

Make Your Home More Energy Efficient.

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When it comes to making your house more energy efficient – and ultimately cheaper to run – there are many design options available and it can be difficult to determine which are best for your home. It is valuable to take independent, technical, professional advice. Consider engaging a registered architect in finding energy-efficient solutions to improve the comfort and cost-effectiveness of your home

Passive solar homes are very simply arranged to take best advantage of free heat, and daylighting, available from the sun. They are designed to suit their siting and the occupancy pattern of the building users, i.e. how people use their home. There is no design template as such but considerations include: a compact design, breathing fabric, natural materials, water conservation, an avoidance of any 'active' mechanical services and hence a design for natural ventilation.

'Passive House' is the brand developed by The Passive House Institute, a private Austrian organisation, which has developed this software-based design tool. It focuses on reducing space-heating demand to a specific low limit. A house designed in this way would, typically, heat living rooms supplying air through ceiling ducts, preheated by exhaust air in a central heat exchange unit; mechanical ventilation with heat recovery, MVHR. A Passive House would not rely on a gas or oil-fired hot water boiler. Both these additional services and the fabric itself require close quality-control during construction, best carried out by your architect. The building is completely wrapped in thick insulation and all sources of draughts must be sealed. Water to taps may simply be provided by electric immersion heater. There is no requirement for renewable energy sources. The system has also been adapted for energy refits, marketed as 'EnerPHIT'.

Independent research has queried the quality of indoor air supplied through ducts, if filters are not kept serviced. Although it has been used widely already, the strategy it is best suited to larger detached houses on open sites, availing of solar gain. The qualifying criteria is energy consumption over floor area, rather than per occupant. Despite the construction of energy efficient homes, each is getting larger, with smaller households. So, unfortunately, nett energy consumption per capita is not actually decreased.

Other design options include the **'Active House'**, which has been developed in Norway to balance comfort, energy and environment including primary energy consumption, per year in use and, also, measured over the building's entire life which does take into account embodied energy of the materials.

The **'Living Building Challenge'** is similarly rigorous for the USA context.

In Ireland, the **Building Regulations** apply to every new build and energy refit project, for all aspects of construction including ventilation, fire safety, resistance to moisture/ Radon gas, conservation of fuel/ energy for dwellings. For new builds, the latter is calculated by the DEAP method and requires a minimal installation of renewable energy (RE). These 'active' measures include hot water from solar-thermal panels and/or electricity from photovoltaic panels. Planning permission may be required for changes to your home and you should always consult a registered architect. You may have to vacate your home during the retrofitting.

How much will energy saving measures cost?

Costs of energy retrofitting are specific to each house, its location and access. The best way to get an estimate is based on detailed design drawings, provided by a registered architect. When costing energy saving measures, consider life-cycle cost rather than simple payback.

Opportunities for the consumer include lower fuel bills and/or increased comfort for occupants. There is grant support through the Sustainable Energy Authority of Ireland (SEAI) (www.seai.ie/Power_of_One/Grants_Available) and also income tax relief for a limited period.

What problems could arise?

Issues that could arise are if asbestos is found and has to be removed. If energy-retrofitting is badly executed, problems down the line could include a risk of damp-ingress, condensation, and dry & wet rot.

What's new in energy-efficient design?

Coming down the line from 2018 onwards, the concept of 'nZEB', stands for nearly-zero-energy buildings, which will be mainly reliant on renewable energy measures (REs). An existing house can be 'retrofitted' with energy efficiency measures.

What if may home can't be retrofitted?

Some houses may be difficult to retrofit, for example if a house has existing structural problems. In such cases a replacement dwelling may be considered. For example, in a recent project by our office the original bungalow had serious structural problems. Located on a naturally slope, it had been built on inadequate fill and the underground drainage had been damaged by the subsidence. So, demolition and rebuild was called-for.

To find out more about energy-efficient design, consult a registered architect. riai.ie



01. Passive Solar homes take advantage of the free heat and day-lighting available from the sun



02. Natural materials, good levels of light, warmth and controlled ventilation increase comfort and reduce energy bills.



03. High level rooflights ventilate and balance daylight deep into this room; bounced off vivid-colour claypaint.



04. This replacement house is compact and passive solar (fewer windows to this the north side), finished with durable natural material.