EuroPHit

D3.4_PHPP Result Sheets

DRAFT

CS12

Family Home_Ville & Andrea Mäkinen

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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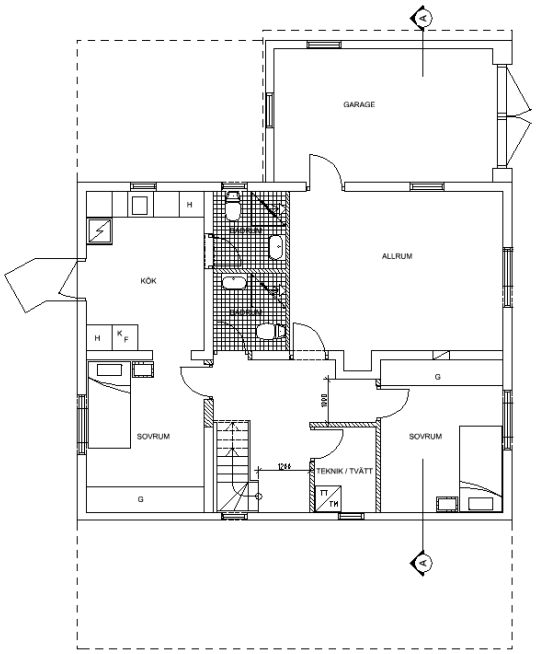
Abstract

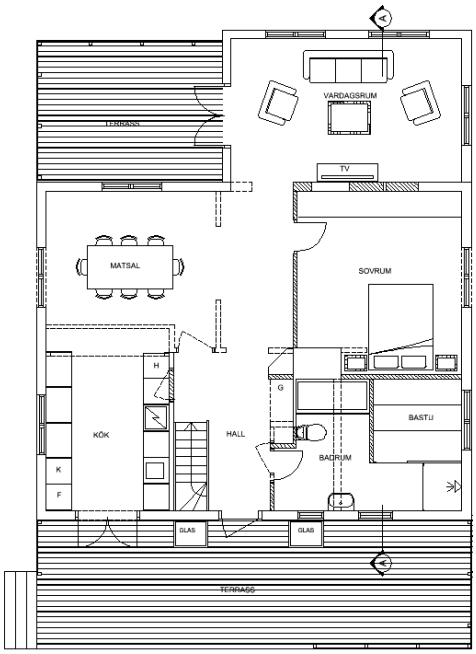
This document provides a short overview of the efficiency improvement of a step-by-step refurbishment to EnerPHit standard to be undertaken for the project 12, Family Home Ville & Andrea Mäkinen in Stockholm, Sweden.

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



KÄLLARPLAN



BOTTENPLAN

Existing building: PHPP Result Sheet

1.1 PHPP Result sheet of the existing building

EnerPHit verification

Building:	Ville & Andrea Mäkinen
Street:	Svartbäcksvägen 11
Postcode/City:	Stockholm
Country:	Sweden
Building type:	Villa
Climate:	[SE] - Stockholm
Altitude of building site (in [m] above sea level):	50
Home owner/client:	Ville
Street:	Svartbäcksvägen 11
Postcode/City:	Stockholm

Architecture:		Mechanical System:	
Street:		Street:	
Postcode/City:		Postcode/City:	
Energy consulting:		Certification:	
Street:		Street:	
Postcode/City:		Postcode/City:	

Year of Construction:	1955	Interior temperature winter [C°]	20.0	Interior temp. summer [C°]	25.0
Number of dwelling units:	1	Internal heat gains winter [W/m²]	2.1	IHG summer [W/m²]	3.1
Number of Occupants:	4.3			Spec. capacity [Wh/K per m² TFA]	204
Exterior vol. V_e:	408.0 m³			Mechanical cooling:	

Specific building demands with reference to the treated floor area

				Requirements	Fulfilled?*
	Treated floor area	150.1	m²		
Space heating	Annual heating demand	235	kWh/(m²a)	25 kWh/(m²a)	no
	Heating load	77	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, auxiliary electricity, lighting, elect.	256	kWh/(m²a)	384 kWh/(m²a)	yes
	DHW, space heating and auxiliary electricity	194	kWh/(m²a)	-	-
	Specific primary energy reduction through solar electricity		kWh/(m²a)	-	-
Airtightness	Pressurization test result n_{50}	4.4	1/h	1 1/h	no

EnerPHit (Modernisierung): Bauteilkennwerte

Gebäudehülle	Außendämmung zu Außenluft	0.76	W/(m²K)	-	-
mittlere U-Werte	Außendämmung zu Erdreich	3.34	W/(m²K)	-	-
	Innendämmung zu Außenluft		W/(m²K)	-	-
	Innendämmung zu Erdreich		W/(m²K)	-	-
	Wärmebrücken ΔU	0.00	W/(m²K)	-	-
	Fenster	2.26	W/(m²K)	-	-
	Außentüren	2.00	W/(m²K)	-	-
Lüftungsanlage	eff. Wärmebereitstellungsgrad		%	-	-

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

Figure 1: Specific energy efficiency values of the existing building modelled with PHPP

2 Retrofit steps

2.1 Overall refurbishment Plan

2.1.1 Retrofit steps:

Wilmcote house will be enclosed in an insulated self-supporting steel skeleton to improve the thermal performance of the walls, roof, windows and doors. New heat recovery ventilation systems will be provided for each flat. Existing heating systems will be retained for the time being.

Step No.	Year	Measures	Specific Heating demand [kWh/(m²K)]	Specific PE demand [kWh/(m²K)]
0	1954	Existing building	235	256
1	2014-15	Replace lower floor & add roof insulation; insulate lower floor walls	111	153
2	2016 (?)	Windows exchange & MVHR instal.	71	124
3	2020 (?)	Upper floor facade insulation	17*)	85
4	2020 (?)	Possible addition of PV and/or solar thermal system	-	65**)

*) EnerPhit-certification via components not necessary

**)Approx. estimate e.g. with a 3.3 kWp PV system

Figure 2: Overview refurbishment steps

2.1.2 Efficiency Improvements

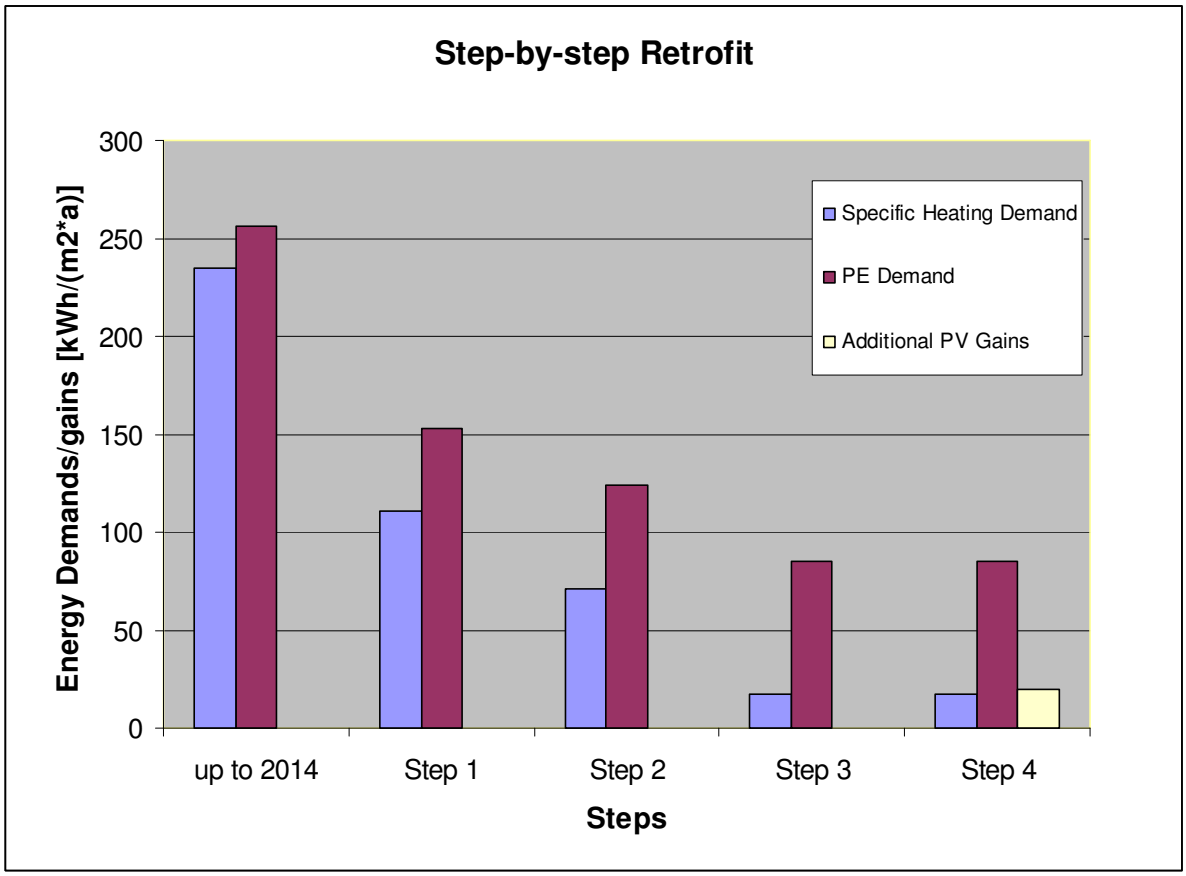


Figure 3: Overview energy efficiency improvement according to the overall refurbishment plan

3 Completion of step-by-step refurbishment to EnerPHit

3.1 PHPP Result Sheet of the completed EnerPHit standard

				Requirements	Fulfilled?*
	Treated floor area	150.1	m²		
Space heating	Annual heating demand	**17**	**kWh/(m²a)**	25 kWh/(m²a)	**yes**
	Heating load	**11**	**W/m²**	-	**-**
Space cooling	Overall specific space cooling demand		**kWh/(m²a)**	-	**-**
	Cooling load		**W/m²**	-	**-**
	Frequency of overheating (> 25 °C)	8.0	%	-	-
Primary Energy	Heating, cooling, dehumidifying, DHW,	**85**	**kWh/(m²a)**	122 kWh/(m²a)	**yes**
	DHW, space heating and auxiliary electricity	32	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	**0.09**	**W/(m²K)**	-	**-**
mittlere U-Werte	Außendämmung zu Erdreich	**0.09**	**W/(m²K)**	-	**-**
	Innendämmung zu Außenluft		**W/(m²K)**	-	**-**
	Innendämmung zu Erdreich		**W/(m²K)**	-	**-**
	Wärmebrücken ΔU	0.00	W/(m²K)	-	-
	Fenster	**0.89**	**W/(m²K)**	-	**-**
	Außentüren	**0.80**	**W/(m²K)**	-	**-**
Lüftungsanlage	eff. Wärmebereitstellungsgrad	**83**	**%**	-	**-**

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