

Property Overview

Year built: 1885

Location: Mill Road

Property type: Victorian terraced house

Cost of energy improvements: £55,000 (private finance)
+ £7,500 heat pump grant

Timeline: September 2023 - October 2024

Meet your hosts: Marta & Felix

We are a couple of professionals: a computer scientist and an architect. So we are both interested in new technologies and in building improvements, it's fair to say. But we are now convinced any home can be transformed, it's not rocket science and the technologies are well tested.

We were spurred into making eco renovations by climate change and the speed with which it is happening, by the urgency of it. We wanted to get to Carbon Net Zero with our energy use as quickly as possible. Our house's operational footprint is now carbon-free; we have cut off gas permanently.

The Renovations

We started by adding insulation to the suspended timber floor, and then topping it with an underfloor heating panel system by Jupiter, who both manufacture and install their system. We chose the Jupiter Ideal EPS insulation panel as it was the most cost-effective, but they also offer Ideal STRAW, Ideal ECO, and Ideal ROC as more sustainable insulation types. The panels house the underfloor heating pipework. We installed wet underfloor heating on the ground floor and new radiators with fans at all upper levels.

The air source heat pump for heating and hot water consists of an external unit and internal units. We had to re-purpose our basement to install these internal buffer units and hot water store, which required quite a bit of space. The silver lining is that the basement is now more usable, as it is quite warm there even though there is no heating. So, we have gained a lovely, clutter free ground floor and a better connection to the garden!

As we live in a conservation area of Cambridge, we knew we would not be able to add external insulation to our Mill Road facing Victorian terraced house. Therefore, we decided to add the most efficient and breathable type of internal insulation - important in historic houses. Ideally we would have 50mm boards at both levels, but on the ground floor we have a big bay window and could only fit in the 25mm boards.



Felix outside the rear of the property

At a Glance

Challenges

- Mill Road Conservation Area - external insulation is not an option

Benefits

- Carbon-free house: no more gas!
- No increase in energy costs despite limited insulation added



Controls in cupboard under the stairs

In order to use these breathable insulation boards on our solid masonry walls, we had to hack off the non-breathable gypsum plaster, prime the brick walls with a breathable primer, then finish off the walls with Best of Lime Warmcote: plaster. The manufacturers were very helpful in telling us how to apply it ourselves. Finally, in order to make sure the walls were FULLY breathable, we applied a breathable clay paint after lime plastering.

We did a lot of research and Cambridge Carbon Footprint and Open Eco Homes were a big help. We rented their thermal imaging camera and visited a Victorian terrace property which had recently had underfloor heating installed. Jupiter gave out contact details of home owners who were former clients, so we spoke to them for advice.

Finance

The government grant for heat pumps (£7,500) and the cut in VAT on heating installations (UFH, new radiators) were what drove us to expedite the installation of the ASHP. The overall cost was still significantly higher than the grant and we would not expect it to be recovered by energy cost reductions any time soon. However, we believe the value of the property has increased thanks to an improved layout without radiators on the ground floor and now enjoy the added comfort of the new heating system.

Performance

The house is very comfortable and we are very happy with the new system. We made the conscious decision to try to get used to lower internal temperatures of around 20°C, and so our new electricity bills are equal to our previous bills of gas plus electricity combined, even though we didn't install that much insulation in this historic property. And 20°C feels quite okay actually; it is great that it is so stable, nearly always the same. The ground floor space is now free of clutter and free of any radiators, so even though it is small, it looks great and optimises use of the space available.

Energy Consumption

Energy Consumption	Energy kWh/m ² /pa			Carbon kg CO ² e/pa	
	Gas	Electricity	Total	/m ²	/person
Before Renovation	111.9	22.7	135	24.5	1346
After Renovation	None	48.8	48.8	8.6	475

Future Plans

In a future phase we hope to lower our energy use by installing external insulation to the rear of the property, upgrading the roof insulation and possibly installing solar panels or a windmill at the rear of the garden.

OEH is run by Cambridge Carbon Footprint, charity no: 1127376. Photographer: Lambertian Architectural Photography



Air Source Heat Pump

Key Features

- Underfloor insulation: 75mm PIR insulation laid on plywood
- 30mm PIR Jupiter Ideal EPS panel underfloor heating
- Breathable wall insulation: Thermablok aerogel boards - 25mm downstairs & 50mm on the first floor
- Breathable primer, lime plaster & paint
- Double-glazed timber sash windows; French door to the rear of the house
- Triple glazed large Velfac kitchen window

TOP TIPS

- It's more cost-efficient to do the work all at the same time, but equally, phasing it well will get you there too!
- Doing research pays off: ask people who had similar work done in a similar property (age, type); go to an eco building materials expo show, get in touch with local organisations or builders. Expand your local network.
- Use recommended & experienced installers.

Professional Contacts

Jupiter

- pre-installation survey
- heat pump & underfloor heating installation
- Highly recommended

Mike Wye

- eco building materials distributor
- provide a lot of advice (call or email)