EuroPHit

D3.4_PHPP Result Sheets

DRAFT

CS05 Courcelles-Lès-Lens

Social Apartment building

SIA Habitat Courcelles-Lès-Lens

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

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Technical References

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Abstract

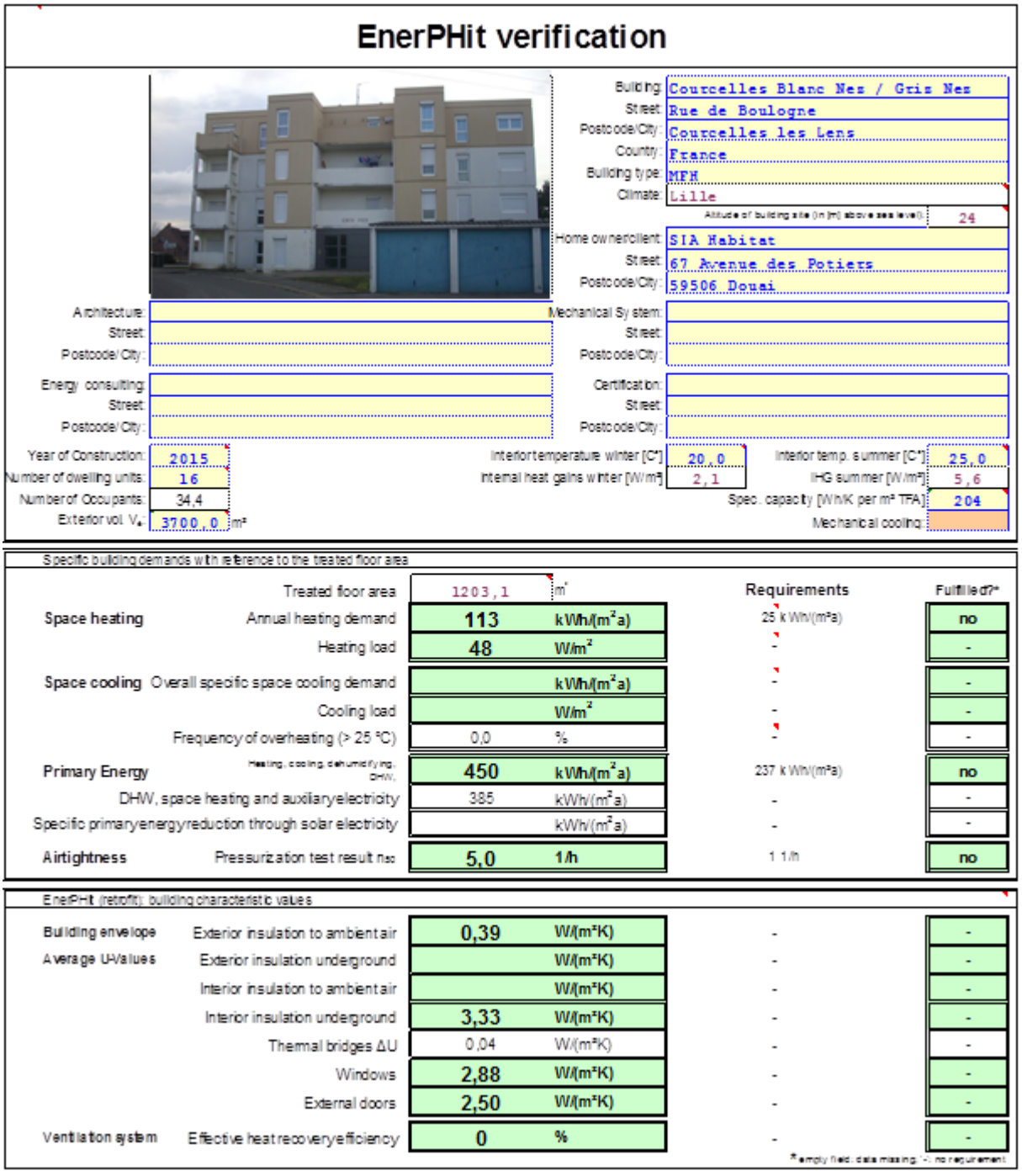
This document provides a short overview of the efficiency improvement of a step-by-step refurbishment to EnerPHit standard to be undertaken for the project Courcelles.

First, the result sheet of the project´ s current status will present the calculated energy consumption of the existing building.

The PHPP result sheet of the completed EnerPHit retrofit will present the energy demand estimated for the completion of the project according to the overall refurbishment plan

1 Existing building: PHPP Result Sheet

1.1 PHPP Result sheet of the existing building



EnerPHit verification

Building:	Courcelles Blanc Nez / Gris Nez
Street:	Rue de Boulogne
Postcode/City:	Courcelles les Lens
Country:	France
Building type:	MFH
Climate:	Lille
Altitude of building site (in [m] above sea level):	24
Home owner/client:	SIA Habitat
Street:	67 Avenue des Potiers
Postcode/City:	59506 Douai
Architecture:	
Street:	
Postcode/City:	
Mechanical System:	
Street:	
Postcode/City:	
Energy consulting:	
Street:	
Postcode/City:	
Certification:	
Street:	
Postcode/City:	
Year of Construction:	2015
Number of dwelling units:	16
Number of Occupants:	34,4
Exterior vol. V_e:	3700,0 m³
Interior temperature winter [C°]	20,0
Internal heat gains winter [W/m²]	2,1
Interior temp. summer [C°]	25,0
IHG summer [W/m²]	5,6
Spec. capacity [Wh/K per m² TFA]	204
Mechanical cooling	

Specific building demands with reference to the treated floor area

				Requirements	Fulfilled? *
	Treated floor area	1203,1	m²		
Space heating	Annual heating demand	113	kWh/(m²a)	25 kWh/(m²a)	no
	Heating load	48	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,	450	kWh/(m²a)	237 kWh/(m²a)	no
	DHW, space heating and auxiliary electricity	385	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 (retrofit): building characteristic values

Building envelope Average U-Values	Exterior insulation to ambient air	0,39	W/(m²K)	-	-
	Exterior insulation underground		W/(m²K)	-	-
	Interior insulation to ambient air		W/(m²K)	-	-
	Interior insulation underground	3,33	W/(m²K)	-	-
	Thermal bridges ΔU	0,04	W/(m²K)	-	-
	Windows	2,88	W/(m²K)	-	-
	External doors	2,50	W/(m²K)	-	-
Ventilation system	Effective heat recovery efficiency	0	%	-	-

* empty field: data missing; -: no requirement

Figure 1: 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:

The first step is chosen as to create the largest energy reduction upfront: airtightness + MVHR can reduce by 60% the heating demand.

Step	Year	Measure	Specific Heating Demand	Specific Primary Energy Demand	Additional Specific Renewable Energy Gains
0	2013	Existing Building	113	450	0
1	2015	Airtightness + MVHR	59	291	0
2	2015	Windows	41	246	0
3	2016	External walls	30	219	0
4	2018	Roofs + Efficient DHW + Solar Thermal + Lighting	22	137	15
5	2019	Slab	13	119	15
6	2021	40 kWp PV	13	119	15+82 (thermal+PV)

Figure 2: Overview refurbishment steps

2.1.2 Efficiency Improvements

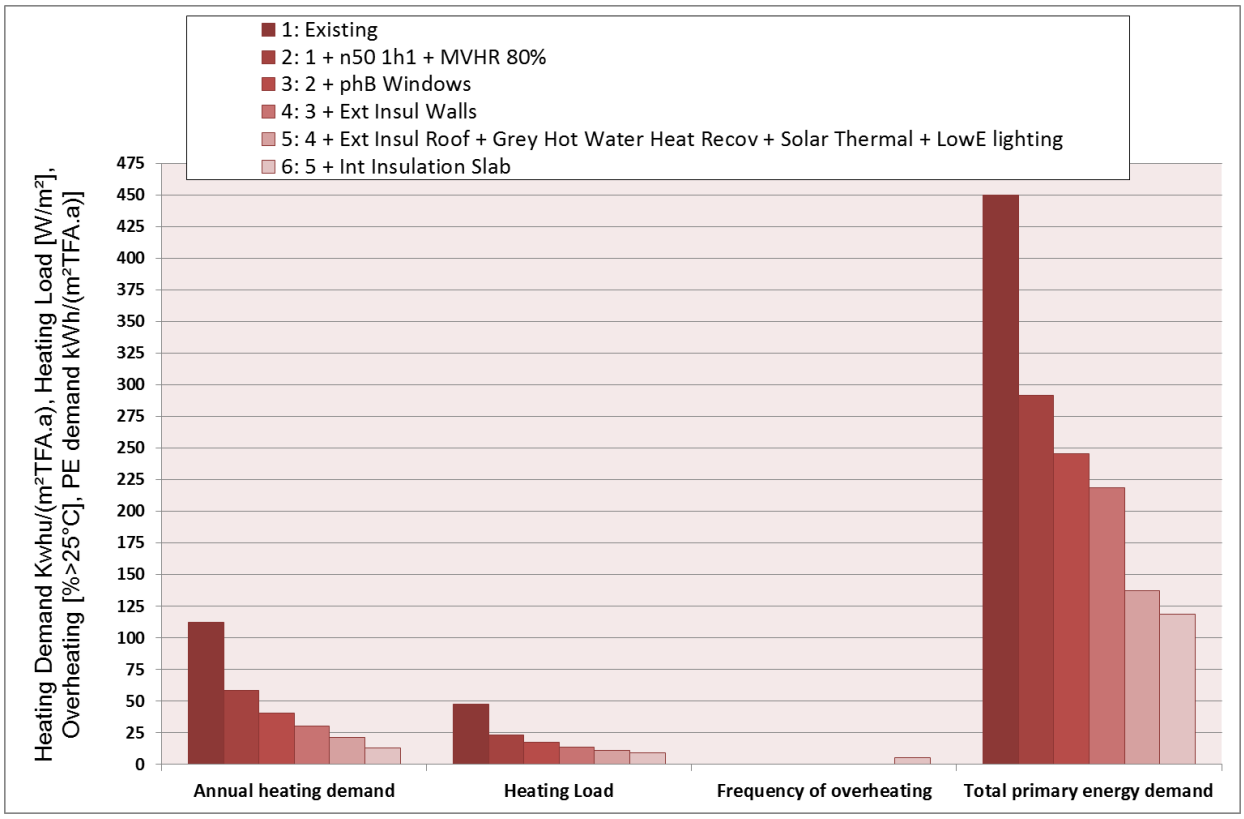


Figure 3: Overview energy efficiency improvement according to the overall refurbishment plan

3 Completion of step-by-step refurbishment to EnerPHit

3.1 PHPP Result Sheet of the completed EnerPHit standard

EnerPHit verification

Building:	Courcelles Blanc Nez / Gris Nez
Street:	Rue de Boulogne
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Country:	France
Building type:	MFH
Climate:	Lille
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Street:	
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Mechanical System:	
Street:	
Postcode/City:	
Energy consulting:	
Street:	
Postcode/City:	
Certification:	
Street:	
Postcode/City:	

Year of Construction:	2015	Interior temperature winter [C°]	20,0
Number of dwelling units:	16	Internal heat gains winter [W/m²]	2,1
Number of Occupants:	34,4		
Exterior vol. V_e:	3700,0 m³		

Interior temp. summer [C°]	25,0				
IHG summer [W/m²]	3,6				
Spec. capacity [Wh/K per m² TFA]	204				
Mechanical cooling:					

Specific building demands with reference to the treated floor area

				Requirements	Fulfilled?*
	Treated floor area	1203,1	m²		
Space heating	Annual heating demand	13	kWh/(m²a)	25 kWh/(m²a)	yes
	Heating load	9	W/m²	-	-
Space cooling	Overall specific space cooling demand		kWh/(m²a)	-	-
	Cooling load		W/m²	-	-
	Frequency of overheating (> 25 °C)	6,1	%	-	-
Primary Energy	Heating, cooling, dehumidifying, DHW,	119	kWh/(m²a)	120 kWh/(m²a)	yes
	DHW, space heating and auxiliary electricity	61	kWh/(m²a)	-	-
	Specific primary energy reduction through solar electricity	82	kWh/(m²a)	-	-
Airtightness	Pressurization test result n50	0,6	1/h	1 1/h	yes

EnerPHit (retrofit): building characteristic values

Building envelope Average U-Values	Exterior insulation to ambient air	0,11	W/(m²K)	-	-
	Exterior insulation underground		W/(m²K)	-	-
	Interior insulation to ambient air		W/(m²K)	-	-
	Interior insulation underground	0,20	W/(m²K)	-	-
	Thermal bridges ΔU	0,02	W/(m²K)	-	-
	Windows	0,94	W/(m²K)	-	-
	External doors	2,50	W/(m²K)	-	-
Ventilation system	Effective heat recovery efficiency	76	%	-	-

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

Figure 4: Specific energy efficiency values of the completed project modelled with PHPP 9 Beta