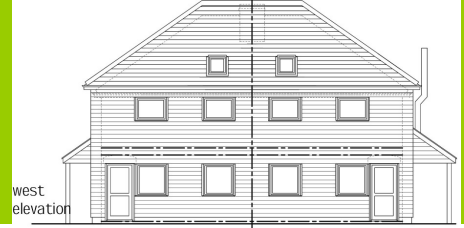
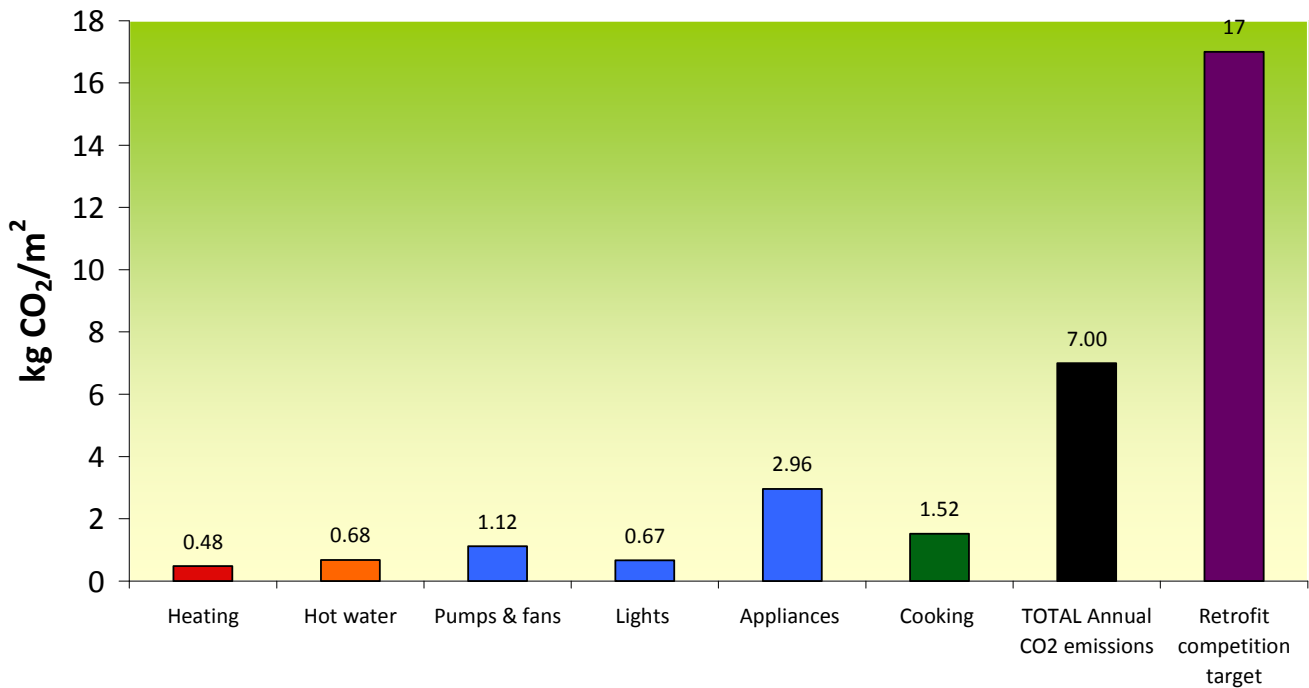


# Barbrook PassivHaus Retrofit

TSB Retrofit for the Future – SW exemplar project



## Predicted kg CO<sub>2</sub> by use



Current	Predicted
SAP 23	SAP 90
Space heating: 712 kWh/m <sup>2</sup> .	Space heating: 12 kWh/m <sup>2</sup> .yr
Primary energy: 743 kWh/m <sup>2</sup> .yr	Primary energy: 90 kWh/m <sup>2</sup> .yr
CO <sub>2</sub> emissions: 7946 kgCO <sub>2</sub> /yr	CO <sub>2</sub> emissions: 312 kgCO <sub>2</sub> /yr

Our proposed targets (modelled using SAP 2005)	
Space heating	12 kWh/m <sup>2</sup> .yr
Whole house primary energy	90 kWh/m <sup>2</sup> .yr
CO <sub>2</sub>	7 kg/m <sup>2</sup> .yr
Electricity consumption	798 kWh per yr
LPG consumption	462 kWh per yr
Biomass heating consumption	2668 kWh per year

Accepted PassivHaus targets (no more than...)	
Total energy demand for space heating and cooling	15 kWh/m <sup>2</sup> .yr
Air tightness	1m <sup>3</sup> /m <sup>2</sup> .hr @ 50 Pa
Opaque U-Values	0.15 W/m <sup>2</sup> K
U-Value of windows and doors	0.8 W/m <sup>2</sup> K
MVHR	75% efficiency minimum

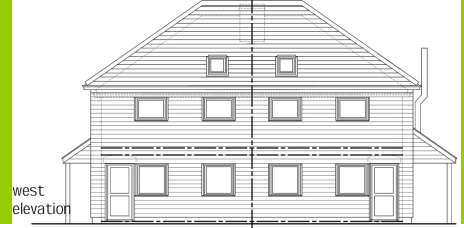


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Architect



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## Key sustainability features

- 300mm Warmcel (recycled newsprint) insulation in a new OSB frame on all external walls
- 350mm Warmcel insulation in the roof space.
- 200mm XPS insulation around the perimeter to 1m depth to reduce thermal bridging from ground floor slab and external wall junction
- Windows; triple glazed timber units with soft low-e coatings and argon fill
- External doors; triple glazed thermally insulated timber units
- New ground floor slab to include 200mm XPS insulation
- Removal of the existing chimneys to avoid thermal bridging and heat loss
- Existing concrete walls retained within new insulated envelope as thermal mass to smooth internal temperatures
- Air tightness of  $1 \text{ m}^3/\text{m}^2 \cdot \text{hr}$  @ q50, using membrane, tapes and parging to eliminate heat loss from air leakage
- High efficiency mechanical ventilation with heat recovery
- $3\text{m}^2$  evacuated tube solar thermal for summer hot water
- Small pellet boiler connected to a thermal store in each property
- Heat metering
- Low energy lighting throughout, ideally dimmable LEDs
- A++ appliances fitted throughout, efficient LPG cooker
- Low flush toilets, low water use taps and showers
- Drying rooms to avoid need for a tumble drier
- Secure external bicycle storage to encourage cycling
- Training and advice for tenants
- Bird and bat boxes



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