

Going Green

Green Design is actually a synthesis of two approaches, Low Energy Design and Ecological Design. KRA is keen to promote its experience and knowledge in the area of Green Design, for the benefit of both clients and the environment. Government grants are available for renewable technologies.

Basic Ideas of Low Energy Design

Reducing energy use is a statement about environmental commitment that increasing numbers of people are taking, linking global action on the environment to a local level. It helps to create a more sustainable future for us all but also reduces the costs of running our individual homes, which makes sound financial sense. The rising cost of fuel is an issue which is not going to go away.

Some ideas are cheap and may have little or no cost while some are expensive, and may take a long time to repay the investment. The ideas here are given in order of likely capital cost, least expensive first and most expensive last;

- Passive solar (orientating windows and living spaces to the South and minimising windows to the North) – should be zero cost.
- Increased efficiency of heating systems (eg condensing boilers).
- Increased efficiency of windows (eg triple glazing).
- Improved air tightness.
- Higher levels of insulation.
- Position thermal mass such as brick walls and concrete floors inside the dwelling to store heat.
- Solar panels (eg preheating of water).
- Small buffer spaces (eg porches or sunspaces).
- Heat recovery from ventilation systems or air-to-water heat pumps.
- Utilisation of wind power, geothermal or solar power
- Large solar sunspaces or conservatories. These should be unheated if they are not to lose more energy than they gain.

KRA can help determine an optimum solution based on the natural resources available on site and the client's budget. Grants are also available from the Energy Savings Trust of up to £4,000 for renewable technology such as solar panels, heat recovery ventilation, wind, geothermal or solar power.

Basic Ideas of Ecological Design

Ecological design responds to a variety of concerns about ensuring our building practices are benign, and also reducing the energy embodied in our building structures and the energy which might be lost and the environmental damage caused if the product cannot be recycled at the end of

its natural life. Some of these green building materials can be very expensive and the claims made are sometimes over the top. For instance sheep's wool insulation can cost 10 times as much as glass wool. Although it is undoubtedly a far nicer material to work with, only you as a client can decide whether this is worth the extra cost. And, by the way, glass fibre is actually 80% recycled bottles so it is not without environmental credentials!

KRA can offer clients choices but at the end of the day it is up to the client how green they want to be! Here are some basic ideas which we would certainly recommend for all projects;

- Use of timber frame. Timber is a renewable building material, and is organic and non-toxic. A typical wooden house contains 12 to 20 cubic metres of timber, equivalent to the absorption of about 14 tonnes of carbon dioxide. It requires low energy inputs to harvest, transport and mill, and is very easily recycled.
- Use of local building materials where possible. (eg Sterling board rather than Canadian plywood)
- Increased use of renewable materials such as timber cladding replacing masonry and render.
- Phasing out materials such as uPVC windows and plastic insulation except where absolutely necessary.
- Use materials which can be recycled or are biodegradable, eg built up metal/standing seam roofing, natural clay tiles rather than concrete etc., not composite metal/insulation panels.
- Minimise concrete use as far as possible (concrete is a major contributor to CO₂ production).

With all of these techniques there is a greater level of technical knowledge required, both on the part of the builder, the supplier and the architect. For instance it is possible to add insulation to the inside of an existing building, but this can cause problems of cold bridging and condensation if not correctly detailed. Also, watch out that some of these techniques can only be cost effectively applied to new buildings.

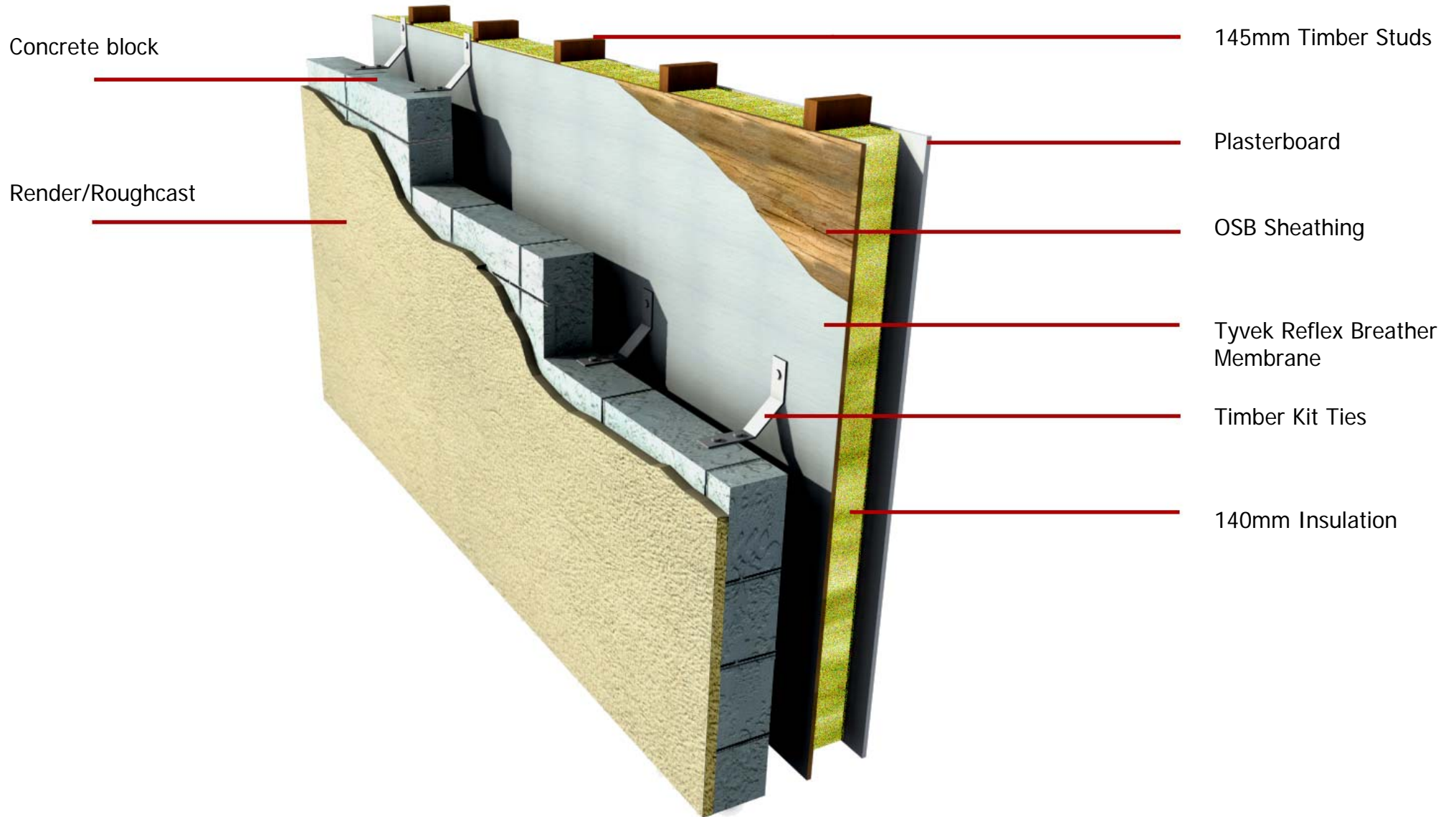
Lastly, there are what might be called "deep green" approaches to building. Some of these ideas are exciting and unusual and we have experience of them – but we don't expect many clients to go down these routes, nor are they feasible in most urban settings.

- Superinsulation. Insulate your house enough and you might be able to eliminate your heating system altogether!
- Greywater recycling. Why not use waste water from wash hand basins to flush your toilet?
- Foul water recycling. With appropriate technology and planting of reed beds, it is possible to treat all your sewage on site.
- Biodiverse construction eg turf roofs. Replacing some of the environmental habitat lost by building your new house...
- Earth sheltering. Taking advantage of the natural insulation qualities of soil by digging the house into the earth!

The following two pages include our recommendations for basic construction methods which are suitable for extensions and new-build and provide a reasonable balance between costs and environmental benefits, allowing you to Go Green without damaging your bank balance unnecessarily!

KRA also has experience of specifying renewable technologies such as windmills, solar panels, ground source and air-to-water heat pumps and would encourage either solar panels or air-to-water heat pumps as appropriate renewable technologies which can be installed at modest additional cost.

Timber Frame: Meeting the Building Regulations



The above is one way of meeting (and exceeding) the current building regulations for walls using timber frame, while having the appearance of a standard masonry house from the outside. The U value of the construction shown is 0.23. The Building Regs basic requirement is 0.30 however CO₂ reductions over a "target house" are also required. The target house wall U value is 0.25. Our recommendations are shown;

Timber Frame: Meeting the Building Regulations		Recommended Standard	Target Standard
Wall	145 x 45mm timber kit with recycled glass or recycled plastic insulation. Tyvek Reflex breather membrane on OSB sheathing. Plasterboard and vapour barrier internally.	U value 0.23	U value 0.25
Roof	Ceilings plasterboard, 250mm glass fibre insulation in roof space.	U value 0.15	U value 0.16
Floor	Chipboard on EPS 75mm on concrete slab OR PFA levelling screed on concrete slab on 100mm EPS.	U value 0.22 U value 0.19	U value 0.22
Windows	Timber double glazed 4:16:4 low E (As Nordan)	U value 1.6	U value 1.8
Rooflights	Timber double glazed 4:16:4 low E with Argon (As Velux)	U value 1.2	U value 1.8
External doors	Insulated timber with draughtseal.	U value 1.6	U value 1.8
Heating System	Alternative specification of air-to-water heat pump would provide environmental benefits in the form of around a 33% reduction in CO ₂ emissions. Similar running costs to gas boiler and grant eligible so could be installed at modest additional capital cost.	Gas boiler as Target Standard or exhaust air heat pump to client's choice.	Gas boiler fan flued 90% efficiency. Programmer + thermostat, TRVs and boiler interlock.
Air Tightness	Sealed, insulated loft hatches, concrete floors, roofspace unventilated (Tyvek Supro or Proctor Roofshield used as felt). Sealant at service penetrations and behind skirting boards. Plasterboard sealed with 2 coats Gyproc Driwall.	9 m ³ /(hm ²) @ 50Pa	10 m ³ /(hm ²) @ 50Pa

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