

A background to running a sustainable housing project

Sustainable Housing

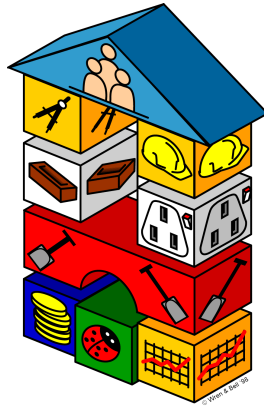
Sustainable housing has the potential to produce good quality housing at a price that is affordable both in the short and long term. The concept of sustainability (meeting the needs of today without compromising the needs of future generations) has been around for a number of years now, however its application to housing has been slow. Those projects that have been undertaken tend to focus largely on producing ultra-green housing that is extremely hard to reproduce as mass development projects.

A truly sustainable housing project should incorporate economic, social and environmental issues in the planning and design stages with the aim of providing a building that is affordable, accessible and environmentally sound. It goes without saying that compromises will have to be made, but the result is a project that can be applied to the mass housing market, where the greatest environmental impact lies.

The requirement for new and upgraded buildings in the UK is massive and it would be preferable for these new buildings to follow a sustainable path to reduce the long-term environmental impacts associated with such developments. This guide provides a background to what is involved in building a sustainable house or houses.

Planning the Project

The planning of a housing project initially involves communication and interaction between a variety of parties. These parties should include a component of environmental expertise. Due to the expert advice and assistance now available it would not be impossible for a developer to



<http://www.sustainableconstruction.co.uk>

produce a sustainable building(s) without the assistance of an environmental specialist however it would be advised that there is environmental expertise available throughout the project.

It is desirable that a forum is created for discussing all the options that are open to the project. Ideally the forum group will consist of the builders, the structural/civil engineers, the architects, the quantity surveyors and of course the developer. It is likely that the developer will have a general idea as to what they wish to be constructed and it is from this point that the forum can move forward.

A forum should encourage the active participation of all members of a design team with regards to the discussions regarding material choice. This participation will prove essential in ensuring a balanced view of materials. For example, an inexpensive material that has excellent



environmental performance may be inappropriate for operational reasons.

This may be something that is obvious to the designers but may not be so crystal clear to an environmental scientist. Conversely, materials that are routinely used in construction may have environmental issues that would not have occurred to other members of the design team. In these situations the forum acts as an information exchange but it has also is useful in situations where there is a delicate trade-off between the three criteria so that the best overall (sustainable) option can be chosen.

If the project wishes to be accredited to an environmental standard, such as BRE's EcoHomes, it is good practice to use it as an initial framework for planning the project as this will help the project gain the highest possible rating. As with all standards for sustainable design, the prioritisation of issues may not be in agreement with your own, however there is the opportunity for obtaining some "easy" credits, gained by

making simple changes to the design at minimal or no cost.

Building Design

This is a major decision in any development, particularly where sustainability is an issue, as the design of the building will play a major role in dictating the building materials used. The design of a building is generally decided and subsequently the materials selected that are required within the job, however if specific building materials are to be prescribed it is sensible that these are highlighted. Certain goals should be set out early on especially the longevity of the building. Most buildings are currently only designed to last 60yrs.

The structure of the building will be a major issue in the sustainability of the materials required for construction. Ensure that the structure that is decided upon is going to have a durable framework but also has the potential to be easily removed at the end of its life.

The energy use of the building will depend on the efficiency of the insulation and also the way in which the insulation is fitted. Thermal bridging, where two building elements meet, should be looked at closely as these areas can be major sources of heat loss. The way in which a building is heated is important. If you are increasing the insulation of a building you can decrease the heating requirements. Don't forget to take into account solar gain and also the heat given off by household appliances. Renewable sources of power should be investigated as these may be able to provide either heated water or actual power for appliances.

Electrical goods (primarily white goods) have the potential to consume large volumes of power, therefore select goods on their energy efficiency. Light fittings can be selected that will dictate energy efficient bulbs.

It is important to ensure that the outside temperature, through insulation, does not unduly influence the building although it is equally as important the building is adequately ventilated and also receives sufficient daylight. Heat exchange

extracting fans can be used to good effect in bathrooms and kitchens to ensure that the heat is not all lost to the outside.

The security of the development will play a major role in making the development desirable to live in. This is not only influenced by locks and intercoms but also by lighting and design. Access for all is influenced by door width and also steps and similar. Aspects of the development which influence how the new project will integrate into the existing community should be examined such as the capability of local facilities to support the development.

Building Materials

The materials that are used to construct the building will have a major influence on all aspects of the construction. Look at the cost of the building material from a number of angles, as a cheaper option may save money in the short term but require greater maintenance or have a shorter life-span resulting in greater expense in the long term, and with it greater environmental impact. More sophisticated insulation may cost slightly more now but over the lifetime of the project may produce significant savings in heating costs. Furthermore materials that are marketed as more environmentally sound may actually represent a greater risk through application of chemicals for improved performance or maintenance.

If the site requires demolition prior to the initial development, the possibility for re use as fill or foundations should be investigated. Ideally, any soil that is on the site should be protected on site to reduce the need for soils to be brought in. Contamination on the site should be remediated to within guidance values, if possible, with the minimum amount being put to landfill, with on site remediation techniques being investigated where applicable.



Try to source materials locally to support the local economy and also to reduce the amount of transportation required. Perversely, transportation by sea, by

weight, is by far the most energy efficient.

Timber will be one of the major materials involved in any building job. It is an ideal building material for its strength and ease of shaping. It also has the potential to be a fully sustainable building material. Ensure that when wood is purchased it is known that it is sustainably harvested. The FSC certification is one of the most rigorous checking system for timber. It ensures that the forests from which trees are taken are sustainably harvested and also that forests are replanted. Other standards exist such as Forests Forever which ensure that trees are replanted for those that are harvested. Ensure that the information that you are provided with is genuine, as many countries are still exporting timber with little regard for the environment.

Timber treatment is not always required. If the timber does not need to be treated with preservatives then there may be no real need. Various varieties of trees have timber that can be used without any form of treatment in exposed sections (eg Douglas Fir). Timber such as this can be used for cladding or even as roof tiles.

The blocks used in construction can be made from materials with a recycled content (85-90%). It is sometimes sensible to ensure the quality of the product by buying block with lower recycled content. Most other aggregate based products can also be obtained with a high percentage recycled quotient.

Insulation material can be found that are made from 100% post consumer products. The performance that they offer is equal to that of Glass Fibre but is generally more expensive. Additional costs may be incurred when using post consumer products for insulation in the form of time or else boarding. Though it is desirable for post-consumer products to be used, economics may dictate the use of standard insulation. The environmental impacts of Glass Fibre products, if



properly managed, are not significant compared to the benefit that the product offers within the building.

Plastics are liked for their flexibility and also for being lightweight. Various plastics have gained bad reputations for the pollution created during production and also for releasing chemicals into water. Most plastics can be recycled, to an extent, at the end of their useful life. Plastics should not instantly be discounted for use within sustainable buildings, however investigations should be made before they are used.

With regards to metals each has its own advantages and disadvantages all of which should be taken into account. Durability and the ability for recycling are the primary advantages whereas cost and weight are the disadvantages. Iron and steel will require to be coated to protect them from the elements that is an additional cost that should be calculated for.

At the end of the buildings life it is desirable that the building may be dismantled easily for recycling or re-use. Screws allow for timber to be removed far more easily than nails and also lime mortar can more easily be separated from bricks than cement. Both screws and lime mortar will require extra time during construction which should be calculated for.

Construction Phase

The construction phase will be the busiest phase in the building's life and with this, increased risks of environmental impact, complaints and loss of money. It is important that the impact of this is minimised. This is also going to be the first contact with the local community so it is important that the disturbance created is minimised.

Each phase of the construction should be planned out in detail with a site plan issued to all contractors informing them of the locations for storage and waste disposal, drains, fuel and other issues. This plan may have to be changed a number of times over the life of the project but it is essential to maintain a well-organised site to minimise accidents, risks and damage to materials.

Waste segregation has the potential to save money. Inert waste has a far lower land fill cost than active waste and wood waste will be collected for minimal or no cost by some companies. This requires skips to be on site at any one time, which on city centre sites may almost be impossible due to space restrictions. Further segregation of waste may be possible if space is available. It is important that procedures are developed and communicated to all parties on site to ensure that they are aware of for example the different types of waste generated the risks associated with it and the mechanisms in place for reducing these risks.



Additional benefits relating to having a dedicated storage area includes the reduced risk of damage to materials prior to use. Materials that are taken out and not used should be returned to this area to prevent materials stored at random around the site.

Oils, diesel and other chemicals should be stored in bunded areas that comply with Health, Safety and Environmental Legislation and other requirements and if diesel is regularly being transferred to plant or machinery, a bunded transfer area should also be created. The site manager should be provided with spill kits for both chemicals and oils so that any spills that do occur do not create contamination on site.

Handing Over to the Occupier

When someone buys any piece of electrical equipment they are provided with a detailed instruction manual that explains how each component works. Though few people read this guide cover to cover it is generally kept and used as a reference when and if problems occur.

A new house or development of houses should be provided with an instruction manual that explains how all the appliances work, locks are used and rooms ventilated. The document can also be used to explain how to reduce power consumption and also to increase the warmth within the building. A

list of local shops and services will serve the occupier and community well and reduce the time it takes for new residents to be integrated into a community.

Providing appropriate bins for the new owners and also the location of the nearest recycling facility should encourage recycling of household waste.

To prove the success of the building project it may be desirable to monitor the power consumption of the houses once the tenants have moved in. This information can be compared to other developments that are not as sustainable to prove the long-term economic benefits of a properly insulated building.