

D3.4_PHPP Result Sheets

DRAFT

CS02

School, Ros Muc

INTELLIGENT ENERGY – EUROPE II

Energy efficiency and renewable energy in buildings IEE/12/070

EuroPHit

[Improving the energy performance of step-by-step refurbishment and integration of renewable energies]

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Technical References

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Project Coordinator	Jan Steiger Passive House Institute, Dr. Wolfgang Feist Rheinstrasse 44/46 D 64283 Darmstadt jan.steiger@passiv.de
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Author(s)	Mariana Moreira
Co-author(s)	Art McCormack
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Abstract

This overall refurbishment plan provides an overview of the retrofit steps of a step-by-step refurbishment to EnerPHit standard to be undertaken for the project School in Ros Muc.

First, the existing building will shortly be described, including building component and component conditions. In addition, the existing energy efficiency performance of the building will be described.

In a second step, the overall refurbishment plan will describe the retrofit steps to be undertaken until the refurbishment will finally be completed. The EnerPHit standard will be achieved through a sequence of refurbishment steps between 2014 and 2018. The proposed development, in essence, comprises a step-by-step expansion, retrofit and enclosure of open space that includes by default the elimination of many existing external walls by their becoming internal.



Figure 1: Areal view [MosArt, 2013]







1 Existing building: PHPP Result Sheet

EnerPHit verification						
				Gairmscoil Na Bpiaisach-Mai	n Building	
			Street:	Rosmuc, Galway		
	The state was and the		Postcode/City:	Galway		
		4	Country:	Ireland		
		1	Building type:	School		
		-	Climate:	[IE] - Birr		
		1222		Altitude of building site (in [m] above sea level):	
		Part of the	Home owner/client:	VEC		
			Street:			
	HAN DA STORE I W		Postcode/City:			
Architecture:			Mechanical System:			
Street:			Street:			
Postcode/City:			Postcode/City:			
Epergy consulting:			Certification:			
Street			Street:			
Postcode/City:			Postcode/City:			
ar of Construction:	1945	Interior ter	nperature winter [C ⁻]	19.0 Interior temp. summer [C	25.0	
r of dwelling units.	11.0	internal nea	it gains winter (vwn-j	2.8 Ing summer (www.	1 129	
Exterior vol. V :	1700 2			Spect capacity (which per his 124	1 132	
Exterior voi. v _e .	1709.3 m ³			Mechanical cooling	:	
Specific building de	emands with reference to the treated floor area					
	Treated floor area	383.7	m	Requirements	Fulfilled?*	
Space heating	Annual heating demand	316	kWh/(m²a)	25 kWh/(m²a)	no	
	Heating load	102	W/m ²	-	-	
Space cooling	Overall specific space cooling demand		kWh/(m²a)		-	
	Cooling load		W/m ²	_		
	- Frequency of overheating (> 25 °C)	0.0	%	-	-	
Primary Energy	Heating, cooling, dehumidifying,	418	kWh/(m²a)	481 k/Wh/(m²a)	yes	
DHW, space heating and auxiliary electricity			kWh/(m²a)	- -	-	
Specific primary e	Specific primary energy reduction through solar electricity			-	-	
Airtightness	Pressurization test result $n_{\rm 50}$	10.0	1/h] 1 1 <i>/</i> h	no	

1.1 PHPP Result sheet of the existing buildings

Figure 2: Specific energy efficiency values of the existing Main Building modelled with PHPP 9 Beta







Passive House verification						
			Building: Street: Postcode/City: Country: Building type:	Gairmscoil Na Bpiaisach-Met Ros Muc, Galway Galway Ireland School	alworks	
í			Climate:	[IE] - Birr Altitude of building site (in (m) above sea level):	
		-	Street: Postcode/City:			
Architecture:			Mechanical System:			
Street:			Street:			
Postcode/City.			Postcode/City:	· · · · · · · · · · · · · · · · · · ·		
Energy consulting:			Certification:			
Street: Postcode/City:			Street: Postcode/City:			
) (ann af Caratmutian			j i octobaloromy:		05.0	
Jumber of dwelling units:		Interior ter	nperature winter [C1] t daips winter [A0m2]	2.8 HG summer DA/m ²	2 3.0	
Number of Occupants:	4.1		goine miller (milli	Spec. capacity [Wh/K per m ² TFA	132	
Exterior vol. Ve	658.1 m ³			Mechanical cooling	:	
Specific building der	nands with reference to the treated floor area					
	Treated floor area	142.5	m	Requirements	Fulfilled?*	
Space heating	Annual heating demand	267	kWh/(m²a)	15 k/Vh/(m²a)	no	
	Heating load	94	W/m ²	10 VWm²	no	
Space cooling	Overall specific space cooling demand		kWh/(m²a)	-	-	
	Cooling load		W/m ²	-	-	
	Frequency of overheating (> 25 °C)	0.0	%	-	-	
Primary Energy	Heating, cooling, dehumidifying, DHW,	397	kWh/(m²a)	120 kWh/(m²a)	no	
DHW	346	kWh/(m²a)	-	-		
Specific primary er	nergy reduction through solar electricity		kWh/(m²a)	-	-	
Airtightness	Pressurization test result $n_{\mbox{\scriptsize so}}$	10.0	1/h	0.6 1/h	no	

Figure 3: Specific energy efficiency values of the existing Metalworks modelled with PHPP 9 Beta







Passive House verification						
		Building: Street: Postcode/City: Country: Building type: Climate:	Gairmscoil Na Bpiaisach- Ros Muc, Galway Galway Ireland School	Classroom		
		Home owner/client: Street: Postcode/City:	Attitude of building site (in [m] above sea lev	el):		
Architecture: Street: Postcode/City:	re: Mechanical System: et: Street: ty: Postcode/City:					
Energy consulting: Street: Postcode/City:	Energy consulting: Certification: Street: Street: Street: Postcode/City: Postcode/City:					
Number of Construction: Number of dvelling units: Number of Occupants: Exterior vol. V _e : 211.3 m ^a	19.0 interior temp. summer [2.8 IHG summer [W/r Spec. capacity [Wh/K per m ² TF Mechanical cooli	m ²] 25.0 m ²] 2.8 FA] 132 ng:				
Specific building demands with reference to the treated floor are	ва					
Treated floor area Space heating Annual heating demand	53.3 253	m [*] kWh/(m ² a)	Requirements 15 kWh/(m²a)	Fulfilled?*		
Heating load Space cooling Overall specific space cooling demand	84	W/m ² kWh/(m ² a)	10 [°] W/m²	no -		
Cooling load Frequency of overheating (> 25 °C)	0.0	W/m ²	-	-		
Heating, cooling, dehumidifying, DHW, chack beating and auxiliany electricity.	468	kWh/(m ² a)	⊿ 120 kWh/(m²a)	no		

Figure 4: Specific energy efficiency values of the existing Classroom/Office modelled with PHPP 9 Beta







2 Retrofit steps

2.1 Overall refurbishment Plan

2.1.1 Retrofit steps:

The upgrading works will be initiated in 2014 and it is likely that they will be completed before 2018, depending on funding made available from the Department of Education and Skills as well as other national sources. The timeframe for the step-by-step works is provided below, allowing for some degree of flexibility in respect of monies being made available.

Step No.	Year	Measures	Specific Heating Demand	Specific Primary Energy Demand
	1945			
1	1960	Existing Buildings	316	418
2	2014	New Roof to Main Building & Metalwork Block, 4 new Classrooms	150	280
		External walls refurbished to all existing buildings and new roof to		
3	2016	Classroom/Office. New Classrooms Built.	115	250
4	2016	Replacement of windows & doors	93	220
5	2016	Airtightness to 1 air changes per hour @ 50 Pa & MHRV installed	51	115
6	2016	Condensing Gas Boiler & new radiators installed	51	98
7	2018	Enclosure of central space to Passive House standard	18	56

Figure 5: Overview refurbishment steps







2.1.2 Efficiency Improvements



Figure 6: Overview energy efficiency improvement according to the overall refurbishment plan







3 Completion of step-by-step refurbishment to EnerPHit

3.1 PHPP Result Sheet of the completed EnerPHit standard

EnerPHit verification

Building: Street: Postcode / City: Country: Building type: Climate:	Gairmscoil Rosmuc, Gai Galway Ireland School [IE] - Birr	Na Bpiaisach-Prop Iway	posal			
Home owner J Clight	IRC					
Home owner r Client:	VEC					
Postcode/Citu						
A						
Architecture:						
Street: Rostcode / Citu						
r ostoder city.						
Mechanical system:						
Street: Destande / City						
Postcode ricity:		1				
Year of construction:	2018	Interior ter	nperature winte	r: 19.0	°C Enclosed volume V, m ^a	6834.6
No. of dwelling units:	1	Interior temp	erature summe	r: 25.0	で Mechanical cooling	:
NO. OF OCCUPANTS: Spec. capacity:	122	Whilk per m³ TEA	nt sources winte Ditto summe	r: 2.8	wm ⁻	
	1.52		Dicto Samine	2.0		
Specific building dema	ands with reference	to the treated floor area				
		Treated floor area	1184.7	m	Requirements	Fulfilled?"
Space heating		Heating demand	18	kWh/(m²a)	25 kWh/(m³a)	yes
		Heating load	11	W/m ²	2	-
Space cooling	Overall spe	cif. space cooling demand		kWb/(m²a)		
		Cooling load		W/m ²		-
	Frequen	- icy of overheating (> 25 °C)	0.1	%	?	-
Primary energy	Heating, cooling,	dehumidification, DHW,	56	kWh/(m²a)	124 kWh/(m³a)	yes
	DHW, space hea	iting and auxiliary electricity	56	kiAlbi(m ² a)		-
Spacific priz	maru energu reducti	on through solar electricity		Multi (m ² n)		
opeone pri	mary energy reduction	on an ough solar electricity		kvvn/m a)		
Airtightness	P	ressurization test result n _{st}	0.6	1/h	1 1/h	yes
					empty rield: data missing; -	: no requirement

EnerPHit building retrofit (according to heating demand)?

Figure 7: Specific energy efficiency values of the completed project modelled with PHPP 8





yes