



**Sustainable Architecture Applied to
Replicable Public-Access Buildings.
Contract: 503183**

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D3: PLANNING AND ARCHITECTURE REPORT

Summary of the results

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1 INTRODUCTION

This report is a project deliverable defined in WP2 of the project Annex 1 description of work.

The role of ETAS (Expert Technical Advice Service) in this project is to ensure best solutions for the several demonstration sites and to follow and document the progress of work. As a first step it was necessary to collect as much information as possible about the ongoing activities. ETAS tried to collate this information in a first "Planning and architecture report" which is divided in six parts:

1. Status of planning
2. Description of the building and energy concept
3. Time schedule
4. Estimation of costs
5. Design tools
6. Organisation involved in the project

The schedule below contains the main results of the data collection process that has involved the submission of individual reports from all eco-building projects and the integration of the results. In the following summary reference is made to each eco-building project site by the acronym of the relevant builder/architects. The table at the end of the report relates these acronyms to the countries, project data and information.

1.1 Status of planning

The actual status of planning at the demonstration sites is quite different and ranges from schematic design (PARADIES II) over design development (PARADIES I, TESSEL, MERCATOR, NAP) and bidding and negotiations with users (DSSS, TULIP) to construction administration (SOTON and TSLAV).

1.2 Description of the building and energy concept

In all demonstration sites there is a close connection between architecture and energy performance.

All demonstration sites also work with high thermal insulation, optimisation of glazing surfaces, use of daylight systems and antiglare shields. These measures are easier to archive in new buildings than in the two refurbished buildings.

Some buildings also use ecological building construction materials like wood (TSLAV), fired-clay tiles (NAP) or ecological insulation materials like hemp, cork and reed (PARADIES).

Intelligent combinations between building design and energy performance are key aspects in this project. Natural ventilation by an atrium is one way and it will be realised in three buildings (DSSS, TULIP, SOTON).

The installation of Photovoltaics and solar thermal collectors are also foreseen in every demonstration site and range from on the roof, roof-integrated to façade-integrated. In some buildings the use is not confined to energy generation, they will be also used for shading (NAP, TESSEL). These demonstration sites can become best practice examples for integration of renewable energy in the architecture.

Further measures foreseen in several demonstration sites you can see in the schedule below under “energy systems”.

1.3 Time schedule

As you can see it in the time schedules below the construction and monitoring of all eight demonstration sites will be possible in the project duration.

1.4 Estimation of costs

The estimation of costs for the different measures are also set out as it is possible to the actual status of planning. A comparability between the demonstration sites by a comparison of costs will be quite difficult because of the different utilisations and the fact that there are new buildings and refurbishments.

1.5 Design tools

PARADIES already uses a dynamic thermal simulation tool called TRNSYS to make preliminary optimisation on the building construction and the integrated technologies for ventilation, heating and cooling.

MERCATOR will make preliminary thermal analysis according to EN832 with GENV 1.1 software and also dynamic thermal analysis and daylight optimisation with TRNSYS, KAMRA, Adeline, Daylight and SENCE software tools.

DSSS used a manufacturer custom tool (NEST) to design the radiant ceiling based HVAC system.

More dynamic simulations at other demonstration sites may follow when the builder/architects are interested in such results.

1.6 Organisation involved in the project

The list of involved organisation of the planning process at every demonstration site should help ETAS to get and distribute all necessary information quickly.

2 COMPARABILITY BETWEEN DEMONSTRATION SITES

The utilisation of the demonstration sites shows that even six of the eight buildings are mainly used as offices and/or training activities which gives the possibility of comparing in several fields (costs, comfort, energy demand,..) between the buildings. Two of these buildings are refurbishment projects which makes comparison more complicated.

The Health Care Centre in Spain and the supermarket in Slovenia must be considered as special utilisations where the building services engineering have to meet more regulations and standards than in the other buildings.

All demonstration sites will use Photovoltaics and solar thermal collectors, so it will be possible to compare the use of these technologies in every building.

3 ADVICE

The results of the demonstration sites which are already under construction (France and the UK) should be presented to and well documented for the other participants, so the results can be used for the demonstration sites which are still in design development. The advanced state of development of these projects obviously limits the influence and impact that the work of ETAs might have on them.

The collecting of information is just at the beginning and must go on in more detail for every demonstration site.

The comparability between the several demonstration sites for example by costs should be discussed from ETAS and suggestions set up.

More dynamic simulations for the demonstration sites which are still in design development would be desirable and this part should be one of the next steps where ETAS can try and influence the development..

4 PROJECT SUMMARY TABLES

The tables on the following pages summarise the basic characteristics of each building and the state of progress. Some sections are incomplete as the initial information available from each building is distinct. In subsequent reports, as the project progresses, the information will become more complete and the degree of homogeneity and integration will increase.

Acronym Country	Units	DSSS E	PARADIES I A	PARADIES II A	SOTON UK	MERCAT OR SL	TULIP P	TSALV F	NAP I	TESSEL UZ
Basic reference data										
Type		Health care 3000 (useful)	Office	lab	Uni. Services	Supermar ket 6735 (gross)	Office	School	Refurb/cult ural/offices	Refurb/ educatio nal
Constructed Area	m2	3721 (constructed)	900 (gross)	2000 (gross)	2600		7395	2200	7500	750
Reference energy consumption	kWh/m2/yr	220	210	210	278	392	308	183	250	300
Target energy consumption	kWh/m2/yr	148	137	137	170	235	218	128	175	210
Target energysaving	%	33%	35%	35%	39%	40%	29%	30%	30%	30%
U values										
Facade	W/m2k	0,5	0,25	0,25		0,2		26% better than stan.d		
Roof	W/m2k	0,45	0,15	0,15		0,15				
Floor	W/m2k					0,2		1,6		
Windows	W/m2k	1,7	1,1	1,1		1,1				
Global	W/m2k	0,38								
Energy Systems										
Heating		Gas boiler	Heat pump		Use of existent heating system			Use of existent heating system		
Cooling		Heat pump (COP 4)	Free cooling, buried air pipes		Free cooling - No AC		Free cooling, buried air pipes	Free cooling, buried air pipes		
Ventilation		Mechanical with heat exchanger	Mechanical with heat exchanger		Mechanical + natural, BMS control	CO2 demand based + heat recovery	Mechanical with heat exchanger			
Distribution		Radiant ceiling	Activation of storage mass for heating and			Radiant floor	Activation of storage mass for heating and cooling			

Acronym Country	Units	DSSS E	PARADIES I A cooling daylight systems	PARADIES II A	SOTON UK	MERCAT OR SL	TULIP P	TSALV F	NAP I	TESSEL UZ
Lighting								100lumen/W, 5kWh/m2 SDO		
Other			rain water utilisation		cogeneration		rain water utilisation, cogeneration	Canadian well		
Renewable Energy Systems										
PV	kWp	100	5		??		15	16		
PV	m2	10	50		??	> 16	150	160	150	
PV	kWh/yr	13000	5000		12500			14000	190000	
Solar Thermal	m2	70	50			> 16				
Other						Skylights and light pipes				
Status of planning										
Outline complete		X	X	X	X	X		X	X	X
Energy Systems specified		X	X Pending simulation results		X	X		X	X	
Detail complete		X			X			X		
All permits obtained		X			X	In progress		X		PV approved
Call for tenders		X			X			X		
Contracts awarded					X			X		
Construction started					X			X		X (Refurb of basic structure)
Time schedule										
Construction start		Spring 2005	may-05	may-06	may-04	jul-05	jul-05	?/2004	Unknown (12/04)	June 2004
Construction finish		Autumn 2006	jun-06	jun-07	jun-05	jun-06	jun-06	Summer 2005	Unknown	end 2006

Acronym Country	Units	DSSS E	PARADIES I A	PARADIES II A	SOTON UK	MERCAT OR SL	TULIP P	TSALV F	NAP I (12/04)	TESSEL UZ
Occupancy								Autumn 2005	Unknown (12/04)	2007
Start of 12 month monitoring		January 2007	jun-06	jun-07	Concrete completed, atrium timber started (11/2004)	jun-06	jun-06	Autumn 2005 2006 40% of construction completed by 12/2004	Unknown (12/04)	2007
Additional info.										
Estimation of costs										
Total cost	€	3954303	1314300		5866753,5	6196200		4089800		
Unit cost	€/m2	1063 constructed 1318 useful	1460		2250	920		1859		
Total eligible costs	€									
Unit eligible costs	€/m2									
Design tools used		Manufacturer e (NEST) custom design tool for HVAC design	TRNSYS for HVAC		No specialised energy design tools have been used.	Preliminary analysis according to EN 832 with GEnV software TRNSYS, KAMRA, Adeline, Daylight and SENCE				