D3.4_PHPP Result Sheets

DRAFT

CS01

Home for Elderly, Dun Laoghaire

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]

Contract N°: SI2.645928

Co-funded by the Intelligent Energy Europe Programme of the European Union

Technical References

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Project Title	Improving the energy performance of step-by-step refurbishment and integration of renewable energies
Project Coordinator	Jan Steiger Passive House Institute, Dr. Wolfgang Feist Rheinstrasse 44/46 D 64283 Darmstadt jan.steiger@passiv.de
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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 Home for Elderly.

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 by: a) externally insulate the existing walls; b) replace existing double glazed windows to passive house windows; c) carefully airtight the building at each junction and fully plaster the external walls, d) heat recovery ventilation unit for each apartment, community areas and circulation areas; e) install a micro CHP (combined heat and power) with gas condenser boiler connected to radiators installed throughout the building.

Figure 1: Northwest view [MosArt, 2013]

Co-funded by the Intelligent Energy Europe Programme of the European Union

1 Existing building: PHPP Result Sheet

1.1 PHPP Result sheet of the existing building

EnerPHit verification

Building:	Block One Rochestown House		
Street:	Sallynogin Road Upper		
Postcode/City:	Dún Laoghaire		
Country:	Ireland		
Building type:	Home for Elderly		
Climate:	[IE] - Dublin		
Altitude of building site (in [m] above sea level):	–		
Home owner/client:	DLR CC		
Street:	Dún Laoghaire		
Postcode/City:	Dún Laoghaire		
Architecture:	DLR CC	Mechanical System:	
Street:	Dún Laoghaire	Street:	
Postcode/City:	Dún Laoghaire	Postcode/City:	
Energy consulting:		Certification:	
Street:		Street:	
Postcode/City:		Postcode/City:	

Year of Construction:	1960	Interior temperature winter [°C]	20.0	Interior temp. summer [°C]	25.0
Number of dwelling units:	34	Internal heat gains winter [W/m²]	4.1	IHG summer [W/m²]	4.1
Number of Occupants:	46.1			Spec. capacity [Wh/K per m² TFA]	204
Exterior vol. V_e:	6339.6 m³			Mechanical cooling:	

Specific building demands with reference to the treated floor area

				Requirements	Fulfilled?*
	Treated floor area	1613.3	m²		
Space heating	Annual heating demand	354.08	kWh/(m²a)	25 kWh/(m²a)	no
	Heating load	110	W/m²	-	-
Space cooling	Overall specific space cooling demand		kWh/(m²a)	-	-
	Cooling load		W/m²	-	-
	Frequency of overheating (> 25 °C)	0.0	%	-	-
Primary Energy	Heating, cooling, dehumidifying, DHW,	688	kWh/(m²a)	527 kWh/(m²a)	no
	DHW, space heating and auxiliary electricity	604	kWh/(m²a)	-	-
	Specific primary energy reduction through solar electricity		kWh/(m²a)	-	-
Airtightness	Pressurization test result n_{50}	5.0	1/h	1 1/h	no

EnerPHit (Modernisierung): Bauteilkennwerte

Gebäudehülle	Außendämmung zu Außenluft	4.05	W/(m²K)	-	-
mittlere U-Werte	Außendämmung zu Erdreich	3.85	W/(m²K)	-	-
	Innendämmung zu Außenluft		W/(m²K)	-	-
	Innendämmung zu Erdreich		W/(m²K)	-	-
	Wärmebrücken ΔU	0.00	W/(m²K)	-	-
	Fenster	1.71	W/(m²K)	-	-
	Außentüren		W/(m²K)	-	-
Lüftungsanlage	eff. Wärmebereitstellungsgrad		%	-	-

*empty field: data missing; '-': no requirement

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

2 Retrofit steps

2.1 Overall refurbishment Plan

2.1.1 Retrofit steps:

This Client is willing to complete the EnerPHit standard refurbishment of this building in one phase – the first refurbishment step that includes the additional floor, entrance area and vertical circulation area to Passive House standards and the refurbishment of existing walls, windows and door. We propose that a Solar hot water system will be installed on the roof by 2020, as the second phase of the refurbishment of this building.

Step No.	Year	Measures	Specific Heating Demand [kWh/m²a]	Specific Primary Energy Demand [kWh/m²a]	Additional Specific PV Gains
1	1960	Existing Building	354	688	
2	2014	EnerPHit standard refurbishment	24	109	
3	2020	Solar Panels	24	95	0

Figure 3: Overview refurbishment steps

2.1.2 Efficiency Improvements

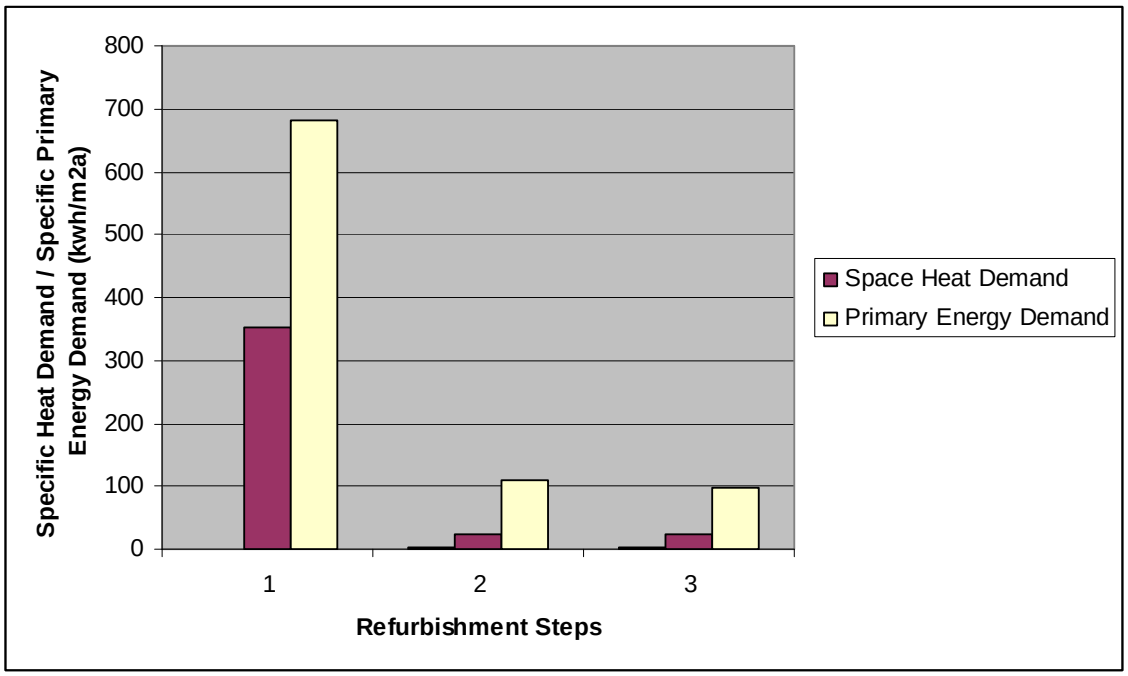
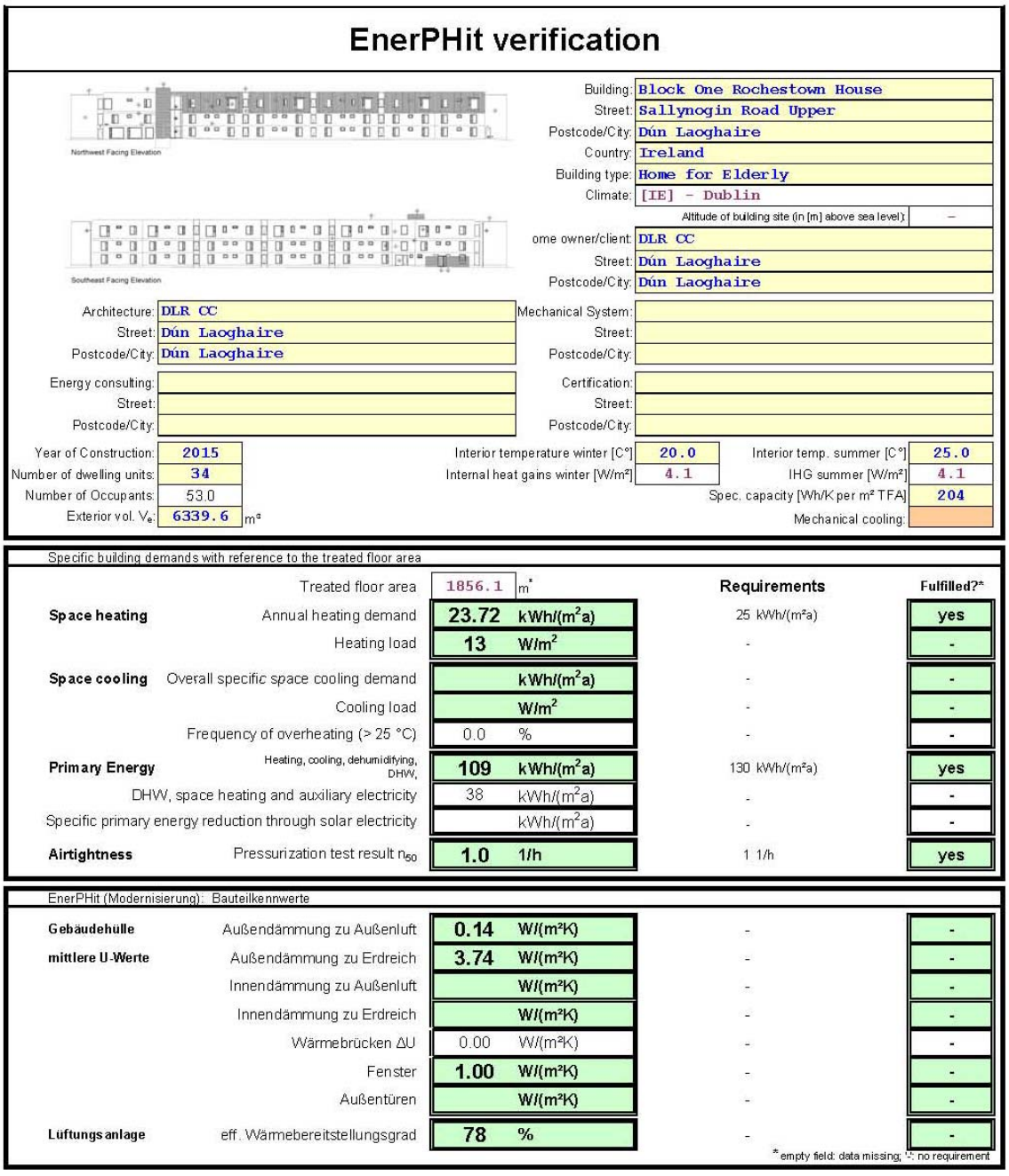


Figure 4: Overview energy efficiency improvement according to the overall refurbishment plan

3 Completion of step-by-step refurbishment to EnerPHit

3.1 PHPP Result Sheet of the completed EnerPHit standard



EnerPHit verification

Northwest Facing Elevation

Southeast Facing Elevation

Building:	Block One Rochestown House
Street:	Sallynogin Road Upper
Postcode/City:	Dún Laoghaire
Country:	Ireland
Building type:	Home for Elderly
Climate:	[IE] - Dublin
Altitude of building site (in [m] above sea level):	–
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Street:	Dún Laoghaire
Postcode/City:	Dún Laoghaire

Architecture:	DLR CC	Mechanical System:	
Street:	Dún Laoghaire	Street:	
Postcode/City:	Dún Laoghaire	Postcode/City:	
Energy consulting:		Certification:	
Street:		Street:	
Postcode/City:		Postcode/City:	

Year of Construction:	2015	Interior temperature winter [C°]	20.0	Interior temp. summer [C°]	25.0
Number of dwelling units:	34	Internal heat gains winter [W/m²]	4.1	IHG summer [W/m²]	4.1
Number of Occupants:	53.0			Spec. capacity [Wh/K per m² TFA]	204
Exterior vol. V_e:	6339.6 m³			Mechanical cooling:	

Specific building demands with reference to the treated floor area

				Requirements	Fulfilled?*
	Treated floor area	1856.1	m²		
Space heating	Annual heating demand	23.72	kWh/(m²a)	25 kWh/(m²a)	yes
	Heating load	13	W/m²	-	-
Space cooling	Overall specific space cooling demand		kWh/(m²a)	-	-
	Cooling load		W/m²	-	-
	Frequency of overheating (> 25 °C)	0.0	%	-	-
Primary Energy	Heating, cooling, dehumidifying, DHW,	109	kWh/(m²a)	130 kWh/(m²a)	yes
	DHW, space heating and auxiliary electricity	38	kWh/(m²a)	-	-
	Specific primary energy reduction through solar electricity		kWh/(m²a)	-	-
Airtightness	Pressurization test result n_{50}	1.0	1/h	1 1/h	yes

EnerPHit (Modernisierung): Bauteilkennwerte

Gebäudehülle	Außendämmung zu Außenluft	0.14	W/(m²K)	-	-
mittlere U-Werte	Außendämmung zu Erdreich	3.74	W/(m²K)	-	-
	Innendämmung zu Außenluft		W/(m²K)	-	-
	Innendämmung zu Erdreich		W/(m²K)	-	-
	Wärmebrücken ΔU	0.00	W/(m²K)	-	-
	Fenster	1.00	W/(m²K)	-	-
	Außentüren		W/(m²K)	-	-
Lüftungsanlage	eff. Wärmebereitstellungsgrad	78	%	-	-

*empty field: data missing; '-': no requirement

Figure 5: Specific energy efficiency values of the completed project modelled with PHPP 9 Beta