

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 1**

**Detached Home of 315.88m<sup>2</sup>, Block cavity traditional build c.2003**  
**Current EPC rating – C (74) – Energy Use 118 kWh/m<sup>2</sup>/yr**  
**Total Energy Use: 37,397 kWh/yr**



**Existing Building Details**

Building Elements		U-Value (W/m <sup>2</sup> .K)
Walls	Block Cavity 2003	2.67
Roof	Insulated at rafters with 100mm Xtratherm Thin R	0.29
Roof	Insulated at joists – 100m rockwool between joists with 100mm on top	0.21
Ground Floor	Solid – 2003 insulated with 100mm Kingspan TF70	0.15
Windows	Double-glazed (2003) uPVC frames	2.1
Rooflights	Double Glazed wooden frames	3.1
Ext Door	1/2 Glazed uPVC doors	2.85

Existing Heating Characteristics			
Element	Heating System	Energy	Efficiency (%)
Primary Heating System	Grant Engineering Vortex Pro Boiler house 36-46	Kerosene	90.7
Secondary Heating System	none		
Domestic Hot Water	From Primary Heating System	Kerosene	90.7
Cylinder	210L cylinder with 50mm factory insulation		
Controls	Programmer only		

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)
Upgrade 1 – upgrade Ext Doors to achieve 1.4W/m2K	704	116	36,693	B (82)	182
Upgrade 2 – Upgrade windows to achieve 0.7W/m2K	2,236	109	34,457	B (83)	919
Upgrade 3 – Int insulation to external walls to achieve 0.20W/m2K	10,396	76	24,061	B (85)	2,687
Upgrade 4 – Upgrade Roof insulation Joists = 0.11W/m2K / Rafters = 0.17W/m2K	1,204	72	22,857	A (94)	311
Upgrade 5 – Install 2.5kW PV	5,998	38	11,010	A	1,912

Note that there is no recommendation to upgrade to a standard Air Source Heat Pump. This means that the building will not be able to achieve carbon neutrality using existing technology on a cost-effective basis

Estimated Costs Summary		
Measures	Estimated Costs (£/m <sup>2</sup> )/ element	Estimated Total Costs (£)
Upgrade 1 – upgrade Ext Doors to achieve 1.4W/m <sup>2</sup> K	£1,000.00 / door	£3,000.00
Upgrade 2 – Upgrade windows to achieve 0.7W/m <sup>2</sup> K	£400.00 / window	£15,500.00
Upgrade 3 – Int insulation to external walls to achieve 0.20W/m <sup>2</sup> K (gain low thermal mass & lower air permeability)	£150 / m <sup>2</sup> wall area	£45,000.00
Upgrade 4 – Upgrade Roof insulation	£41.00 m <sup>2</sup> floor area	£2,665.00
Upgrade 5 – Install 2.5kWp PV	£5,000.00 / install	£5,000.00
<b>Total to achieve A rating</b>		<b>£71,165</b>
<b>PM Fee (8%)</b>		<b>£5,693.20</b>
<b>Subtotal</b>		<b>£76,858.20</b>
<b>VAT (20%) - (PV @ 5%)</b>		<b>£14,621.64</b>
<b>Total Build Costs</b>		<b>£91,479.84</b>
<b>Simple Payback</b>		<b>36 yrs</b>

Savings Summary					
BER Rating	Energy Use (kWh/yr)	Energy Use (kWh/m <sup>2</sup> /yr)	Energy Savings (kWh/yr)	Cost Savings (£/yr)*	CO2 Savings (kg)*
Current Rating C (74)	37,397	118			
Upgrade 1 Rating B (82)	36,693	116	704	£70.40	181
Upgrade 2 Rating B (83)	34,457	109	2,236	£223.60	575
Upgrade 3 Rating B (85)	24,061	76	10,396	£1,039.60	2,672
Upgrade 4 Rating A (94)	22,857	72	1,204	£120.40	309
Upgrade 5	11,010	38	5,998	£1,084.74	1,979
<b>TOTAL</b>	<b>11,010**</b>	<b>38</b>	<b>20,538</b>	<b>£2,538.74</b>	<b>5,716</b>

\*See 'Assumptions' Below

\*\* This represents 30% 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 408 evergreen trees.**

## Savings Calculations

### Upgrade 1 (Ext door upgrade)

Space Heating 704 kWh x £0.10 (kerosene)	£70.40
Water Heating – no cost saving	
Electricity – no cost saving	
<b>TOTAL SAVED Ext Door upgrade</b>	<b>£70.40 per annum</b>

### Upgrade 2 (upgrade to triple glazed windows)

Space Heating 2,236 kWh x £0.10 (kerosene)	£223.60
Water Heating – no cost saving	
Electricity – no cost saving	
<b>TOTAL SAVED Window Upgrade</b>	<b>£223.60 per annum</b>

### Upgrade 3 (int insulation to ext walls)

Space Heating 10,396 kWh x £0.10 (kerosene)	£1,039.60
Water Heating	no cost saving
Electricity	no cost saving
<b>TOTAL SAVED Ext wall Upgrade</b>	<b>£1,039.60 per annum</b>

### Upgrade 4 (upgrade roof insulation)

Space Heating 1,204 kWh x £0.10 (kerosene)	£120.40
Water Heating	no cost saving
Electricity	no cost saving
<b>TOTAL SAVED Roof Upgrade</b>	<b>£120.4 per annum</b>

### Upgrade 6 (Install PV)

Elect Saved with PV 5,998kWh x 70% usage x £0.2365 (grid elect)	£992.97
Elect exported to grid 5,998kWh x 30% usage x £0.051 (grid elect)	£91.77
<b>TOTAL SAVED PV</b>	<b>£1,084.74</b>

**Total Saved System** **£2,538.74**

## Assumptions

Kerosene produces 0.257kg CO<sub>2</sub> 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/kWh<sup>1</sup>

Electricity Rate pence per kWh = £0.2365

Kerosene cost per kWh = £0.10

Seasoned Wood & coal per kWh = £0.08<sup>2</sup>

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

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