

Carbon Negative Homes

Andy Hills
Derby City Council



Derby City Council

Context/Background

- Derby Homes is the Council's ALMO
- Stock base of 12,400 homes
- Average SAP rating 76
- 1,300 of PVs installed, currently integrated into the re-roofing programme
- All Council homes will be at least band C by 2026
- Location - Cummings Street, Arboretum ward.



Defining a carbon negative property



A HOME THAT PRODUCES MORE ENERGY FROM A RENEWABLE SOURCE THAN IT REQUIRES TO OPERATE.



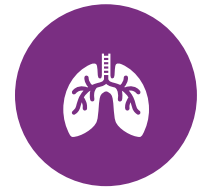
STEP 1 BUILD A HOME THAT IS VERY WELL INSULATED, AND THEREFORE REQUIRES VERY LITTLE HEAT TO MAINTAIN A COMFORTABLE INTERNAL ENVIRONMENT.



STEP 2 USE A LOW CARBON SOURCE OF HEATING. HEAT PUMPS WORK GREAT IN WELL INSULATED HOMES WITH UNDERFLOOR HEATING TO THE GROUND FLOORS.



STEP 3 INCORPORATE RENEWABLES INTO THE ROOF DESIGN, OURS ARE INTEGRATED INTO THE ROOF WITH A SAVING ON ROOF TILES AND A MUCH SMARTER LOOK.



STEP 4 PROVIDE ADEQUATE VENTILATION, HUMIDISTAT FANS IN KITCHEN & BATHROOM, TRICKLE VENTS IN ALL WINDOWS.



Energy Performance Certificate

Impact on the environment

This property's environmental impact rating is A.

An average household produces

6 tonnes of CO₂

This property produces

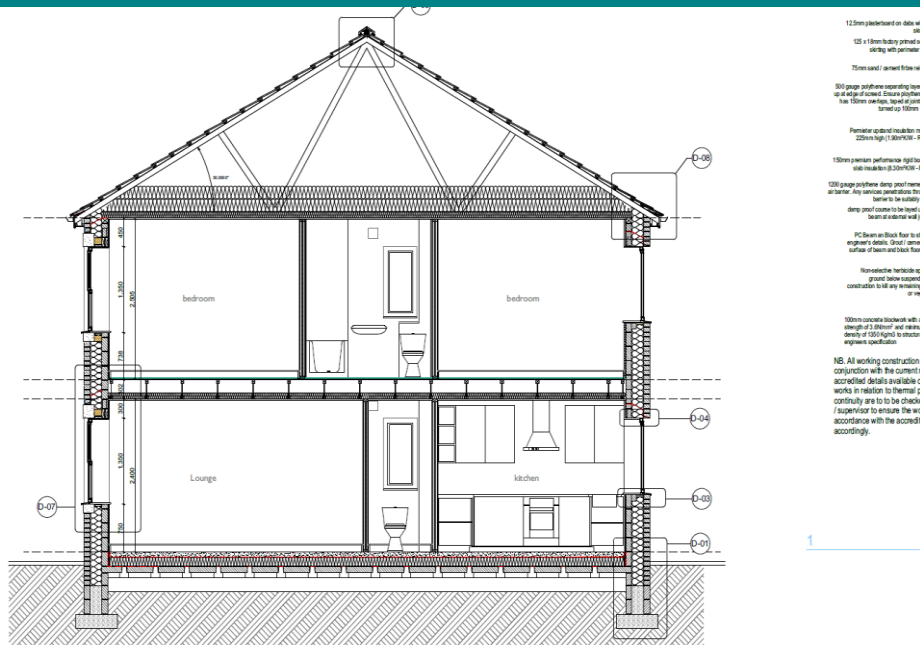
-0.5 tonnes of CO₂

This property's potential production

-0.6 tonnes of CO₂

Feature	Description	Rating
Walls	Average thermal transmittance 0.15 W/m ² K	Very good
Roof	Average thermal transmittance 0.08 W/m ² K	Very good
Floor	Average thermal transmittance 0.10 W/m ² K	Very good
Windows	High performance glazing	Very good
Main heating	Air source heat pump, radiators, electric	Average
Main heating control	Time and temperature zone control	Very good
Hot water	From main system	Good
Lighting	Low energy lighting in all fixed outlets	Very good
Air tightness	Air permeability 4.6 m ³ /h.m ² (as tested)	Good
Secondary heating	None	N/A

Technical Specification



- Traditional build, internal blockwork provides good thermal mass to help regulate temps
- Insulation: 500mm roof, 200mm walls, 150mm floor
- Get junctions and details right to avoid gaps/thermal bridges
- Low carbon heating system
- Solar Pv integrated into the roof (saving on roof tiles).

Technical Specification

- Vaillant Aerotherm Air source heatpump
- Underfloor heating distribution to the ground floor
- Traditional radiators upstairs
- Solar Panels on both the east and west facing pitched roof, just like the ones we integrate within our re-roofing programme
- High performance double glazing, standard spec these days, identical to the ones we use on our replacement window programme.



Expected outcomes and benefits

A home that:

- someone on low income can live in a comfortable environment whilst being able to cope with the running costs
- can easily be maintained
- will last for over 100 years
- does not contribute to climate change
- over time repays its embedded carbon
- feels like any other home to live in.



Extra Costs (per home)

- Forming the 200mm cavities and insulating them fully £1,400
- Extra wide lintels £1,200
- Heat pump £6,500
- Solar Pv (east and west facing systems) £8,000
- Insulated Cavity closers on openings £540
- Total Extra cost (net) **£17,640**

What Next?

- City Sustainability Partnership undertaking a LAEP – more granular info to inform future retrofit interventions
- Derby Homes and Derby City Council have agreed to work to the future home standard and aim to get close to net zero on all developments
- Complete insulation work to last few homes that are not at band C, tapping into the SHDF funding stream
- Continue to integrate solar panels through re-roofing programme (circa 150 per year)
- Explore other options for Solar Pv, with energy local schemes to help the business case/support the local community.



Thank you

