

4.1 Annex 1 - Baseline Report

Municipality: Plovdiv
 Building code:
 Building: UHAT „Sv.Georgi“ EAD
 Paediatrics and Children's rehabilitation (Children's clinic)
 Address: Bld."Vasil Aprilov" 15A, Plovdiv
 Total floor area, m²: 3 572



Expected results	Value
Energy saved, MWh/year	1 074.00
Energy saved, €/year	40 597
CO ₂ emissions saved, tco ₂ /year	213.66
CAPEX, €	143 700
Simple payback period ¹ , year	3.54

¹ Simple payback including cost price of materials, labor, mechanization, profit and not including cost of finance.

4.1.1. Current status of the building

Infrastructure	Description
Commissioned	1947 year
Building structure	Solid reinforced concrete structure with one semi-underground and five overground floors. On the first floor are situated medical offices, x-rays, bathrooms; on the second is the Intensive care; on the third is the Pulmonology; on the fourth is the Onkohematologiya; on the fifth are lecture hall, Psychologist, Kitchen office and bathrooms.
Facade walls	Basement - reinforced concrete surrounding walls, both sides plastered, without heat insulation. Overground floors - masonry with solid brick, both sides plastered, without heat
Roof structures	Concrete structure with attic space ("cold roof"), covered with waterproofing, without heat insulation.
Basement structures	Floor over heated semi-underground floor. Small area is in contact with external air, without heat insulation.
Joinery	Double glazed PVC joinery (~ 77%) Metal joinery with single glazing (~ 15%) Wooden joined joinery (~ 8%)
Heating	Individual substation for heating, connected to power station of water vapour. Bad condition of the pipe-line system - insulation partially torn, leakage. Two-pipe system line and forced circulation. Radiators of cast iron, not fully functioning. There is no heat armature for regulation.
Domestic hot water	The DHW system works with an 5 m ³ external boiler, heated up by power station of water vapour. Thermal isolation with torn places.

Electric appliances and lighting	Appliances, affecting and non-affecting the heating; Lighting with luminescent lamps and incandescent lamps.
Air conditioning and ventilation	There is no ventilating system. Few rooms conditioned by individual air-conditioners, split system.
Operational hours	Residents: 24 hours a day, 7 days a week, including holidays Heating: the same as residents

4.1.2. Current energy consumption

Energy	Heating			Electricity		DHW		Total		
	Year	Gcal/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year
	2012	842.20	979.48	47 225	215.70	19 238	224.02	10 801	1 419.20	77 264
	2013	699.91	813.99	38 204	66.54	6 401	224.02	10 514	1 104.55	55 119
	2014 ¹	785.91	914.01	42 147	84.26	5 917	224.02	10 330	1 222.29	58 394
	Average	776.00	902.49	42 525	122.17	10 519	224.02	10 548	1 248.68	63 592

¹ Reference year

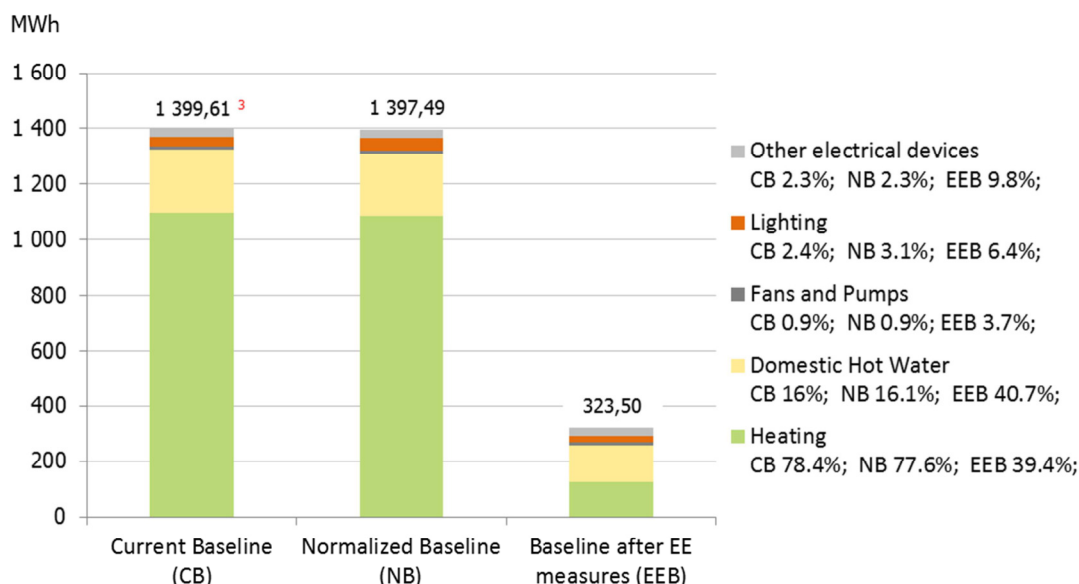
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

4.1.3. Analysis of the estimated energy savings

Energy saving measures		Energy saved ²			Capex	Pay-back
Nº	Discription	MWh/year	€/year	t co ₂ /year	€	year
1	Isolation of external walls	144.53	5 298	30.00	31 278	5.90
2	Roof isolation	56.32	2 064	11.00	6 662	3.23
3	ESM on basement	23.59	865	4.90	2 232	2.58
4	Joinery replacement	98.29	3 603	20.40	14 351	3.98
5	Switching the heating from local to DHS supply					
	- heating system renovation	634.43	23 257	121.17	79 994	3.41
	- change of energy source	-	186			
6	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	93.87	3 407	7.38	1 919	0.54
	- change of energy source	-	143			
7	Lighting measure	22.97	1 774	18.81	7 265	4.10
	Total	1 074.00	40 597	213.66	143 700	3.54

² The amount of the energy savings is calculated according to the normalized value of the base consumption.

4.1.4. Energy consumption share



Parameter			Baseline	
No	Description	Measure	Current	Normalized ⁴
1	Internal temperature	°C	26.3	26.3
2	DHW consumption	l/m ²	1100.0	1 107.0
3	Lighting functioning	%	100.0	100.0

³ The difference between the numbers arising from the invoices and the software comes by technological deviation in the degree-days, used in modelling. According the methodology approved by the norm.

⁴ Values come from the norm according to type and functioning of the building, number of persons inside, etc.

4.1.5. Energy saving measures - description

Energy saving measures	Activities	Measure	Price ¹ (€)	Quantity	Sum (€)
1. Isolation of external walls	Preliminary preparation of external walls	m ²	4.62	897	4 144
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	897	19 169
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	897	5 642
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	897	2 323
	Total ESM 1:				
2. Roof isolation	Mineral wool insulation 12 cm., covered with plaster	m ²	11.44	516	5 903
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ³	1.47	516	759
	Total ESM 2:				

3. ESM on basement	Preliminary preparation of external walls	m ²	4.62	64	296
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m2	m ²	21.37	64	1 368
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	64	403
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	64	166
	Total ESM 3:				2 232
4. Joinery replacement	Mounting PVC windows with double panes (one multigrade and one float glass), exterior and interior window panels and anti-mosquito nets to the opening parts	m ²	88.61	137	12 140
	Sealing, patching and flipping edges ; plastering and painting from inside	m ²	10.6	137	1 452
	Dismantling of old joinery, collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	5.54	137	759
	Total ESM 4:				14 351
5. Switching the heating from local to DHS supply	Design of a new HVAC project for reconstruction - stage: technical level	m ²	0.75	3 115	2 336
	Dismantling of pipelines and radiators, iollection, transport and disposal of waste to landfill up to 20 kilometers	m ²	0.90	3 115	2 804
	Supply and installation of fan coils (Q heat / cool = 4,2 / 1,5kW) equipped with three-way valve for two-pipeline system	m ²	3.80	3 115	11 837
	Supply and mounting of a new pipeline system thermo-isolated for the heating system	m ²	16.70	3 115	52 021
	Supply and installation of pipelines for the condensate and connect the fan coil units to the internal electro grid	m ²	1.00	3 115	3 115
	Supply and installation of water collector and distributor with fittings and thermo isolation	m ²	1.00	3 115	3 115
	Supply and mounting of plasterboard decorations, mineral wadding isolated	m ²	0.40	3 115	1 246
	Supply and installation of a an automated system for the HVAC monitoring	m ²	1.10	3 115	3 427
	Charge new accession to the central heating	psc	93.82	1	94
	Total ESM 4:				79 994
6. Switching the DHW from local to DHS supply	Connecting the subsystem to the existing DHW pipelines, thermo isolation of pipelines	m	55.00	25	1 375
	Dismantling of the existing boiler and pipeline connections, transport and disposal of waste to landfill up to 20 kilometers	m	15.00	30	450
	Charge new accession to the DHS	psc	93.82	1	94
Total ESM 5:				1 919	
7. Lighting measure	Dismantling of luminaires (whole units)	psc	2.81	150	422
	Supply and installation of new luminaires	psc	23.26	150	3 489
	Supply and mounting of LED cigars	psc	10.74	300	3 222
	Dismantling of incandescent lamps, supply and installation of energy saving lamps	psc	3.58	20	72
	Collection, transport and disposal of lighting waste to landfill up to 20 kilometers	m ³	30.68	2	61
Total ESM 5:				7 265	
Total:				143 700	

¹ Cost assumptions are based on analyze of normal practice of local contractors and usage of the guide prices in construction - the last published edition (01.2016). Usage of trade marks is not permitted by the regulator. All the materials has to be chosen by their basic characteristics. All costs are considered at average level - neighter conservative, nor optimistic.

4.1.6. Information about investments and savings according to the measures applying

Additional activities

Type of Measures	Investments (BGN)
Related to external walls ESM	6 118
Related to roof ESM	1 303
Related to basement ESM	437
Related to joinery replacement	2 807
Related to switching the heating from local to DHS supply	15 645
Related to switching the DHW from local to DHS supply	375
Related to Lighting ESM	1 421
Total:	28 105

Energy consumption

Items	Object
Type of object	hospital
Gross floor area (sq.m.)	3572
Type of heat energy before the project	Natural gas
Type of heat energy after the project	Central Heating Energy
Class of the building before the project	E
Class of the building after the project	B

Energy Prices (BGN/kWh)	Before the project (historical)	After the project
Electical energy	0.14	0.15
Heat Energy (type of fuel)	0.09	0.07
Example: Diesel		
Example: Gas		

Object 1	Pre-project Consumption		Normalized consumption		Consumption after the project	
	kWh	BGN	kWh	BGN	kWh	BGN
Total consumption	1 389 724	128 921	1 387 731	129 264	323 504	28 117
Electrical energy	76 913	10 768	87 374	12 232	64 407	9 727
Heat Energy	1 312 811	118 153	1 300 357	117 032	259 097	18 390