

19. Detached bungalow, cavity walls, 1983-1993





	Building elements :	Insulation	U - value	
Walls	Cavity walls, partially filled	25-50 mm	0.6	
Roofs	Pitched, insulation between joists	100 mm	0.4	
Floors	Solid	10-15 mm	0.57	
Windows	Double glazed, wooden frame, 6 mm gap	n.a	3.1	
Doors	Solid wooden	none	3.0	
Heati	ng systems characteristics:	Fuel	Efficiency	
Heatin Primary	ng systems characteristics: Central heating boiler, pipework uninsulated.	Fuel Heating oil	Efficiency 75%	
Heatin Primary Secondary	ng systems characteristics: Central heating boiler, pipework uninsulated. Open fire in grate	Fuel Heating oil Coal	Efficiency 75% 30%	
Heatin Primary Secondary Hot water	ng systems characteristics: Central heating boiler, pipework uninsulated. Open fire in grate From primary heating system. Electric immers	Fuel Heating oil Coal ion heater is used	Efficiency 75% 30% d in summer.	
Heatin Primary Secondary Hot water Cylinder	 b g systems characteristics: Central heating boiler, pipework uninsulated. Open fire in grate From primary heating system. Electric immers Insulated, spray foam 30mm, no cylinder therm 	Fuel Heating oil Coal ion heater is used	Efficiency 75% 30%	

Description

50

0

Very typical rural bungalow from the 1980s. 50mm of polystyrene wall insulation was normally fitted during construction. The part-filled cavity can be full-filled by pumping in additional insulation beads.

	Ref	Prim. energy kWh/m ² /y	nergy Carbon D /m ² /y kgCO ₂ /		Energy Rating					
0	Bu	ilding fa	abric upgrade steps:	Expected U-values	303 (actual state)	78 (actual state)		E1		
1	Roof insulation and standard package*	Add	200 mm mineral wool over the existing insulation.	0.13	271	70		D2		
2	Wall insulation	Add	Remaining cavity (50mm) filled with insulation beads	252 65			E1			
Systems upgrade:										
3	Space and water heating system and controls	g zones with ng.	146	36		B3				
*als	*also includes draughtstripping, 80mm lagging jacket for DHW cylinder and low energy bulbs. Estimated costs and payback time**									
3	50 Refurbishi	eps—Standard Measures	Meas	sure Estima	Estimated costs		Payback (y)			
3	00			Stej	• 1 €	3 1,940		5.3		
2	50		Primary Energy	Step	02 €	€ 1,270		5.2		
2		Step	• 3 €	€ 3,500		2.8				
	00	Tot	al €	€ 6,710		3.6				

Standard upgrade summaryConsumption of primary
energy reduced by:157 kWh/m²/y

dioxide

42 kgCO₂/m²/y

Emission of carbon

reduced by:

Primary Energy: kWh/m²/y, Carbon Dioxide emissions: kg/m²/y

2

1

**Note: 1. Costs are indicative only, based on typical prices (2011). 2. Measures analysed are one of many options, especially for the renewable heating systems.

3

Typical roof upgrade (standard/advanced)				Heating system upgrade									
100 mm of min- eral wool be-				Feature:		S	Standard		Advanced		ed		
twe jois	n the ceiling				Heat genera	ator Regula boiler		ar condensing		Ground source heat pum		at pump	
Typical roof After:				Efficiency: 90%)%		400%					
insu 300	topping the attic insulation up to 300 mm			Fuel: Heating		ting oil		Electricity					
Conductivity = 0.04 W/mK						SH Controls Full z type:		ull zone control		Full zone control			
Typical wall upgrade (standard)				Hot water		Primary heating		Primary heating system		system			
	Before After			source (HW):		system			and solar thermal pane providing 50% of HW demand		panels HW		
	Cavity walls filled with in boards, 25-5 thick. U-value =0.6 W/m ² K		vity walls, partially ed with insulation ards, 25-50 mm ck. value 6 W/m ² K		Remaining cavity filled with insulation beads, conductivity	HW Cylinder: 120 inst		120 li insula	120 litre, factory		200 litre combined cy der, factory insulated		ed cylin- ated
					=0.033 W/mK	HW Controls Time static		e and thermo-		Time and thermostati		static	
					Ventilation	tilation: Natu		ral		MVHR, 90% efficient		cient	
	Refurbishment steps — advance							Prim. energy kWh/m ² /y			Carbon Dioxide kgCO ₂ /m ² /y		Energy Rating
0		Building fabric upgrade steps:					Expected U-values		303 (actual state)		78 (actual state)		E1
1	Roof insul standard p	ation and Add 200 mm mineral wool over the exist ackage* Add Add				ng insulation.	0.	0.13		271		70	
2	Wall insulation Add Remaining cavity (50mm) filled with beads, walls insulated internally with phenolic/urethane drylining boards			insulation 50 mm	0.21		242		62		D1		
Systems upgrade:													
3 Space and water heating system and controls Replace Ground source heat pump 400%, two time and thermostatic control, independent and panels providing 50% of hot wat cylinder. Mechanical ventilation with				separated heating ndent water heatin er demand with co heat recovery (M	g zones ng, solar ombinec IVHR).	zones with ;, solar ther- abined HW /HR).			26		B2		
* package also includes draughtstripping, 80mm lagging jacket for DHW cylinder and low energy bulbs. Estimated costs and payback time**									ime**				
3						Me		Meas	Measure Estima		ated costs Payba		ck (y)
3	³⁰⁰ Refurbishment Steps—Advanced Measures					_		Step 1		€ 1,940		5.3	
2	250 Pr 200 Ca 150 Ca				Primary Energy		Step 2		€ 1	€ 11,400		30.9	
2							Step 3		€ 18,100		9.8		
1							Total: €		31,440		12.2		
								Advanced upgrade summary				ary	
					Consumption energy reduce			tion of p duced b	f primary 157 kWł by:		h/m²/y		
	o P	rimary Energy: k	¹ Wh/m ² /y, C	2 arbon Dioxic	³ le emissions: kg/m ² /y		En rec	nission duced b	of carbo y:	on dic	oxide 5	2 kgC($D_2/m^2/y$
**N	lote: 1 Costs a	re indicative only	v hased on t	vnical prices	(2011) 2 Measures analy	used are one of ma	inv onti	ons esne	cially for	the renew	vable heating	systems	

Analysis conducted in association with IHER Energy Services, www.iher.ie