



The windows are triple glazed and have low-maintenance composite timber and aluminium frames

# Powerhouse project

With a roof full of solar photovoltaic tiles, this house has free energy all year round

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**F**reeing themselves from high energy bills was not the motivation for Christin Peglow and David Archer to build a home to Passivhaus standard, but it will certainly be one of the benefits. The couple and their children – Lissie, 12, and Lotte, 9 – were living in Bristol, but with Lissie about to start a new school, they began looking for a property outside the city.

Somewhere with a good sense of community was an important requirement for architect Christin, 44, and David, 53, so the couple were happy to find a house in the thriving village of Chew Stoke. Built in the 1960s, the new home needed significant work to make it suitable for the family, and the couple started to think about

knocking it down and building a replacement. ‘The biggest rooms faced north, it had a poor layout and minimal insulation,’ says Christin. ‘Refurbishment would have been a compromise and renovation costs were similar to building new, especially considering VAT rates.’

Christin and David, who is an architectural master planner, took pre-planning advice on what might be permitted from the local authority, which prompted them to go ahead with their self-build idea. ‘It allowed us to make the most of the southerly aspect, the views, the natural light and the relationship with the garden,’ says Christin. ‘It also meant we could design something interesting and of its time.’ With two storeys, the top floor extends over >>



**IN BRIEF**

**LOCATION** Chew Stoke, Somerset  
**TYPE OF PROPERTY** Renewable energy new-build  
**BEDROOMS** 4  
**PROJECT STARTED** April 2018  
**PROJECT FINISHED** April 2019  
**SIZE** 220sqm  
**COST OF PROPERTY** £720,000  
**BUILD COST** £450,000 (plus £50,000 for landscaping)

A planting scheme and design for the garden was devised by Carolyn Marks Garden Design

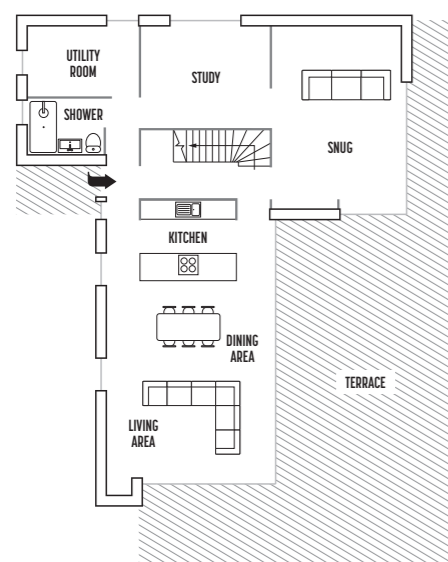


Exterior aluminium powder-coated blinds from Internorm help regulate solar gain and prevent the house overheating in summer

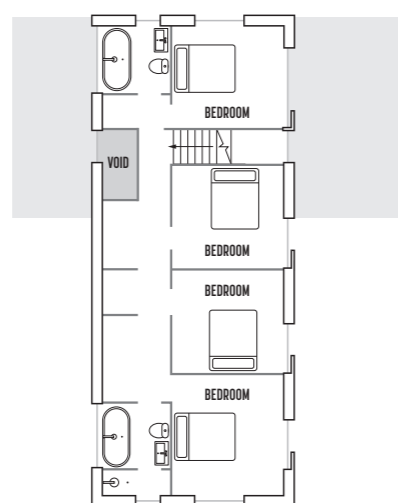


In the living area a modular Amsterdam sofa from BoConcept faces the garden. Christin and David took down some trees to improve the views

FLOOR PLANS



GROUND FLOOR



FIRST FLOOR

'It allowed us to make the most of the southerly aspect, the views and the natural light'



The Eames recliner in the snug is a copy of the classic design



Engineered oak flooring, factory finished with two coats of dark oak hard wax oil, is a practical choice for the entrance hall

the ground level on the south-facing side to provide shade for the open-plan living area, which has two walls of floor-to-ceiling glazing. Although built along Passivhaus principles, Christin and David's home is not certified as the amount of glazing makes it less thermally efficient than the rigorous certification standard. This was a satisfactory trade-off for the couple, who prioritised maximising the views and having easy access to the garden.

A Passivhaus-standard level of insulation throughout keeps the entire house cosy. Below the concrete raft foundation, semi-rigid insulation prevents heat loss through the floor and radiates it back into the home. Christin's design harnesses this rising warm air to heat upstairs, helped by a double-height void – a central open space from floor to roof which the landing crosses like a bridge. In summer automated rooflights cool the entire house by venting the warm air.

Christin and David chose to invest in solar energy, using photovoltaic (PV) roof tiles to generate their home's electricity. Fixed on the south-facing roof »



slope, the 440 tiles each produce 15W. Matching plain concrete tiles cover the north-facing slope.

A solar storage battery holds up to 13.5kWh of electricity generated during the day in the summer, which can be used at night. It switches to storing cheaper nighttime energy from the grid in winter, costing about £300 per year. But as they are paid for sending excess energy to the grid during the summer, the cost for electricity amounts to zero in a 12-month period. 'The battery app predicts the weather and required nighttime charging, and helps us use electricity efficiently by only turning on the dishwasher and washing machine once the water is hot, the car is charged and the battery is full,' says Christin. Two electric radiators and a woodburning stove provide extra cosiness on grey winter days.

One of Christin's biggest challenges was achieving the airtightness level needed for a Passivhaus-standard

home without a conventional heating system. 'Our first air test failed, as the sealing tape was incompatible with the airtightness membrane,' says Christin. 'With the help of our carpenter we went around re-taping every joint for two weeks, which led to delays in the schedule.'

Although some aspects of managing the project were challenging, on the whole Christin enjoyed the process and the knowledge and experience provided by the subcontractors she chose. Support also came in the form of their neighbour, farmer James Baker, who allowed lorryloads of deliveries into his yard, which he then transferred by tractor up the steep drive to the site.

The family have settled comfortably into their home with the year-long build a distant memory. 'I love opening the big sliding doors and cooking while the children run in and out,' says Christin. 'This house is very definitely "our space". Plus, it feels good to be energy independent.' GD



Christin's carpenter made the built-in bedroom shelving

LEFT A low bathroom window allows bathers to enjoy the view while soaking in the tub



Topsoil retained from the excavation work was used to create the raised beds where the family grow fruit and vegetables

## SUPPLIERS

### PROJECT TEAM

**Architect** Christin Peglow, Pad Design (pad-design.com)

**Structural designer** George Holland, Element Structures (elementstructures.com)

**Airtightness** BAT Building Analysis and Testing (batltd.co.uk), Mendip Energy (mendipenergy.com)

**Plumber** Steven Taylor (steventaylor.help)

**Electrician** Simon Dias (simonselectrics.co.uk)

**Carpentry** Mark Johnson (07860 122291)

**Plasterer** Jason Moloney (07515 476577)

**Decorator** Mark Williams (07894 047886)

**Hard landscaping and substructure**

Adam Roberts Groundworks (07792 535764)

**Soft landscaping** Carolyn Marks Garden Design (carolynmarks.co.uk)

### STRUCTURE

**Insulated raft** Isoquick (isoquick.co.uk)

**Structure and timber frame** All Timber Frames (alltimberframes.co.uk)

**Insulation** Back to Earth (backtoearth.co.uk)

**Windows and external blinds**

Internorm (uk.internorm.com)

**Rooflights** Velux (velux.co.uk)

**PV tiles** Marley Edgemere (marley.co.uk),

TBS Specialist Products

(tbspecialistproducts.co.uk)

**Flat roof** Steve Poole (poolesingleply.co.uk)

**Cladding** Ben White Carpentry (07552 951343),

Timbersource (timbersource.co.uk)

**Builders' merchant** RO Dando & Sons

(dando.org.uk)

**Paving slabs** Miety Stone

(mietystone.co.uk)

### FIXTURES AND FITTINGS

**MVHR** Blue Ocean Ventilation (bosw.co.uk),

Systemair (systemair.com)

**Hot water solar PV cylinder** Heatrae Sadia

(heatraesadia.com)

**PV commission, Frontius inverter**

and **Tesla battery** Solarsense

(solarsense-uk.com)

**Pocket doors** Eclipse (eclipse.co.uk)

**Timber floor** Broadleaf Timber

(broadleaftimber.com)

**Tiles** Mandarin Stone (mandarinstone.com)

**Bathrooms** Angel Interiors (angelinteriors.co.uk),

Bathstore (bathstore.com)

**Kitchen cabinets** Ikea (ikea.com/gb)

**Kitchen worksurface** Worktop Express

(worktop-express.co.uk)

**Worksurface finish** Osmo (osmouk.com)

**Stove** Bristol Heart Woodburners (heartwoodburners.co.uk)

### FURNITURE AND ACCESSORIES

**Pendant lights** Mullan Lighting

(mullanlighting.com)

**Sofas** BoConcept (boconcept.com)

**Bed** John Lewis (johnlewis.com)