BUILDING GOOD PRACTICE

Primary School N17 – Świętochłowice, Upper Silesia

GENERAL INFORMATIONS		
Name of the public building renovation:		**Świętochłowice Primary School N17**
Index of Building Good Practice (ex. BGP n°1 – IT)		**BGP n°1 – PL**
Sub-group		**Historical buildings, schools**
Description	Photo	 
	Address	14 Armii Ludowej Street 41-608 Świętochłowice (building A) 12 Armii Ludowej Street 41-608 Świętochłowice (building B)
	Public sector contractor	The City Hall of Świętochłowice – Awarding Entity ***Building installation contractor:*** BUD-LEP General Construction and Installation, 12 Wyzwolenia Str. 41-600 Świętochłowice ***Building construction contractor:*** PERFEKT. Construction and Installation Company, 14 Imieli Str. 41-605 Świętochłowice
	Architect Engineering consulting	DYNAMIKA Co. Research and Design Service Company, 4 Kosów Str. 44-100 Gliwice
	Building Characteristics (surface, number of	<u>Building A:</u> detached building on a plan of a rectangle, full basement, the walls of full ceramic bricks (thickness 25-63 cm), reinforced concrete ceiling, reinforced concrete flat roof with a non-ventilated air space,

	users, orientation etc.)	a staircase in the middle, extended in the shape of semicircle; – construction technology: traditional, – number of floors: 4, – gross volume: 9330 m^3, – the heated surface volume: 9023 m^3, – footprint: 620,4 m^2, – floorage: 1779 m^2, – the heated surface: 1779 m^2, – number of users: 291; <u>Building B:</u> building plan L-shaped, composed of four separated by movement joints segments, full basement. First and third segments are two-storey, the second segment (middle), containing the staircase and two storey outbuilding is also a two-story, with one room at third floor level, adjacent to the attic. The fourth segment includes floor at basement level with workshop and a gym downstairs. The external walls of full ceramic bricks. Brick facades have many decorative elements in the form of cordon cornices, crowning cornice with frieze arcade and decorations of glazed ceramic. Ceilings - mostly Klein ceilings, only above the gym area and a room in the attic are wooden. Wooden roof covered with tiles, only the flat roof over two-storey semi-detached outbuilding next to the staircase and the fourth segment is made of reinforced concrete. In the past the building was anchored with wall clamps due to mining damages. – construction technology: traditional, – number of floors: 2-5, – gross volume: 10300 m^3, – the heated surface volume: 9325 m^3, – footprint: 691,1 m^2, – floorage: 1730 m^2, – the heated surface: 1770 m^2, – number of users: 316.
	Date of construction	Building A: 1932; Building B: 1907.
	Legal aspects	Listed building under the protection of historic monument's

	(e.g.: protected property)	conservator.
	Date of renovation	2011
	Nature of the work (short description)	<u>Building A:</u> I. Thermal retrofitting of building structures: 1. Insulation of external walls and walls at the ground level (using a slightly-wet ETICS method, external walls with 14 cm of insulation - polystyrene, the walls at the ground level with 8 cm of insulation - extruded polystyrene foam); 2. Insulation of warm deck flat roof (8 cm layer of spray foam polyurethane - on existing flat roof surface); 3. Replacement of windows and exterior doors (windows with U = 1.7 [W/m^{2}K] and doors with U = 0.9 to 2.5 [W/m^{2}K]. II. Improvement of heat supply system: 1. Replacement of the central heating installation working in an open system based on the steel wires, cast iron radiators, finned tube elements and traditional valves using a new radiators with thermostatic valves and automatic air vents in vent stacks; 2. Improvement of ventilation by installing controlled air inlets built into the window frames; 3. Replacement of boiler room with coke cast iron boilers without controls for boilers completely automatic based on two gas-fired condensing boilers used for heating and hot water supply; 4. Improvement of water heating system through the removal of existing electrical heaters, with the use of circulating system installation connected with condensing boiler room. <u>Building B:</u> I. Thermal retrofitting of building structures: 1. Insulation of external wall of fourth segment - gym (slightly-wet method ETICS, 12 cm of insulation – polystyrene); 2. Insulation of internal walls adjacent to unheated attics (slightly-wet method ETICS, 12 cm of insulation - polystyrene); 3. Insulation and sealing of joints (mineral wool strips with a width of 0.5 m, thickness of 10 cm inserted into the slit and covered with sheet metal); 4. Insulation of flat roof over the locker room at the gym and ceiling over the last floor (8 cm layer of spray foam polyurethane

		- on existing flat roofs, insulation of ceilings on the last floor by layers of mineral wool mats with a thickness of 15 cm); 5. Replacement of windows and exterior doors (windows with U = 1.7 [W/m^{2}K] and doors with U = 0.9 to 2.5 [W/m^{2}K]. II. Improvement of heat supply system: 1. Replacement of the central heating installation working in an open system based on the steel wires, cast iron radiators, finned tube elements and traditional valves using a new radiators with thermostatic valves and automatic air vents in vent stacks; 2. Improvement of ventilation by installing controlled air inlets - built into the window frames; 3. Replacement of boiler room equipped with coke cast iron boilers for water without controls with boilers completely automated based on two gas-fired condensing boilers used for heating and hot water supply; 4. Improvement of water heating system through the removal of existing electrical heaters, with the use of circulating system installation connected with condensing boiler room.
	Budget and source of financement	The task was financed by Świętochłowice municipality own funds in the amount of 2.344.121 PLN gross *(1€ - approx. 4,3 PLN, it is: 545 144 €)*. Expected accrued income in the amount of 1.992.503 PLN *(463 372 €)* from the European Union Funds *(within the framework of ROP SV Priority No 5 Environment, Measure 5.3. Clean Air and Renewable Energy for the tasks carried out by Primary School No 3 and 17 called: "Improving air quality in the city through a comprehensive thermal modernization of school buildings in Świętochłowice" (payment requested))*.
AVAILABLE RESULTS		
What were the big problems (in terms of energy efficiency) to tackle?		Lack of thermal comfort – too cold or overheated rooms (no adjustment of the heating system, and inadequate thermal insulation of building partitions).
Has this building been already analyzed and certified?		no
What are the key innovative energy efficiency measures undertaken through the renovation?		Achieving the required level of thermal comfort, improvement of heat generation efficiency, conversion of energy carrier for more beneficial to the environment (coal, coke - gas), reducing building energy requirements needs for heating and hot water.
What are the measurable improvements in terms of energy efficiency (kWh		The audit foresaw the following results of thermal modernization: ***In Building A*:** – reduction in heat consumption of 79% i.e.522,93 MWh/year,

saved)?	– reduction in demand for thermal power of 44% i.e. 132,6 kW; ***In building B:*** – reduction in heat consumption of 70% i.e.545,28 MWh/year, – reduction in demand for thermal power of 29% i.e. 118,1 kW, – Total up (buildings A and B) in the process of modernization the estimated savings of heat come up to 1068,21 MWh/year.
Ecological Effect	As a result of the project the emission of gases and dust decreased.
ENERGY EFFICIENT MEASURES	
Energy efficient measures of the building envelope	The thermal insulation of external walls and walls at the ground level: – **in building A** - comprehensively, – **in building B -** only the gable-end of the fourth segment (from the yard) in consideration of the historical character of the building and restoration recommendation. 
Energy efficient measures of the heating system	The replacement of ineffective heating system based on solid fuel boilers (coke) with fully automatic high-duty heating system composed of gas condensing boilers.  Boiler rooms in both buildings are analogical.
Energy efficient measures of monitoring energy	The inclusion of the object into „Internet power management system" – administered by outsourcing company (REUS Poland), authorised to monitor the energy and media consumption. The system includes all public buildings except for The Health Care facilities. The City Hall and the administrators of individual outposts incorporated receives monitoring data.
Energy efficient measures regarding behaviour	Trainings are conducted by the Municipality and outsourcing company. The average frequency of training – every two years. In the meantime individual consultations are held over the phone and by mail. The training is for administrators as well as users (seldom).

Others?	The Municipality, outsourcing company, manager (administrator) of the building.
SUSTAINABILITY OF THE RENOVATION	
Design and choice of sustainable materials?	Reliable solutions resulting from good practices were chosen, and appropriate materials were used – only those technically approved for the use in construction, in the public procurement the environmental criteria were not applied.
Sustainable building site management? (sorting waste, water…)	During the process wastes were sorted and utilised or stored by authorized units, contractors used high energy efficiency tools.
Application of a valuation method (BREAM? HQE? Others?)	
BUILDING MAINTENANCE: life of the building after the renovation	
Is the building object of an energy monitoring? Is there a responsible manager?	Yes, the object was included into „Internet power management system" – administered by outsourcing company (REUS Poland), authorised to monitor the energy and media consumption.
Who is in charge of the maintenance of the heating system of the building?	The manager-administrator of the object (school headmaster) and the site engineer responsible for technical inspection on behalf of the municipality (the City Hall).
Who is in charge of the day to day energy management?	The outsourcing company (REUS Poland), Manager – administrator of the object (school headmaster), the City Hall.
Are there some specific measures to raise energy awareness and to implicate users in energy efficiency?	Yes, the training system organised by the City Hall and outsourcing company. The average frequency of training – every two years. In the meantime individual consultations are held over the phone and by mail. The training is for administrators as well as users (seldom).
TRANSFERABILITY	
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.)? **In the planning process it was important to adjust the work timing to object functioning schedule, but also to follow important principle to conduct heat-insulating works on building partitions before the replacement of heat source in order to avoid its oversizing (Conversely, using the reduced thermal power source in comparison to existing system might have caused the decrease of thermal comfort).**
	Transferability of the process of renovation (management structure, monitoring system, implication of end users, participation, etc.)? **The supervision over thermal modernization work was held by persons with appropriate powers and large experience in similar building projects.**
	Transferability of results (good solutions, adaptability, change of behaviour, etc.)?

	The building was included into „Internet power management system" enabling to monitor the consumption and cost of energy and water upon the invoices of services suppliers and meters readings (day and night) what allows the actual evaluation of thermal modernization effect.
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	The project-documentation, the energy-audit.
Website	Yes, www.swietochlowice.pl
Interviews	Yes, with people responsible for the process realisation.