Development of optimal financing plan – case: Poland

Deliverable D.T 3.2.4

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1. INTRODUCTION

As any activity, energy renovation has its related costs, which vary according to the depth of the refurbishment, i.e. number and complexity of implemented energy efficiency (EE) measures. Therefore, any decision on energy renovation of a building must carefully evaluate these costs and ensure financing, in order to reap the benefits after the implementation.

The most usually utilised financing models for EE were presented and discussed in the **Deliverable D.T2.2.1 - Collection of existing financing mechanisms**. They include: own funding, loan financing, ESCO model (Energy Performance Cintracting – EPC), public-private partnership (PPP), grant schemes or some combination of the beforementioned models. All financing models may be compared based on several important criteria as demonstrated in the Table below. There is no universally best solution, but for each particular situation (country, region, building) an optimal solution should be tailor-made.

TableError! No text of specified style in document. **1 - Comparative analysis of considered alternative models**

Criteria/ Model	Own financing	Loan financing	Grants	ESCO model	PPP model
Neutral impact on government debt	☺	☹	☺	😐	☺
Administrative procedure complexity	☺	😐	😐	😐	☹
Guarantee of savings / service standard	☹	☹	😐	☺	☺
Capacities and capabilities of the public bodies to implement the model	☺	😐	😐	☹	☹
Estimated multiplier effect	☹	☹	😐	☺	☺
Projects for which the model is appropriate	Simple EE measures with short pay-back periods	Simpler EE measures with shorter pay-back periods	More complex projects, with longer pay-back periods	Highly complex projects, with moderate pay-back periods (up to 10 years)	Highly complex projects, usually with new buildings, long-term

Usually, energy efficiency projects in public buildings combine two financing models. Rarely, more than two financing models are used. Research of usual practices in the Project Partner countries showed that dominantly grants (if available) are combined with own financing.

Recently, with the availability of EU structural and investment funds for energy efficiency across the MS, the blending of such funds with other financing models becomes increasingly interesting. The blending refers to combination of EU grants with other financing mechanism such as loans or ESCO/PPP model.

The deliverables D.T2.2.1 presented available financing models in each participating country and, based on the Project partners' feedback, provided a comparative analysis of availability, current usage and planned usage of different financing models.

This document builds upon the previous data gathered on and analyses of available and desirable financing models and provideds the list of all available incentives and financing mechanisms for energy efficiency actions in Poland.

2. AVAILABLE INCENTIVES AND FINANCING MECHANISMS IN POLAND

2.1. Overview of financing mechanisms for EE

Poland has well developed financing mechanisms for EE projects in schools. Schools are owned by cities and there are well established budget items for planning capital expenditures of investments in schools.

There are several credit lines available for EE projects with two of them - Council of Europe Development Bank and at the European Investment Bank - being the most attractive with interest rates of 1.85%.

There are also many grant schemes using EU financing from European Regional Development Fund or Cohesion Fund (grat rates 80-85%) and there is also national co-financing available from National and Regional Fund for Environmental Protection and Water Management (25-40%).

The ESCO market in Poland is assessed as being at the initial stage of development. PPP models has been prevously used for EE projects in limited number of municipalities.

Table 2 - Overview of financing mechanisms for EE projects in schools

Criteria/ Model	Own financing	Loan financing	Grants	ESCO model	PPP model
Availability	√	√	√	√	√
Previous and current usage	√	√	√	-	-
Planned usage	√	√	√	-	-

In table below the sources for more inromation on financing mechanisms for EE are provided.

Table 3 - Overview of sources for more information about financing mechanisims for EE

Information	Source
General information about EE	City of Warsaw http://infrastruktura.um.warszawa.pl/ National Fund for Environmental Protection and Water Management www.nfosigw.gov.pl Cluster – Bioenergy for Region http://www.bioenergiadlaregionu.eu/centrum-transferu-technologii-

	oze/laboratorium-efektywnosci-energetycznej/
Information about loan financing	Bank Gospodarstwa Krajowego www.bgk.pl BOS Bank https://www.bosbank.pl/
Information about ESCO financing	ESCO in Poland www.escowpolsce.pl
Information about PPP financing	Public-Private Partnership Platform www.ppp.gov.pl

2.2. List of incentives for EE

Analysis of energy efficiency improvements' costs and benefits in the selected schools demonstared that EE projects need high grants in order to demonstrate financial feasibility. It is, therefore, very important to ensure incentives in form of grants as well as to inform potential users on their existance and terms and conditions for their utilisation.

An overview of available incentives for EE projects in schools in Poland is given in Table below.

Table 4 - Overview of incentives and financing mechanisms for EE projects in schoolsin Poland

Criteria/ Model	Grant programme 1	Grant programme 2
Name of institution	Mazovian Unit for Implementation of EU Programmes	National Fund for Environmental Protection and Water Management
Name and description of grant	Regional Operational Programme of Mazovia Voivodship 2014-2020, Measure 4.2 Energy efficiency - Energy renovation of buildings and use of renewable energy sources in the public sector buildings	Priority program "Improving air quality. Part 6) Public utility buildings with a higher energy efficiency standard"
Max. percentage of subsidy (%)	80%	40%
Max. value of subsidy (€)	€ 813.953,49	-
Availability	periodical	periodical
Legislative reference	ERDF	Act of 27 April 2001 on Environmental Protection Law (Journal of Laws of 2017, item 519, as amended),
Possible combination with other incetives/financing mechanisms	YES	YES
More info	https://www.funduszedlamazowsza.eu	http://nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/poprawa-jakosci-powietrza-energetyczne/

Criteria/ Model	Grant programme 2	Grant programme 3
Name of institution	Ministry of Environment of	Regional Fund for Environmental

	Investment and Development	Protection and Water Management in Warsaw
Name and description of grant	Technical Assistance Operational Programme (Cohesion Fund) – Call for PPP advisory services	Programme OA-2 "Modernisation of electrical lighting"
Max. percentage of subsidy (%)	90%	20%
Max. value of subsidy (€)	-	-
Availability	constant	constant
Legislative reference	Cohesion Fund	Act of 27 April 2001 on Environmental Protection Law (Journal of Laws of 2017, item 519, as amended)
Possible combination with other incetives/financing mechanisms	YES	YES
More info	http://www.ppp.gov.pl/Aktualnosci/Strony/Wielosektorowy_nabor_projektow_ppp.aspx	http://wfosigw.pl/strefa-beneficjenta/programy2019/JST/OA_2

Criteria/ Model	**Grant programme 5**
Name of institution	Regional Fund for Environmental Protection and Water Management in Warsaw
Name and description of grant	Programme OA-1 "Reducing emissions of pollutants into the air, reducing heat consumption and the use of renewable energy sources"
Max. percentage of subsidy (%)	25%
Max. value of subsidy (€)	-
Availability	constant
Legislative reference	Act of 27 April 2001 on Environmental Protection Law (Journal of Laws of 2017, item 519, as amended)
Possible combination with other incetives/financing mechanisms	YES
More info	http://www.ppp.gov.pl/Aktualnosci/Strony/Wielosektorowy_nabor_projektow_ppp.aspx

3. ASSESSMENT OF THE NEED FOR INCENTIVES FOR EE PROJECTS

3.1. Description of the model

The feasibility of EE projects depends on both technical potentials of applied mesures in terms of energy savings and on the conditions of financing mechanisms available for their support.

Within FEEDSCHOOLS project, a calculation model has been developed aiming at analysing different possible financing models for a given school and deciding on the optimal model. Calculation parameters,

like available grant rates or loan interest rates are obtained through feedback of Project partners and are presented in Table below.

Table 5 - Overview of incentives for EE projects in schools

Criteria/ Model	Value
Interest rate	1,50%
Discount rate	5%
Life cycle of EE renovation (years)	25
Administrative, legal and architect cost	10%
Other bank cost	3%
ESCO cost	20%
PPP cost	30%
Max % of grant available	80%

The analysis included following model: 1) budget financing; 2) loan (credit) financing; 3) ESCO financing; 5) PPP financing and 6) combination of ESCO and subsidy (with 80% subsidy rate). Furthermore, subsidy rate needed to break even is also determined.

The model also uses the results of perfomed energy audits for each shool, which are shown in Table below.

Table 6 - Financial outputs of energy audits for energy renovation of schools in Poland

POLAND Name of school	Floor area [m2]	Investment Costs [€]	Investment € per m2	Cost saving per m2	Energy cost saving [€]	Simple pay-back period
SP 61	2.450	559.386,00	228,32	10,85	26.579,00	21,05
SP 340	2.630	791.599,00	300,99	7,26	19.085,00	41,48
SP 378	3.323	1.115.627,00	335,72	8,11	26.957,00	41,39
SP 341	8.357	1.195.602,00	143,07	2,76	23.073,00	51,82
SP 77	2.304	264.130,00	114,64	4,36	10.036,00	26,32
SP 28	1.976	670.662,00	339,40	11,82	23.352,00	28,72
SP 227	3.792	1.115.627,00	294,21	7,11	26.957,00	41,39
SP26	6.292	559.386,00	88,91	4,22	26.579,00	21,05
AVERAGE	**3.890**	**784.002**	**231**	**7**	**22.827**	**34**

POLAND Name of school	Total energy consumption before renovation (kWh)	Total energy savings after nZEB renovation (kWh)	Energy saving per m2 [kWh/m2]	Energy savings [% of current total energy consumption]	Total energy costs before renovation (€)	Average energy price €/kWh
SP 61	641.571,06	758.243,00	309,49	118,19%	36.875,43	0,06
SP 340	1.014.787,44	438.110,00	166,58	43,17%	53.843,61	0,05
SP 378	1.053.399,11	743.194,00	223,64	70,55%	61.113,43	0,06
SP 341	1.180.681,11	579.697,00	69,37	49,10%	71.472,27	0,06

SP 77	519.538,89	229.073,00	99,42	44,09%	26.183,08	0,05
SP 28	640.772,64	644.667,00	326,25	100,61%	39.450,32	0,06
SP 227	745.067,89	743.194,00	195,99	99,75%	44.236,10	0,06
SP26	740.206,67	758.243,00	120,52	102,44%	48.984,30	0,07
AVERAGE	**817.003**	**611.803**	**189**	**1**	**47.770**	**0,06**

3.2. Results per school for Poland

Based on the established model for determining optimal financing model, the following proposals for each participating school are given. It has to be noted that in the recommendations provided below, the project partners are directed to investigate possibilities for co-financing of energy efficiency via grants from national sources that already exist in their countries. Most of these grant schemes are related to the use of European Structural and Investment Funds, in particular to the use of European Regional Development Fund. These grants are more easily accessible and appropriate for smaller projects, like projects in individual schools.

Recommendation:

All schools have very long repayment period. Due to budget limitations and restrictions to increasing public debt, we recommend using ESCO model in combination with subsidies. We emphasize that percentage of subsidies needed to breakeven is not higher than percentage of subsidies available in Poland (max. 80%), except for one school. However, if this maximal subsidy amount is not obtainabe, i.e. if the subisiddies are not in the range between 54 and 81% depending on the project, these projects will not be economically viable.

POLAND Name of school	Investment Costs [€]	Energy cost saving [€]	Simple pay-back period	Administrative, legal and architect cost (10%)	Interest rate	Credit financing cost	Other bank cost (3%)	ESCO cost (20%)	ESCO financing cost	PPP cost (30%)	PPP financing cost
SP 61	559.386,00	26.579,00	21,05	55.938,60	1,50%	150.149,74	16.781,58	111.877,20	209.515,53	167.815,80	251.147,86
SP 340	791.599,00	19.085,00	41,48	79.159,90	1,50%	651.290,93	23.747,97	158.319,80	1.077.310,92	237.479,70	1.499.336,93
SP 378	1.115.627,00	26.957,00	41,39	111.562,70	1,50%	913.304,70	33.468,81	223.125,40	1.508.081,34	334.688,10	2.094.473,20
SP 341	1.195.602,00	23.073,00	51,82	119.560,20	1,50%	1.890.985,38	35.868,06	239.120,40	#NUM!	358.680,60	#NUM!
SP 77	264.130,00	10.036,00	26,32	26.413,00	1,50%	97.038,59	7.923,90	52.826,00	138.602,55	79.239,00	168.810,80
SP 28	670.662,00	23.352,00	28,72	67.066,20	1,50%	281.321,79	20.119,86	134.132,40	407.160,20	201.198,60	500.617,98
SP 227	1.115.627,00	26.957,00	41,39	111.562,70	1,50%	913.304,70	33.468,81	223.125,40	1.508.081,34	334.688,10	2.094.473,20
SP26	559.386,00	26.579,00	21,05	55.938,60	1,50%	150.149,74	16.781,58	111.877,20	209.515,53	167.815,80	251.147,86

POLAND	1. Budget financing				2. Credit financing				3. ESCO financing			
Name of school	Total cost	Payback	NPV	IRR	Total cost	Payback	NPV	IRR	Total cost	Payback	NPV	IRR
SP 61	615.325	23,15	-240.722	0,60%	782.256	29,43	-407.653	-1,22%	936.717	35,24	-562.114	-2,48%
SP 340	870.759	45,63	-601.776	-4,18%	1.545.798	81,00	-1.276.815	-7,55%	2.106.390	110,37	-1.837.407	-9,19%
SP 378	1.227.190	45,52	-847.259	-4,16%	2.173.963	80,65	-1.794.033	-7,52%	2.958.396	109,75	-2.578.466	-9,17%
SP 341	1.315.162	57,00	-989.973	-5,54%	3.242.016	140,51	-2.916.826	-10,41%	#NUM!	#NUM!	#NUM!	#VALUE!
SP 77	290.543	28,95	-149.096	-1,10%	395.505	39,41	-254.059	-3,23%	481.972	48,02	-340.525	-4,50%
SP 28	737.728	31,59	-408.606	-1,72%	1.039.170	44,50	-710.048	-4,02%	1.279.021	54,77	-949.899	-5,30%
SP 227	1.227.190	45,52	-847.259	-4,16%	2.173.963	80,65	-1.794.033	-7,52%	2.958.396	109,75	-2.578.466	-9,17%
SP26	615.325	23,15	-240.722	0,60%	782.256	29,43	-407.653	-1,22%	936.717	35,24	-562.114	-2,48%

POLAND	4. PPP financing				5. Subsidies (ESCO + Subsidy)					6. Financing gap (Subsidy needed to breakeven)				
Name of school	Total cost	Payback	NPV	IRR	% subsidy	Total cost	Payback	NPV	IRR	% subsidy	Total cost	Payback	NPV	IRR
SP 61	1.034.288	38,91	-659.685	-3,15%	80%	151.852,20	5,71	222.751	17,17%	54%	374.602,95	14,09	0	5,00%
SP 340	2.607.576	136,63	-2.338.593	-10,28%	80%	224.648,25	11,77	44.335	6,89%	76%	268.982,93	14,09	0	5,00%
SP 378	3.656.351	135,64	-3.276.421	-10,24%	80%	316.538,47	11,74	63.392	6,92%	76%	379.930,46	14,09	0	5,00%
SP 341	#NUM!	#NUM!	#NUM!	#VALUE!	80%	347.482,32	15,06	-22.293	4,35%	81%	325.189,58	14,09	0	5,00%
SP 77	538.593	53,67	-397.146	-5,18%	80%	72.504,86	7,22	68.942	13,22%	63%	141.446,83	14,09	0	5,00%
SP 28	1.439.545	61,65	-1.110.423	-6,00%	80%	185.049,62	7,92	144.072	11,85%	66%	329.121,79	14,09	0	5,00%
SP 227	3.656.351	135,64	-3.276.421	-10,24%	80%	316.538,47	11,74	63.392	6,92%	76%	379.930,46	14,09	0	5,00%
SP26	1.034.288	38,91	-659.685	-3,15%	80%	151.852,20	5,71	222.751	17,17%	54%	374.602,95	14,09	0	5,00%

NOTE: When #NUM! is shown in table it means that projects can't cover cost of financing (interests) with projected savings, the monthly cost of financing is greater than monthly saving, thus project can't be repaid.