SERPENTE PROJECT – C3

RETROFITTED PUBLIC BUILDING Malmö

Template for subgroup Sport facilities *(adapted by CEA)*

I. Introduction

The purpose of this Public building type template is to identify good practises among renovation of public buildings belonging to the sub-groups: historical buildings, social housing, sports facilities, schools and offices. In this case the template has been adapted for the subgroup Sport facilities.

II. How to identify suitable buildings Good Practices?

The two good practice examples (if available) selected and proposed by a partner will have to answer to all of the following criteria:

1. Availability of results (by this, we mean projects already completed which shows concrete upraise of energy efficiency through renovation)
2. Level of Innovation: energy efficient measures including Renewables for energy demand reduction
3. Sustainability: a project reasonably affordable, with sustainable materials,..
4. Building maintenance after the renovation
5. Transferability (meaning = projects have to show a potential for transfer, both from a region to another one and from one function type to another)

III. Work organisation of the sub-groups

1. Work to be done by each partner

Each partners is requested to select two examples and prepare a fact sheet for each public building selected (sport facilities in this case), incorporating the five exemplary criteria mentioned above.

2. Working group supervised by the group leader

Each Group Leader will be responsible to adapt, modify, complete this template and to collect good practices within its group members.

The subgroup leader (SGL) leads the work of the sub-group. The SGL organizes the exchanges and the meetings between the partners, and sets the form and the publicity of the exchanges (link with the CC2).

The SGL organizes the analysis of the Fact sheets by all participants in the sub-group in order to validate them, paying particular attention to the transferability criterion.

If, as a result of this analysis, some of the proposed examples cannot be accepted, the SGL asks the partners members of the Group to complete the fact sheet or, possibly, to find other examples which are more adequate.

The SGL will then analyse strengths and weaknesses and report them to the responsible of Component 3.

IV. Definition of Sport facilities in this subgroup

Individual buildings or groups of structures designed for exercising, sports training and practice, and competition in various sports.

The sport facilities are classified among the most intensive public buildings because of their occupancy rate, their specificities and their design for use that increase the energy consumption in comparison with other public buildings.

This definition does not include:

- car racing
- beaches (beach volley)
- stables (horse riding)

This definition includes:

- Structures of sports facilities (football pitches with associated infrastructure, hockey, swimming pools, tennis, cycling stages, gyms, stadiums, etc.)
- Shooting
- golf courses
- skiing facilities (excluding ski slopes)

The modern sports structures are the classical palaestrae, gymnasiums, stadiums, hippodromes, and circuses. Modern sports structures and facilities serve more than 50 types of sports. A structure or facility is usually divided into the principal area, where training is done and competitions are held (fields, courts, halls), auxiliary areas (cloakrooms, dressing rooms, shower rooms, rooms for officials, equipment rooms), areas for the maintenance systems (water, heat, and electric power supplies), and the spectator area (stands and seats, lobbies, refreshment counters, and restrooms). Sports structures and facilities can be outdoor or indoor.

Individual buildings may be designed for one or several types of sports, for example, auditoriums or halls for both gymnastics and games; sports complexes consist of several specialized structures designed for different sports. Fields and courts for games and track and field, ice rinks, swimming pools, rowing channels, ski trails, sledding runs, ski jumps, cycle tracks, and firing ranges are examples of individual outdoor structures and facilities. Stadiums with sports arenas and courts for different sports and equestrian sports centres are outdoor complexes. Individual indoor sports structures and facilities include halls or auditoriums for various sports, indoor arenas for track and field events and games, indoor ice rinks, tennis courts, and swimming pools. Indoor complexes include buildings with multiple arenas, general-purpose halls for entertainment and sports, and indoor stadiums.

The indoor facilities; either the gyms, especially those in which competitions are held, or the swimming pools are very energy intensive, due to the large amount of energy required based on the sports standards. Their height of the indoor gym automatically increases its volume, thus requiring a large amount of energy for space conditioning. All gyms, regardless of age and their scale, ie if are new or old

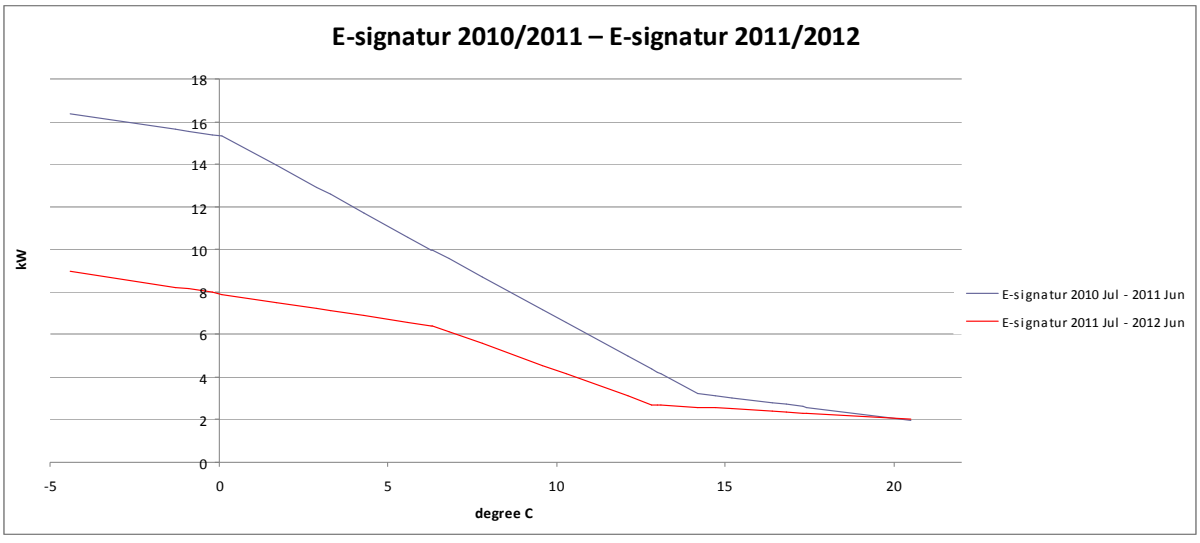
installations, small or large buildings must adopt all other requirements for building operations, such as those listed in the Directive 2010/31/EU.

V. Good practice Retrofitted Public buildings fact sheet

GENERAL INFORMATION		
Name of the public building renovation:		Gullviksborgs IP
Building Good Practice number (example BGP n°1 – Malmö)		BGP n°1 Sport – Malmö
Sub-group		Sport Facilities
Description	Photo	
	Address	Eriksfältsgatan 94, 214 54 Malmö
	Building Area	229 square meters
	Public sector contractor	Malmö Municipal Properties
	Architect Engineering consulting	Engineering consult for this project: Prenad AB
	Date of construction	Building constructed: 1976 Football fields was established: 1969
	Date of renovation	Start: 12/9-11, finished: 27/10-11
	Nature of the work (short description)	Installed Direct Digital Control system (DDC), installed presence detectors and changed electrical radiators. Connected the light, electric radiators and ventilation to the DDC. Programmed the DDC so that the light, heat and ventilation are controlled depending on presence in the building. Installed energy meter and domestic hot water meter in the building. Connected the DDC to a SCADA-system. Prevent the users to raise temperature.

	Budget and source of financement	Approximately €22 000, financed by Malmö Municipal Properties.
AVAILABLE RESULTS		
What were the big problems (in terms of energy efficiency) to tackle?		Old electrical radiators with internal thermostats. Poorly isolated structure. Exhaust ventilation system. Low investment cost was required for profitability
Has this building been already analysed and certified?		The building has been certified. None of the energy measures that have been done was proposed in the energy certification.
What are the key innovative energy efficiency measures undertaken through the renovation?		Change old electrical radiators to new. Take control of the light, heating and ventilation system by connecting them to a DDC and SCADA-system. Lower the ventilation flow and temperature inside the building when there is no presence in the building and at the same time turn of the light.
What are the measurable improvements in terms of energy efficiency in electricity and heating (kWh saved)? • **kWh saved, kWh before/after, kWh given in the studies/real kWh)** • **carbonated energy kWh substituted by REN** • **kg CO2 saved**		No predicted energy saving was calculated before the project. The energy is weather corrected with degree day method. Only bought electricity was measured before installation. One year is compared even if installation was not done until October: • 2010 July – 2011 Jun: 77400 kWh • 2011 July – 2012 Jun: 44200 kWh • Reduction 33200 kWh (43 %)

E-signatures made from average effect / month under one year, July 2010 – Jun 2011 and July 2011 – Jun 2012.



ENERGY EFFICIENT MEASURES	
Energy efficient measures of the building envelope	None
Energy efficient measures of the heating system	Change old electrical radiators with an internal thermostat to new electrical radiators (was in need of replacement). Connecting the electric radiators and the ventilation system to a DDC. Lower the temperature and ventilation when there is no presence within the building. Prevented the user to raise temperature.
Energy efficient measures of monitoring energy	Installed domestic hot water meter and an energy meter for the heating system.
Energy efficient measures regarding behaviour	Light, heat and ventilation are automatically controlled depending on presence in the building.
Stakeholders' involvement in the energy efficient measures	The Recreation and Sport Department was informed about the project.

SUSTAINABILITY OF THE RENOVATION	
Design and choice of sustainable materials?	Every design and choice of material has been made to make the installations protected against vandalism and durable.
Sustainable building site management? (sorting waste, water…)	No information on this available.
Application of a valuation method (BREAM? HQE? Others?)	No

BUILDING MAINTENANCE: life of the building after the renovation	
Is the building object of an energy monitoring? Is there a responsible manager?	The electricity and water is monitored every month. The energy is monitored by the Energy Section.
Who is in charge of the maintenance of the heating system of the building?	A technical unit at the Department of Services.
Who is in charge of the day to day energy management?	The facility manager.
Are there some specific measures to raise energy awareness and to implicate users in energy efficiency?	No.

FUNDING	
What financing plan?	Financed by Malmö Municipal Properties
Innovative or specific aspects in the method of financing (European funds or loan, energy performance contract,...)	Self financed
What is the balanced budget for each stakeholder • **Energy costs for tenant before /after** • **Increase in the rent**	The reduced energy cost for Malmö Municipal Properties is planed to finance the cost for the investment in the future.
Is there any specific economical indicators (payback time on investment, global cost, ...)	No

TRANFERABILITY	
Transferable aspects according to the partner in charge of this example of good practice	**Transferability of planning (forming a partnership, choosing priorities, setting up a renovation building teams, etc.)?** This type of BGP is effective on buildings with a low rate of use, direct heating or maybe direct cooling (electric radiators or air to air heat pumps), mechanical ventilation and a light construction (wood or steel structure). It also has to be accepted by the users that the building won't have the right temperature when they arrive to the building at first. It is also important that the effect in the heating or cooling system is enough to reach a good temperature within a reasonable time.
	Transferability of the process of renovation (management structure, monitoring system, implication of end users, participation, etc.)? It is important to inform the users that it will take some time for the building to reach the right temperature when they arrive.
	Transferability of results (good solutions, adaptability, change of behaviour, etc.)? **This type** of BGP has been adapted in a few properties within Malmö Municipal Properties with good energy results. It should be very possible to transfer these good practises to other regions. The results will be depending on the climate in the other region.

Transferable aspects according to all the partners of Serpente project	The other partners will analyse and validate these good practices. During the process of validation the partners will take on the role of auditors because they will assess and improve the effectiveness and portability of good practices in their context.
	The validation process will promote a systemic approach in local competent public administrations. Moreover, this process of selection and validation is a peer review and entails the mutual role of experts and auditors depending on typology of buildings and partner's expertise.

SOURCES	
Publications	
Website	
Interviews	The Technical facility manager at Malmö Municipal Properties.

GENERAL INFORMATION		
Name of the public building renovation:		Bellevuestadion
Building Good Practice number (example BGP n°1 – Malmö)		BGP n°2 Sport – Malmö
Sub-group		Sport facilities
Description	Photo	
	Building Area and use	12658 square meters • 16 tennis courts (7 outside) • 10 badminton courts • 8 squash courts • 2 floorball plans • 3 Indoor Beach Volleyball Plans • Gymnastics hall with room for aerobics and table tennis • Rehabilitation • Fitness
	Address	Bollspelsvägen 3, 216 25 Malmö
	Public sector contractor	Malmö Municipal Properties
	Architect Engineering consulting	At this project: Stjärnfelts VVS, Syd total, WSP.
	Date of construction	1972, expanded 1977 (badminton hall) and 2000 (entrance to the building). New light fixtures installed 2007-2008.
	Legal aspects (e.g.: protected property)	No
	Date of renovation	Start at end of 2011 - Most of the installations was ready in the beginning of 2012. Some is still going on.

	Nature of the work (short description)	This has been a project to reduce energy use. The systems have been adjusted and optimised, new control system has been installed, energy efficient pumps installed and some ventilation without heat recovery have been connected to an existing HRV-system. Some of the district heating system within the building has been replaced.
	Budget and source of financement	Approximately: €290 000

AVAILABLE RESULTS	
What were the big problems (in terms of energy efficiency) to tackle?	Over temperature in the building. Badly optimised heating, ventilation and light according to using hours. No heat recovery in some ventilation systems. No timers on some ventilation systems.
Has this building been already analysed and certified?	Yes, it has been certified before the renovation in the summer 2011. No energy policy proposals were given in the energy certification. An external consultant has made an energy audit and actions in this project have been based on the report.
What are the key innovative energy efficiency measures undertaken through the renovation?	Operation optimizing of the heating system, ventilations system and the lights. Replace old thermostat valves and installed variable speed pumps. Coupled some extraction and supply air systems without heat recovery to an existing HRV-system. Installed timers on some ventilation units. Installed water-saving showers.
What are the measurable improvements in terms of energy efficiency in electricity and heating (kWh saved)? • **kWh saved, kWh before/after, kWh given in the studies/real kWh)** • **carbonated energy kWh substituted by REN** • **kg CO2 saved**	Calculated energy saving in energy audit: • Heating: 364 000 kWh/year • Electricity: 75 000 kWh/year Measured energy: One year is compared even if most of the installations was not ready before sometime in the beginning of 2012. Construction has been ongoing for some of the performance period. The energy is weather corrected with degree day method: • Heating 2010 July – 2011 Jun: 1 284 027 kWh • Heating 2011 July – 2012 Jun: 956 038 kWh • Electricity 2010 July – 2011 Jun: 957 939 kWh • Electricity 2011 July – 2012 Jun: 746 167 kWh • Reduction heating: 328 000 kWh (- 26 %) Reduction electricity: 212 000 kWh (- 22 %)

ENERGY EFFICIENT MEASURES	
Energy efficient measures of the building envelope	No
Energy efficient measures of the heating system	Operation optimizing of the heating system and ventilations system. Replace **old** thermostat valves and installed variable speed pumps. Coupled some extraction and supply air systems without heat recovery to an existing HRV-system.
Energy efficient measures of monitoring energy	Meter for measuring the utilization time of the sauna has been installed.
Energy efficient measures regarding behaviour	Optimized the ventilation system according to the time the facility is used. Optimised the light system, a function in the light system now prevent the occupancy sensors from turning the light on unless the room is booked.
Stakeholders' involvement in the energy efficient measures	
Others?	

SUSTAINABILITY OF THE RENOVATION	
Design and choice of sustainable materials?	Every design and choice of material has been made to make the installations protected against vandalism and durable.
Sustainable building site management? (sorting waste, water…)	No information on this available.
Application of a valuation method (BREAM? HQE? Others?) **Carrying out consultation process with dwellers? Concerted choice on the work program? Which external partners?**	No.

BUILDING MAINTENANCE: life of the building after the renovation	
Is the building object of an energy monitoring? Is there a responsible manager?	The electricity and water is monitored every month. The energy is monitored by the Energy Section.
Who is in charge of the maintenance of the heating system of the building?	A technical unit at the Department of Services.

Who is in charge of the day to day energy management?	The facility manager.
Are there some specific measures to raise energy awareness and to implicate users in energy efficiency?	No.

FUNDING	
What financing plan?	Financed by Malmö Municipal Properties
Innovative or specific aspects in the method of financing (European funds or loan, energy performance contract,...)	Self financed
What is the balanced budget for each stakeholder • **Energy costs for tenant before /after** • **Increase in the rent**	The reduced energy cost for Malmö Municipal Properties is planed to finance the cost for the investment in the future.
Is there any specific economical indicators (payback time on investment, global cost, ...)	Before the project an pay-off time was calculated: 4,8 years

TRANFERABILITY	
Transferable aspects according to the partner in charge of this example of good practice	Transferability of planning (forming a partnership, choosing priorities, setting up a renovation building teams, etc.)? An energy audit was made to identify profitable measures so that these could be implemented in the same project which reduces the overall cost compared to doing it in several small projects.
	Transferability of the process of renovation (management structure, monitoring system, implication of end users, participation, etc.)? It is important to inform the user how to use the new system, especially when the energy savings is dependent on the user.
	Transferability of results (good solutions, adaptability, change of behaviour, etc.)? Control of the light and heating system reduce lots of energy in buildings where the facilities in the property only is used for short periods.
Transferable aspects according to all the partners of Serpente project	The other partners will analyse and validate these good practices. During the process of validation the partners will take on the role

	of auditors because they will assess and improve the effectiveness and portability of good practices in their context.
	The validation process will promote a systemic approach in local competent public administrations. Moreover, this process of selection and validation is a peer review and entails the mutual role of experts and auditors depending on typology of buildings and partner's expertise.

SOURCES	
Publications	Strategisk Energieffektivisering Fritidens fastigheter, WSP, 2011
Website	
Interviews	The technical facility manager