

This Publishable Report is provided as part of The Rathlin Sustainable Island Network study and is for illustrative public information purposes. The building owner's reports are confidential and thus not published here.

ENERGY AUDIT REPORT Sample Home 9

Detached Home of 87.45m²

Original: pre 1900 with Solid Stone Walls /Extn = 1986 Block Cavity
Current EPC rating – F (41) – Energy Use 369 kWh/m²/yr – Total Energy Use: 19,276 kWh/yr

Existing Building Details		
Building Elements		U-Value (W/m ² .K)
Walls	Original house: 440mm solid stone uninsulated	2.53
Walls	Extension added 1986 – Block Cavity insulated	0.42
Roof	Pitched Roof – Insulated at joists to extension 100mm rockwool	0.42
Roof	Original roof – Insulated at joists 100mm rockwool	0.42
Ground Floor	Original & 1986 extension is uninsulated	0.67
Windows	Double-glazed, air filled 12mm, wood frames	2.8
Ext Door	Solid Wooden Doors	3.0



Existing Heating Characteristics			
Heating System		Energy	Efficiency (%)
Primary Heating System	Warmflow 50/70 Oil boiler to rads	OIL	85.4
Secondary Heating System	Open fire in grate	House coal	No data
Domestic Hot Water	From primary heating	Oil	85.4
Cylinder	25mm Jacket Insulation		No data
Controls	Programmer & Room Stat		

Domestic Retrofit Guidelines (Step by Step)						
Proposed Interventions		Energy saving (kWh/yr)	Energy saving (kWh/m2/yr)	Revised energy use (kWh/yr)	Revised BER Rating	CO2 savings/yr (kg)
1	Upgrade 1 – upgrade Ext Doors to achieve 1.4W/m2K & windows to achieve 0.9w/m2K	1,945	22.25	30,358	E (45)	418
2	Upgrade 2 – Int insulation to external walls to achieve 0.21W/m2K and Roof to achieve 0.11w/m2K	13,814	157.97	16,544	C (70)	3,685
3	Install ASHP	5,645	64.55	10,899	C (79)	2,277
4	Install PV	6,717	76.82	4,181	A (92)	1,217
Overall Savings Potential		28,121	321.59	4,181	A (92)	7597



Estimated Costs Summary			
Measures		Estimated Costs (£/m ²)/Element	Estimated Total Costs (£)
1	Upgrade extension doors to achieve 1.6w/m ² K / Windows to achieve 0.9w/m ² K	£1000 / door £400 / window	£6,000.00
2	Top up roof insulation to 400mm & Int Insulation to Ext walls (gain low thermal mass & lower air permeability)	£150 / m ² wall area	£17,550.00
3	Install ASHP & associated radiator upgrades	£15,000.00 / house	£15,000.00
4	Install 2.8kW PV	£5,000.00	£5,000.00
Total to achieve C rating			£43,550.00
PM Fee (8%)			£3,484.00
Subtotal			£47,034.00
VAT (20%)			£8,656.00
Total Build Costs			£55,599.00
Simple Payback			29 years

Savings Summary					
BER Rating	Energy Use (kWh/yr)	Energy Use (kWh/m ² /yr)	Energy Savings (kWh/yr)	Cost Savings (€/yr)*	CO2 Savings (kg)
Current E (41)	19,276	369.40	()	0.00	
Upgrade 1 E (45) Replacement windows	30,358	347.15	1,945	£78.22	418
Upgrade 2 C (70) Insulate Roof & Int insulation to Ext Walls	16,544	189.18	13,814	£1,319.00	3,685
Upgrade 3 C (79) ASHP	10,899	124.63	5,645	-£715.00	2,277
Upgrade 4 2.8 kWp PV	4,181	47.81	6,717	£1,215.00	1,218
TOTAL	4,181	47.81	28,121	£1,897.00	7,597

*See 'Assumptions' Below

** This represents 25% of the pre-upgrade energy consumption

To illustrate Carbon Dioxide savings: 1 10-year-old evergreen tree will absorb 14kg of CO₂ per year (deciduous absorb less). Therefore, the carbon savings of the works would be the equivalent of **planting 542 evergreen trees.**

Savings Calculations

Upgrade 1 (Replacement windows & Doors)

Space Heating 635 kWh x £0.10 (Kerosene)	£63.50
Secondary Heating 184kWh x £0.08 (coal)	£14.72
Total this measure	£78.22

Upgrade 2 (Insulate Walls & upgrade roof insulation)

Space Heating 10,703 kWh x £0.10 (Kerosene)	£1,070.30
Secondary Heating 3,111kWh x £0.08 (coal)	£248.88
Total This Measure	£1,319.00

Upgrade 3 (Install ASHP)

Space & Water Heating Oil 12,401Wh x £0.10 (kerosene)	£1,240.00
2 nd Heating 2,276Wh x £0.08 (coal)	£182.08
Electricity 1,867.31kWh x 0.2365 (elect) <u>£441.55</u>	£1,863.00
Space & Water Heating ASHP 9,703kWh x £0.2365 (grid Elect)	£2,295.00
Electricity 1,196kWh x 0.2365 (elect) <u>£283.00</u>	<u>£2,578.00</u>
Total Saved this Measure	-£715

Upgrade 4 (Install PV)

Elect Saved with PV: 6717kWh x 70% usage x £0.2365	£1,112.00
Elect exported to grid: 6717kWh x 30% usage x £0.051	£103.00
Total Saved this measure	£1,215.00

TOTAL SAVED ALL UPGRADES **£1,897.22**

Assumptions

Kerosene produces 0.257kg CO₂ per kWh. This does not include emissions in production and transport

The amount of Carbon that is emitted per kWh Electricity in Northern Ireland is .330kg/kWh¹

Electricity Rate pence per kWh = £0.2365

Kerosene cost per kWh = £0.10

Seasoned Wood & coal per kWh = £0.08²

¹ <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Northern%20Ireland%20Carbon%20Intensity%20Indicators%202021.pdf>

² <https://nottenergy.com/resources/energy-cost-comparison>