneficial in terms of embodied energy

- lacq. steel: 33.7 kgCO₂/m²
- aluminium : 310 kgCO₂/m²



The on-site experience with the cork insulation has been interesting as it proved much more difficult to work with than the alternative insulation products due to the relatively small size of the tiles and difficulties in manipulation (cutting).

This resulted in waste material, use of more time than anticipated and risk of inconsistencies in the insulation layer.

7. Energy design optimisation within the SARA project

The SARA project enabled the local design team to collaborate with zafh.net in Stuttgart, experts in building simulation, to consider various options for shading the central patio and also for the design of the principal (South west) façade. This collaboration resulted in the inclusion of perforated fixed shading devices on the South west façade and also over the central patio. This choice represents a pragmatic solution that offers energy performance benefits through solar protection and daylight penetration whilst meeting economic criteria of reasonable cost.



Two design solutions

8. Water management

The building design aims to reduce consumption of mains supplied drinking water by 35%, saving an estimated annual 383m³ in water consumption on site (and indirect energy savings related to water treatment). These savings are to be achieved by:

- Installation of dual flush toilets and Venturi effect, flow restricted taps to reduce consumption of water.
- Collection of rain water and grey water (15000 litre tank). This water, after treatment, is used for toilet flushing and the fire extinguishing systems.

9. Use of solar energy

Solar thermal



24m² of flat solar thermal collectors

A significant part (65%) of the annual domestic hot water needs will be supplied by the roof-top solar thermal panels. The 24 m² of panels will provide an estimated 11 000kWh/year of heat energy.

Photovoltaics

Two photovoltaic systems have been installed on the building, a 6m² roof system (pictured) and a 50m² façade integrated system.

An estimated 12 000kWh of electrical energy will be produced every year to compensate the electricity consumption of the building.



Roof installed PV

10. Information strategy

In collaboration with the SARA project, training material has been developed and used in specific on site session for skilled contractors during the building's construction. A good practice users

guide is being planned aimed at the medical and other staff of the building once in use. For the general public, the end users of the centre, a large flat-screen in the building foyer has been selected as







the best public access interface. This will be programmed to display information and images from the local building, the SARA project and energy performance information

from the building. In addition local language posters and leaflets have been produced to explain the building in the context of the need for continual improvement in the energy performance in buildings.

Eco-buildings

The table below shows the state of advance in April 2007. The table will be updated for the next bulletin with any information you care to supply.

Photo credits : X ULFGG, Estates and Facilities, Southampton University, Hespul, RAP

Ljubljana (Slovenia) Supermarket	Southampton (UK) University Services Building	SARA annual meeting and project news	
<p>Preparation works and demolition began on the site of the future Mercator Centre in Ljubljana, Slovenia in March. Construction will follow and it is expected that the Centre will be open for business in time for the Christmas period.</p> <p>Project documentation is developed by Mercator Optima in collaboration with University of Ljubljana, Faculty of Civil and Geodetic Engineering.</p> 	<p>After 18 months of occupation the Building Management System is now providing monitoring data automatically. This data is analysed by the SARA research groups. Analysis involves error checking, transformation for internet dissemination and feedback on optimisation of building energy management. Some monitoring data will soon be available on the web site</p>  <p><i>Main Entrance</i></p>	<ul style="list-style-type: none"> • The next SARA project meeting will be held in Barcelona on the 24th and 25th May 2007. • We are now working on the Public Access Interface for TSALV and UB. • Advance of Monitoring... On-line performance data from the building management system is now available for the Southampton building. • PARADIES, from Austria, has requested withdrawal from the 	<p>SARA project as they are unable to complete the construction of their building as proposed. We are sad to lose this demonstration building..</p> <ul style="list-style-type: none"> • EC requests feedback for FP7. If you have an interest FP7 participation it is important to respond to this request for feedback. Please contact Mike Barker (Universitat de Barcelona) if you have comments or wish to discuss this in more detail.
La Tour de Salvagny (France) School building	Napoli (Italy) Cultural Centre	Bukhara (Uzbekistan) Cultural Centre	Sinabelkirchen (Austria) Office building
<p>The main construction process has been followed by a period of verification and regulation of materials and components. The BMS is undergoing evaluation and work is focused on the public access interface, for which the hardware is already in place.</p>  <p><i>Visitors and the PAI</i></p>	<p>Work on site has started and the contractor has increased the number of the staff in order to speed up progress.</p>  <p><i>Site works</i></p>	<p>Due to the lack of financial support, no restoration works are going on at present. A technical visit in November 2006 by Arsenal Research raised interest and support for the project from Uzbek authorities and energy technology companies operating in the country.</p> <p>The latest from TESSEL, the French NGO responsible for this building project within SARA, is that a general assembly will be held during April to decide whether the demonstration objectives can be achieved on time.</p>	<p>The construction of this building is not possible due to financial problems. PARADIES wishes to withdraw from the SARA project</p>  <p><i>The withdrawn project</i></p>
	<p>SARA : Sustainable Architecture Applied to Replicable Public-Access Buildings An energy demonstration project supported by the European Commission (DG TREN) 6th Framework Programme Contract: TREN/04/FP6EN/S07.31838/503118</p>		