

THE HOUSE NEXT DOOR

What can you do to a 1970s Semi to reduce impact on the environment?

THE HOUSE NEXT DOOR



The average 3 bedroom semi
This one is in Oxford
There are millions more!

- Little changed since it was constructed
- Masonry cavity wall construction (with no insulation)
- Tiled roof
- Single glazed

THE HOUSE NEXT DOOR



CLIENT BRIEF

To update the house in the most environmentally friendly way.

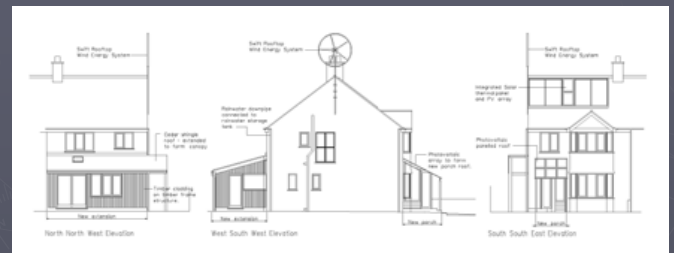
We designed, specified and oversaw the works.

The client wanted to show what was both possible and practical, in order to encourage others to follow.

A demonstration project therefore.

Observer Ethical Award

THE HOUSE NEXT DOOR



- Small 'scullery' kitchen, hence a new extension
- Improved insulation
- Rainwater harvesting
- Condensing gas boiler
- Waste water heat recovery
- Water saving appliances
- Energy saving appliances
- Low energy lighting
- Wind turbine
- Photovoltaic panels
- Solar thermal
- Window replacement
- Entrance porch
- 'Green' materials

THE HOUSE NEXT DOOR



NEW EXTENSION - TIMBER FRAME CONSTRUCTION

- as simple and constructible as possible
- Limiting the use of concrete
- Timber floor construction also



THE HOUSE NEXT DOOR



NEW EXTENSION TIMBER FRAME CONSTRUCTION

OSB deck with underfloor heating then a laminated softwood floating floor on top.

Screed for thermal mass

Lambs wool insulation to floor, walls and roof. The builders loved this, it was much more pleasant to work with.

Fermacell plasterboard cladding. It has a high proportion of recycled material, and greater impact resistance than other boards.



THE HOUSE NEXT DOOR



- TIMBER CLADDING**
- Western red cedar shingles
 - Western red cedar cladding. Class O fire treatment becoming more widely available
 - Low embodied energy and low maintenance

U-values W/m²K:
Walls 0.21
Roof 0.19

-Danish timber windows (1.1 W/m²K centre pane U-value)

THE HOUSE NEXT DOOR



THE HOUSE NEXT DOOR



- IMPROVEMENTS TO INSULATION**
- Cavity wall insulation injected; glass mineral wool fibres U-value in 65mm cavity, 0.45 W/m²K, 70% recycled material.
 - Roof insulated on the slope, boiler and hw cylinder were housed in the attic.
- Government Grant available.
- Grant for roof insulation does not apply to insulation which follows the line of the roof!

THE HOUSE NEXT DOOR



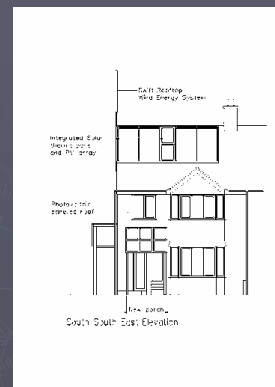
- RAINWATER HARVESTING**
- Feeds WCs, the washing machine and an outside tap
 - Fed by the rear roof slopes
 - 3500 litres with mains backup
 - A large system for a family or a single keen gardener!
 - 'Freerain' system cost £2,250

THE HOUSE NEXT DOOR



- SOLAR THERMAL & CONDENSING BOILER**
- Complete system by Ecohometec www.eco-hometec.co.uk
 - Modulating gas condensing boiler
 - Twin coil cylinder
 - Flat panel solar collectors
 - Two outputs for new underfloor heating and existing radiators
 - Thermostatic valves fitted to existing radiators

THE HOUSE NEXT DOOR



- PHOTOVOLTAIC PANELS**
- Dropped!
 - NEA also dropped from their list early on.

-The proposed 1.32 kWp array would have cost £11,200 inc VAT, and produced approximately 1100kWh/annum.

$$\frac{£11,200}{£99} = 57\text{yrs}$$

50% Grant

THE HOUSE NEXT DOOR



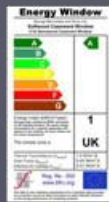
WATER SAVING APPLIANCES

- Washing machine (rainwater)
- Low flush WCs (rainwater)
- Dishwasher
- Shower (as well as bath)
- Flow restrictors (6l/s)

ENERGY SAVING APPLIANCES

- All new appliances A rated
- www.est.org.uk have a useful list
- All new light fittings low energy
- All retained light fittings fitted with low energy lamps

THE HOUSE NEXT DOOR



WINDOW REPLACEMENT

- Danish timber windows (1.1W/m²K centre pane U-value)
- Pre Building Regulations 2006. Rational was one of the very few companies that could offer high performance, environmentally friendly windows suitable for window replacements in the UK (until our UK window industry catches up)
- George Barnsdale now produces the first A rated timber framed window manufactured in the UK

THE HOUSE NEXT DOOR



Integration of New and Renewable Energy in Buildings.

BRE with De Montfort, Loughborough, Nottingham and Ulster Universities

MONITORING AND DISSEMINATION

Generation Homes programme (INREB) will monitor

'In theory 60% reductions in CO₂ emissions can be achieved on a typical semi-detached house'

Dissemination:-

- Generation Homes
- www.generationhomes.org.uk
- Client's website
- www.sageoxford.org.uk
- Awards like the Observer Ethical

THE HOUSE NEXT DOOR



POWERPIPE - WASTE WATER HEAT RECOVERY

Supplier – RenewABILITY
Energy Inc. Ontario Canada.
www.renewability.com
UK Distributor – Envirozone Ltd.
Belfast.

- Copper coils around a copper section of waste stack.
- Cold water supply circulates through the copper coil and is heated. No moving parts
- flow and energy metered
- 25-40% energy saving (for shower only in this case)

THE HOUSE NEXT DOOR



PORCH

- South Facing
- Unheated sun-space
- Draught lobby

ENVIRONMENTALLY FRIENDLY MATERIALS

- Thoroughly specified
- From 100% recycled aggregate in these paving blocks (China Clay Stent) to Auro environmentally friendly paints.