

D.T3.5.2 RENOVATION PLAN FOR PILOT SCHOOLS

Poland

Version 1
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1. Aim of the document

Pilot schools have been involved in a series of activities within WP T3, including the following:

1. Data collection - preliminary data have been collected, such as historical energy consumption and building technical schemes.
2. On site energy audits - pilot schools have been visited and energy audits have been conducted. As a result, reports describing building energy performance have been drafted.
3. Improvement options - based on on-site energy audits results, energy efficiency measures have been proposed so that nZEB standard could be reached.
4. Optimal financing schemes - using the Financial App, plans of financing the renovation measures have been proposed.
5. Carbon footprint of restoration - using the ERE App, the improvement of building carbon footprint has been calculated.

The overall objective of these tasks was to develop a renovation plan aimed at transformation of existing educational buildings into nearly zero-energy ones. Using a comprehensive approach, renovation proposal is composed of not only technical improvements, but also financial scheme and calculation of carbon footprint of the restoration. Results of each step are described in dedicated national reports:

- D.T3.2.1 Data collection,
- D.T3.2.2 On site Energy Audits,
- D.T3.2.3 Energy simulations and technical improvement options,
- D.T3.2.4 Development of optimal financing plan,
- D.T3.2.5 Carbon footprint of restoration.

The aim of this document is to summarise renovation options that have been developed and proposed within WP T3 tasks.



2. Renovation plan for SP 61 (ul. Białobrzaska 27, 02-340 Warszawa)

2.1. Current state of the building

Building name	SP 61
Street, number, city and postcode	ul. Białobrzaska 27, 02-340 Warszawa
Country	Poland
Construction year	1956 / 1998
Total useful area [m2]	2450
Primary energy consumption [kWh/m ² a]	318.9
Final energy consumption [kWh/m ² a]	287.7
CO2 emissions [kg/m ² a]	105.56

Building picture:





2.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls with 14 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	205,830	185,247	68.39	6,223	91,924	15
Windows modernisation	Exchange of old windows with new ones of U-value = 1.1 W/m ² K	88,204	79,383	29.31	2,667	136,360	51
Roof insulation	Insulation with 18 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K	156,159	140,543	51.89	4,721	36,767	8
Heating source modernisation	Changes in time of a district heating heat exchanger usage	85,466	93,400	28.40	2,583	11,628	5
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones	38,020	114,060	27.30	2,829	55,261	20
Heating control automation	Installation of weather forecast heating control system	54,242	48,818	18.02	1,407	2,326	2
Mechanical ventilation with heat recovery	Installation of mechanical ventilation system with heat recovery.	73,796	46,175	24.52	1,942	113,953	51



Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	18,526	55,580	13.3	1,379	46,051	33
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2,828	65,116	23



2.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
559,386	26,579	21.05	1.50%	-240,722	0.60%	-407,653	-1.22%	-562,114	-2.48%	-659,685	-3.15%	80%	222,751	17.17%	54%	0	5.00%



2.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	748,407.00	180,366.00
Electricity	0.00	0.00
Total	748,407.00	180,366.00



3. Renovation plan for SP 340 building B

3.1. Current state of the building

Building name	Szkoła Podstawowa nr 340 (d.G95)
Street, number, city and postcode	Lokajskiego 3 02-793 Warszawa
Country	Poland
Construction year	1991
Total useful area [m2]	2,630
Primary energy consumption [kWh/m²a]	162.5
Final energy consumption [kWh/m²a]	127.4
CO2 emissions [kg/m²a]	47.59

Building pictures:





3.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls with 8 cm (1 st stage building) and 6 cm (2 nd and 3 rd stage buildings) of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	51,974	46,777	17.27	1,571	102,254	65
Foundation walls	Insulation with 4 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K	4,051	3,646	1.35	122	20,722	169
Roof insulation	Insulation with 4 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K	14,880	13,392	4.94	450	109,539	243
Heating source modernisation	Exchange of the old convectors with new plate heaters with thermostats. Changes in time of a district heating heat exchanger usage	45,026	40,523	14.96	1,361	51,395	38
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones	66,869	200,606	48.01	4,976	97,193	20
Heating control automation	Installation of weather forecast heating control system	84,764	76,287	28.17	2,330	2,326	1
Mechanical ventilation	Installation of mechanical ventilation system with heat recovery.	99,961	38,468	33.22	3,022	262,060	87



with heat recovery							
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	32,585	97,754	23.40	2,425	80,994	33
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2,828	65,116	23



3.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
791,599	19,085	41.48	1.50%	-601,776	-4.18%	-1,276,815	-7.55%	-1,837,407	-9.19%	-2,338,593	-10.28%	80%	44,335	6.89%	76%	0	5.00%



3.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	833,689.00	200,919.00
Electricity	0.00	0.00
Total	833,689.00	200,919.00



4. Renovation plan for SP 378

4.1. Current state of the building

Building name	Szkoła Podstawowa nr 378 (d. G 143)
Street, number, city and postcode	Bartnicza 8 03-358 Warszawa
Country	Poland
Construction year	1974-1976 / 2006
Total useful area [m2]	7,057
Primary energy consumption [kWh/m ² a]	162.1
Final energy consumption [kWh/m ² a]	140.7
CO2 emissions [kg/m ² a]	44.10

Building picture:





4.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls with 10 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	100,845	90,760	31.90	3,049	87,652	29
Foundation walls	Insulation with 6 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K	11,529	10,375	3.65	349,	102,438	294
Windows modernisation	Exchange of old windows with new ones of U-value = 1.1 W/m2K	57,186	51,467	18.09	1,729	293,933	170
Roof insulation	Insulation with 12 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K	88,943	80,048	28.13	2,689	96,056	36
Heating source modernisation	Exchange of the old convectors and iron ribbed heaters with new plate heaters with thermostats.	117,549	105,793	37.13	3,554	50,419	15
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones	50,565	151,693	36.31	3,763	82,994	22
Heating control automation	Installation of weather forecast heating control system	130,057	117,050	41.13	3,699	2,326	1
Mechanical ventilation	Installation of mechanical ventilation system with heat recovery.	122,377	64,915	22.81	3,700	264,698	72



with heat recovery							
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	26,143	78,429	18.77	1,946	69,995	36
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2828	65,116	23



4.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
1,115,627	26,957	41.39	1.50%	-847,259	-4.16%	-1,794,033	-7.52%	-2,578,466	-9.17%	-3,276,421	-10.24%	80%	63,392	6.92%	76%	0	5.00%



4.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	1,373,990.00	331,132.00
Electricity	0.00	0.00
Total	1,373,990.00	331,132.00



5. Renovation plan for SP 341

5.1. Current state of the building

Building name	Szkoła Podstawowa nr 341
Street, number, city and postcode	Oławska 3 01-494 Warszawa
Country	Poland
Construction year	1993-1998 / 2006
Total useful area [m2]	7,791
Primary energy consumption [kWh/m²a]	140.7
Final energy consumption [kWh/m²a]	119.7
CO2 emissions [kg/m²a]	44.83

Building picture:





5.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls with 4-5 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	74,909	34,295	11.98	2,265	148,163	65
Windows modernisation	Exchange of old windows with new ones of U-value = 1.1 W/m ² K.	142,046	127,842	44.66	4,294	267,430	62
Roof insulation	Insulation with 12 cm for the building part built in stage I, 6 cm for stage II, 2 cm for stage III and 4 cm for stage IV. Each insulation will be made of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	25,232	22,709	7.93	763	152,302	200
Heating source modernisation	Changes in time of a district heating heat exchanger usage.	32,142	28,928	10.11	972	11,628	12
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones.	61,163	183,488	43.91	4,552	101,599	22
Heating control automation	Installation of weather forecast heating control system.	56,900	51,210	17.89	1,488	2,326	2
Mechanical ventilation	Installation of mechanical ventilation system with heat recovery.	117,682	37,901	13.24	3,558	362,372	102



with heat recovery							
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	31,623	94,868	22.71	2,353	84,666	36
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2,828	65,116	23



5.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
1,195,602	23,073	51.82	1.50%	-989,973	-5.54%	-2,916,826	-10.41%	NA	NA	NA	NA	80%	-22,293	4.35%	81%	0	5.00%



5.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	1,693,150.00	408,049.00
Electricity	0.00	0.00
Total	1,693,150.00	408,049.00

6. Renovation plan for SP 77

6.1. Current state of the building

Building name	Szkoła Podstawowa nr 77
Street, number, city and postcode	Samogłoski 9 01-494 Warszawa
Country	Poland
Construction year	1963 / 2017
Total useful area [m ²]	9781
Primary energy consumption [kWh/m ² a]	157.6
Final energy consumption [kWh/m ² a]	112.8
CO ₂ emissions [kg/m ² a]	42.96

Building picture:





6.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
Heating source modernisation	Changes in time of a gas boiler usage.	25,104	27,615	8.342	759	16,279	14
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones.	24,821	74,466	17.821	1,847	41,232	22
Heating control automation	Installation of weather forecast heating control system.	18,084	19,893	6.009	314	2,326	7
Mechanical ventilation with heat recovery	Installation of mechanical ventilation system with heat recovery.	110,231	98,977	36.628	3,333	125,433	38
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	12,833	38,501	9.214	955	13,744	14
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	173,736	-	2,828	65,116	23



6.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
264,130	10,036	26.32	1.50%	-149,096	-1.10%	-254,059	-3.23%	-340,525	-4.50%	-397,146	-5.18%	80%	68,942	13.22%	63%	0	5.00%



6.4. Carbon footprint of restoration

Deliverable D.T3.2.3 does not include information to evaluate improvement solutions applicable in the ERE app for the school building.



7. Renovation plan for SP 28

7.1. Current state of the building

Building name	Szkoła Podstawowa nr 28
Street, number, city and postcode	Gościeradowska 18/20 03-535 Warszawa
Country	Poland
Construction year	1964/ 1994 (heating source exchange)
Total useful area [m2]	3521.2
Primary energy consumption [kWh/m²a]	181.1
Final energy consumption [kWh/m²a]	158.8
CO2 emissions [kg/m²a]	58.8

Building picture:





7.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls with 14 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	165,048	148,543	54.842	4,990	81,664	16
Foundation walls	Insulation with 10 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	4,765	4,289	1.583	144	9,220	64
Windows modernisation	Exchange of old windows in the sport hall with new ones of U-value = 1.1 W/m ² K.	3,720	3,349	1.236	112	27,473	244
Roof insulation	Insulation with 14 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	67,177	60,460	22.322	2,031	62,390	31
Heating source modernisation	Exchange of the old iron ribbed convectors with new plate heaters with thermostats. Changes in time of a district heating heat exchanger usage.	96,546	86,892	32.080	2,919	64,093	22
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones.	37,612	103,192	27.005	2,799	54,850	20
Heating control automation	Installation of weather forecast heating control system.	85,009	76,509	28.247	2,337	2,326	1



Mechanical ventilation with heat recovery	Installation of mechanical ventilation system with heat recovery.	129,718	85,169	43.103	3,922	163,777	42
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	17,072	51,216	12.258	1,270	139,753	14
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2,828	65,116	23



7.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
670,662	23,352	28.72	1.50%	-408,606	-1.72%	-710,048	-4.02%	-949,899	-5.30%	-1,110,423	-6.00%	80%	144,072	11.85%	66%	0	5.00%



7.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	655,034.00	157,863.00
Electricity	0.00	0.00
Total	655,034.00	157,863.00



8. Renovation plan for SP 277

8.1. Current state of the building

Building name	Szkoła Podstawowa nr 277
Street, number, city and postcode	Suwalska 29 03-252 Warszawa
Country	Poland
Construction year	1970
Total useful area [m ²]	3753
Primary energy consumption [kWh/m ² a]	184.4
Final energy consumption [kWh/m ² a]	173.1
CO ₂ emissions [kg/m ² a]	61.86

Building picture:





8.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls of the sport hall with 8 cm and the other part of the building with 14 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	128,852	115,966	42.815	3,896	84,384	22
Foundation walls	Insulation with 10 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	8,730	7,857	2.901	264	22,160	84
Windows modernisation	Exchange of old windows with new ones of U-value = 1.1 W/m ² K.	134,206	120,785	44.594	4,057	208,391	51
Roof insulation	Insulation of the sport hall's roof with 10 cm and the rest building's roof with 14 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	43,764	39,388	14.542	1,323	53,829	41
Heating source modernisation	Exchange of the old iron ribbed convectors with new plate heaters with thermostats.	66,548	59,893	22.113	2,012	45,395	23
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones.	25,300	75,901	18.165	1,883	42,027	22
Heating control automation	Installation of weather forecast heating control system.	112,371	101,133	37.339	3,165	2,326	1



Mechanical ventilation with heat recovery	Installation of mechanical ventilation system with heat recovery.	208,526	151,956	69.289	6,304	174,558	28
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	13,081	39,243	9.391	973	14,009	14
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2,828	65,116	23



8.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
1,115,627	26,957	41.39	1.50%	-847,259	-4.16%	-1,794,033	-7.52%	-2,578,466	-9.17%	-3,276,421	-10.24%	80%	63,392	6.92%	76%	0	5.00%



8.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	937,679.00	225,981.00
Electricity	0.00	0.00
Total	937,679.00	225,981.00

9. Renovation plan for SP 26

9.1. Current state of the building

Building name	Szkoła Podstawowa nr 26
Street, number, city and postcode	Miedziana 8 03-252 Warszawa
Country	Poland
Construction year	1890/1960/2002-2007
Total useful area [m2]	5594
Primary energy consumption [kWh/m ² a]	156.1
Final energy consumption [kWh/m ² a]	142.4
CO2 emissions [kg/m ² a]	51.38

Building picture:





9.2. Renovation options

Measure name	Measure scope	Final energy savings [kWh/a]	Primary energy savings [kWh/a]	CO ₂ reduction [Mg/a]	Financial savings [EUR/a]	Investment costs [EUR/a]	Payback time [years]
External walls insulation	Insulation of the external walls with 4 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	132,383	119,145	43.988	4,002	98,056	24
Foundation walls	Insulation with 10 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	10,862	9,776	3.609	328	15,183	46
Roof insulation	Insulation of the roof of the non-historical parts of the building with 18 cm of polystyrene with thermal conductivity parameter of $\lambda=0.04$ W/m•K. Insulation of the roof of the historical part of the building with 18 cm of mineral wool with thermal conductivity parameter of $\lambda=0.04$ W/m•K.	143,908	129,517	47.818	4,351	69,614	16
Heating source modernisation	Changes in time of a district heating heat exchanger usage. Installation of thermostatic valves in the canteen.	93,113	83,802	30.940	2,815	12,326	4
Lighting modernisation	The modernisation of the lighting system includes exchanging fluorescent bulbs with LED ones.	34,145	105,066	24.516	2,541	58,801	23
Heating control automation	Installation of weather forecast heating control system.	52,360	47,124	17.398	1,350	2,326	2



Mechanical ventilation with heat recovery	Installation of mechanical ventilation system with heat recovery.	189,010	128,403	62.804	5,714	238,234	42
Lighting control automation	Installation of an automatic control which is based on the amount of light from the outside (DALI system) and presence of people in a room/corridor (motion sensors).	18,302	54,905	13.141	1,362	19,600	14
Photovoltaic system	Installation of PV modules of a capacity of 40 kWp.	-	114,000	-	2,828	65,116	23



9.3. Optimal financing scheme

Investment Costs [€]	Energy cost saving [€/y]	Simple pay-back period	Interest rate	1. Budget financing		2. Credit financing		3. ESCO financing		4. PPP financing		5. Subsidies (ESCO+Subsidy)			6. Financing gap (Subsidy needed to breakeven)		
				NPV	IRR	NPV	IRR	NPV	IRR	NPV	IRR	% subsidy	NPV	IRR	% subsidy	NPV	IRR
559,386	26,579	21.05	1.50%	-240,722	0.60%	-407,653	-1.22%	-562,114	-2.48%	-659,685	-3.15%	80%	222,751	17.17%	54%	0	5.00%



9.4. Carbon footprint of restoration

Energy type	Energy saved [kWh]	Fuel carbon footprint [kg CO ₂ e]
Thermal energy	714,624.00	172,224.00
Electricity	0.00	0.00
Total	714,624.00	172,224.00