Department of Geography

University of Leicester

GY3154 Contemporary Environmental Challenges



Lecture 3

Low Impact Development and eco-communities

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INTRODUCTION

- Looking an inspiring examples and how try to overcome some of the political tensions identified last week
- What do LID and eco-village approaches offer us?
- How, in particular, do they tackle environmental and economic tensions
- Have worked with those who are involved in the design, physical build, and then occupation of a variety of eco-houses

A. What are LID's and eco-communities

DEFINITIONS

Springhill Co-housing

- Low Impact Development
- Eco-village
- Eco-communities
- *Co-Housing*: some shared facilities (eg energy/ heat production, waste management, gardens, meeting rooms, child care) but individual dwellings
- Individual eco-construction
- Housing Associations: i.e. Sustainable Homes Ltd
- And variables inbetween

Defining eco-building

- An eco-building minimises resource use (in construction and life-cycle) while also providing a comfortable environment in which to live.

- A good eco-building balances our need for comfort with ecological impact. An extremely ecological house that provides no comfort does not satisfy our human need for a home.

Breadth of approaches between;

- Buildings which use technology to reduce their environmental impact and **those which rely upon natural materials and a low impact lifestyle.**
- The more natural buildings can actually have a negative carbon footprint because materials like straw actually store CO_2.
- Eco-building thus requires careful consideration of location, materials, resource use, toxicity, durability, reclamation potential, biodiversity, aesthetics, relation to community, and the ongoing dynamic relationships between people and their homes

Low Impact Development

- Low Impact Development (LID) is a form of low impact living, a deep green vision where we minimise our environmental impact in all aspects of our daily lives
- LID is a radical form of housing and livelihood that works in harmony with the landscape and natural world around it

Brithdr Mawr

They are environmental in their construction, maintenance, and in the ways in which they are lived in. Many of them are also autonomous – operating with their own non-mains electricity and water supply, and with minimal visual impact. These experiments offer us small-scale solutions and inspiration for radically rethinking how we construct and live in our homes

Low Impact Development is a combination of:

1. land-based livelihoods
2. carbon-neutral houses which blend into the landscape
3. with a positive contribution to society

- “a low impact development is one that, through its low negative environmental impact, either enhances or does not significantly diminish environmental quality” (Fairlie, 1996)

"A LID has a low visual impact by blending with its surroundings, is built from local, recycled or natural materials, is small scale and environmentally efficient. They are autonomous in the sense that they generate their own energy (through wind, solar or water power) and deal with their waste (through recycling and composting) thus they are not connected to mains supplies.

In addition LID is about more than just the construction of environmentally-friendly dwellings: it is about the *way* we live. Implicit in the LID approach is an emphasis on minimising vehicle use, creating livelihoods largely from the land on which we live, reducing consumption and purchasing other items locally. Moreover, LID can positively enhance biodiversity and is reversible" (Pickerill, 2008)

Eco-villages and eco-communities

- Intentional communities
- Mixed goals but often include becoming more socially, economically and ecologically sustainable
- Share values
- Growth of international eco-village network
- Focus on community
- “human-scale full-featured settlement in which human activities are harmlessly integrated into the natural world in a way that is supportive of healthy human development, and can be successfully continued into the indefinite future” (Gilman, 1991)

How compare to other eco-builds?

- High tech solutions as main alternative approach
- Can involve use of technology *per se* (such as solar panels and photovoltaic) or high spec building
- Passivhaus – as very high spec building. Built to strict standards and very box like structure
- LID often more free-flowing in design and structure. Each house unique and self-crafted

Key features of eco-village

Tinkers Bubble, Devon, UK

- Self-build/ Do-it-yourself (NaSBA report, 2008)
- Collectively/ sharing/ communal
- Care for others
- Low-cost
- Minimal environmental impact
- Requires change of lifestyle/ income
- Changes relationships – gender equality?
- Autonomous – generates what need
- Minimal resource use (in construction and lifecycle)
- Often rural (in UK)

B. Implications

Eco-housing tensions

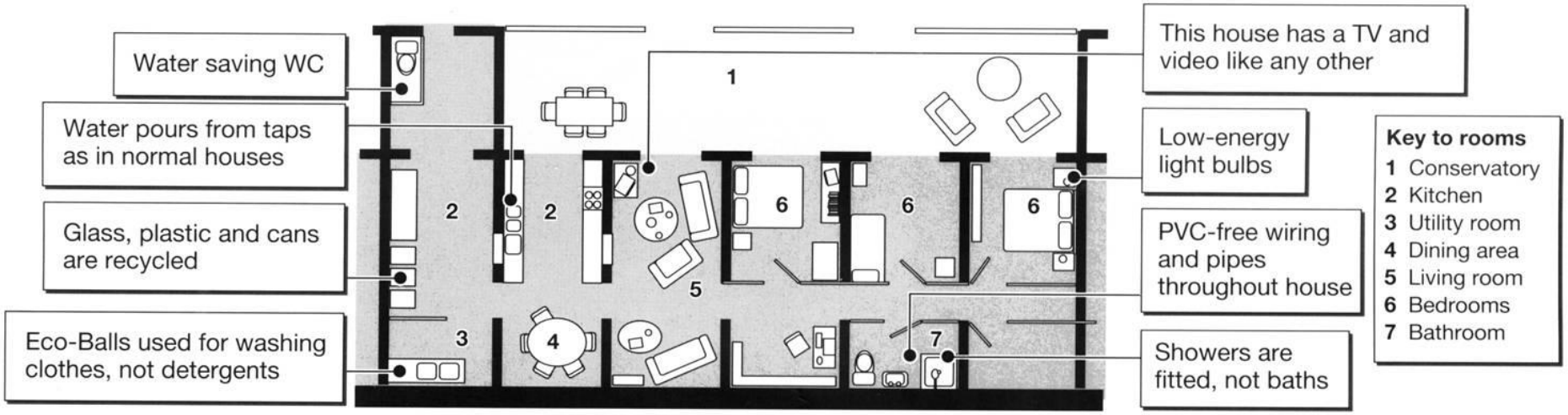
- Key areas of tension around eco-housing in Britain:
    1. CO_2 and energy
    2. Standards
    3. Supply
    4. Demand
    5. Land and location
    6. Knowledge and Innovation
    7. Affordability
- Use exemplars to explore success (or failure) in each tension
- Inspiring and leading projects, not assume that meant to be replicated in current form, learn from what works and failures

1. CO_2 and energy – **Hockerton, UK**
2. Standards **– Lammas, UK**
3. Supply and Demand – **Kailash Eco-village, USA**
4. Land and location – **La ecoaldea del Minchal, Spain**
5. Knowledge and Innovation – **Pun Pun, Thailand**
6. Affordability – **Dignity Village, USA**

CO_2 and ENERGY: Hockerton

- Hockerton: Five house earth-sheltered terrace in Nottinghamshire
- One of early LIDs in UK
- Won a number of prizes for energy efficiency and zero-carbon emissions
- The structure has a particularly high thermal mass because it is built into a hill with large insulating walls
- It is self-sufficient; wind power is used to generate electricity, they harvest their own water, and a reed bed system is designed to dispose of their sewage
- Hockerton video (7 minutes)

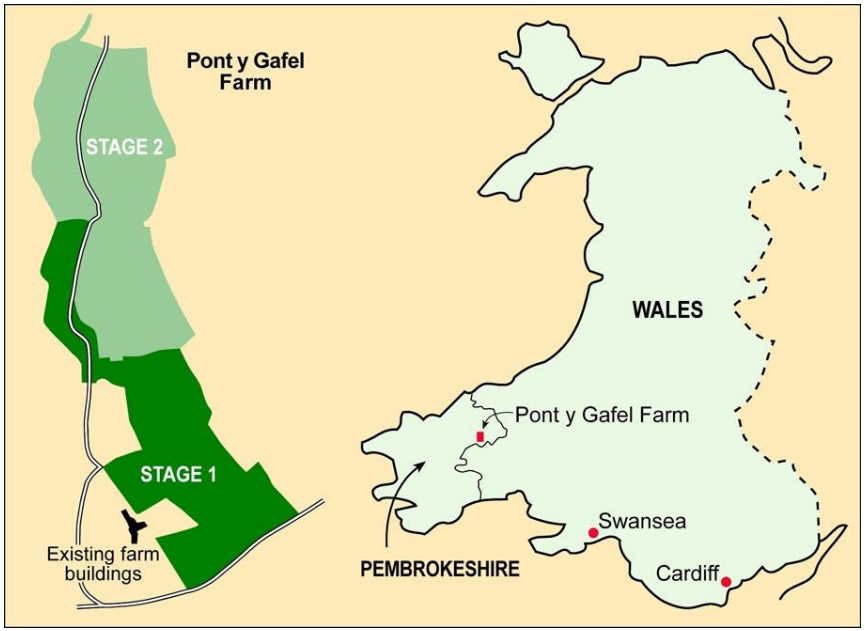
The interior



Does Hockerton solve energy issues?

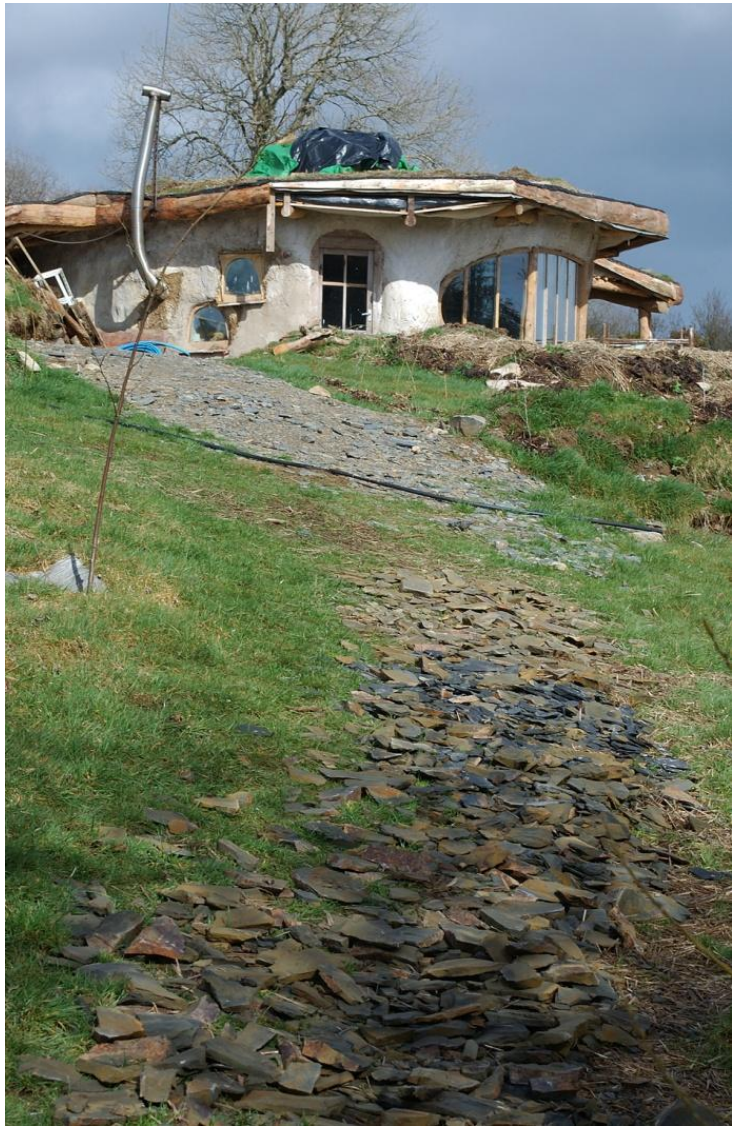
- Proved it can work with a replicable and simple design (no heat)
- Radically reduced energy use and CO_2 emissions
- *Limitations:* High use of concrete, internal design not popular, issues of light internally, need large amount land (all south facing), not everything worked (have had to make adjustments)
- Acts as education and political lobbying centre. See role as expanding good eco-housing across UK

STANDARDS: Lammas



- A new settlement of eco-smallholdings. Sited on 175 acres of mixed pasture and woodland next to the village of Glandwr, Wales
- The first stage will see the establishment of 9 smallholdings, a campsite and a community hub building
- Planning APPROVED August 2009
- Received government funding for community hub
- First stage of houses complete

Lammas, Wales



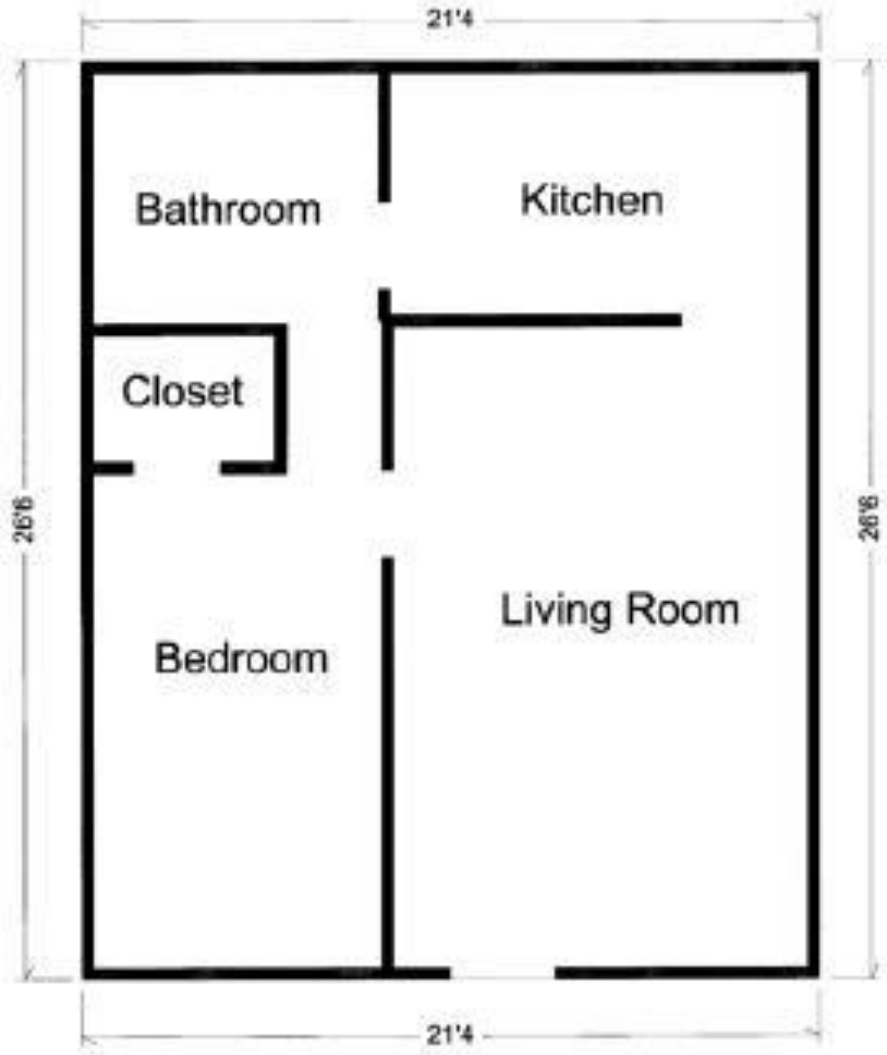
Impact on standards

Has Lammas improved standards and building regulations, or proved that they are unnecessary?

- Lammas - Inspectors comes to call (5 minutes)
- Challenged standards, but not necessarily sought to improve them
- *Limitations:* Instead sought exception from them, in much the same way that sought exception from planning limitations
- As a result does this reduce the ability of others to replicate of their designs?
- Is it too early to judge given that only first stage of houses are complete?

SUPPLY AND DEMAND: Kailash Eco-village

- SE Portland, USA
- Existing 1959 apartment building which has been eco-retrofitted
- Urban project which enables people to rent eco-units and participate in some collective activities
- Explicit focus on affordability – using a rental rather than owner model
- Allows people to try out community living without the risks (or barrier) of capital investment



LIVING AREA
565 sq ft

Changing supply and demand

Has Kailash increased supply and changed demand for housing?

- Units can be rented at approximately $650 a month in 2010, low for the area
- Provided small-scale units for single people, missing in eco-housing provision
- Increased supply by retrofitting and 'reclaiming' homes in rundown area
- Challenged emphasis of ownership
- *Limitations:* But at same time is ONLY suitable for small households, units are all same size and so limited expansion for later in life – limits long-term community potential. Not collective in decision-making. Not really challenged demand, except to suggest people live in smaller spaces

LAND and LOCATION: Spain

- La ecoaldea del Minchal, Molvizar, Andalucia, Spain, started 2007
- Hot and dusty, the dryness of land and exposure to the wind makes for a potentially harsh environment
- Every bit of land is being put to use to grow a huge variety of fruit trees – bananas, papaya, avocados and mango
- The village is spread across a number of terraces cut into the hillside
- There are yurts, a wooden timber frame house, and a house which is a mixture of wooden cabin, solid all construction, traditional Spanish tile roof, eco-design and traditional Spanish appearance
- The most magnificent is a zome

Using different land

Has La ecoaldea del Minchal challenged the issues of land provision and land being too costly?

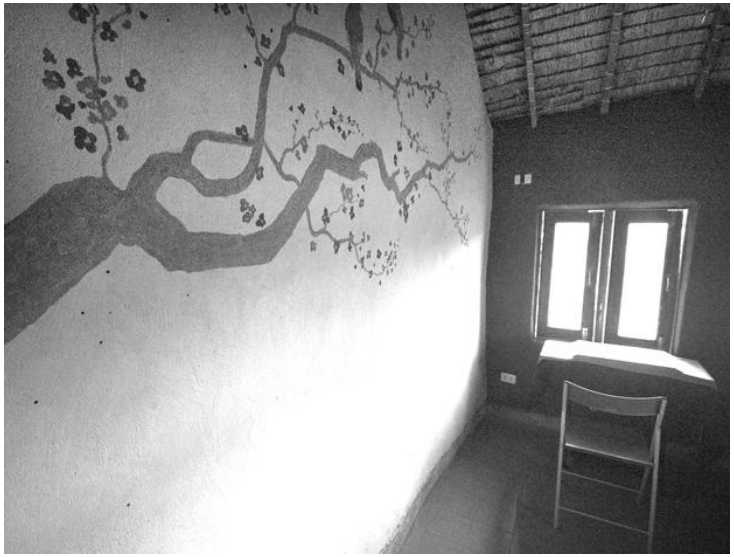
- It has in that has used land others thought worthless – terraces high in the hills
- Proved that can live and grow food in marginal land
- Chosen area of Spain where planning and building regulations are lax, so shows sometimes have to location to enable eco-housing
- *Limitations:* Not everyone can move location, quite remote, need vehicles to access it. Harsh climate
- Similar to Earthships in New Mexico and Lammas in Wales

KNOWLEDGE and INNOVATION: Pun Pun

- Pun Pun, Chaing Mai, Thailand
- Just 20 Rai of land which locals considered to have very poor soil and thus had little promise
- Motivated by a desire to be self-reliant, as many Thai's once were, and thus providing the four basic needs of life – **housing, medicine, clothes and food**, for yourself
- Combination of adobe and metal supporting beams with a concrete aggregate-fibre tiled roof
- The process of building has been experimental and has had to adapt to the tropical climate
- Need to find a long-lasting cheap alternative to concrete which is rapidly becoming the build material of choice across Thailand
- This emphasis on simplicity, collectivity, and using an easy technique all help make these buildings affordable


House at Pun Pun


Cafe at Pun Pun



What materials to use?

Estimation of expertise, precision, cost and time for different materials

Build method and material	Expertise necessary	Precision required	Ease of learning	Cost of materials	Time taken	Totals
Concrete	2	4	1	3	3	13
Adobe	2	1	1	2	8	14
Straw bale	5	3	2	2	3	15
Hybrid: straw and adobe	5	3	3	2	5	18
Rammed tyres	6	3	3	3	6	21
Cob	5	2	2	2	10	21
Wood	7	8	5	8	5	33
Bamboo	8	9	7	6	3	33

Numbers out of 10, with 10 being the hardest/ most time-consuming and 1 the easiest/ quickest to do

- Adobe is one of the few alternatives which can be freely, or at least cheaply, sourced locally, learnt easily and yet still has a robustness and longevity which can entice people away from using concrete
- Pun Pun deliberately focuses on working with groups who want to build together
- Without knowledge will use easy and cheap materials – concrete
- ‘whenever you are doing something, if it is hard, it is wrong’

AFFORDABILITY: Dignity Village

- Portland
- This site has been built and run by homeless people to give them free housing
- Started as a squat protest and negotiated permanent land access
- Built using all sorts of scrap reclaimed materials – wood, straw, adobe, metal
- Donated material and donated labour, but also whole system of organising themselves
- Free to live, but there are certain criteria
- Dignity Village (7 minutes)

Homes for the homeless?

Has Dignity helped solve the affordability problem?

- Yes, in that enabled homeless to build their own homes, as they wish and how they want
- Very cheap
- Enabled creativity rather than force people to live a certain way
- Maintained and built community

- *Limitations:* Houses not that ecological, overall poorly insulated. Straw-bale house has been badly maintained because skills not passed on (or resisted).

Tension	Positive contribution to solving	Not helped resolve key tension
CO_2 and energy	✓	
Standards		✓
Supply and demand	✓	
Land and location		✓
Knowledge and innovation	✓	
Affordability	✓	

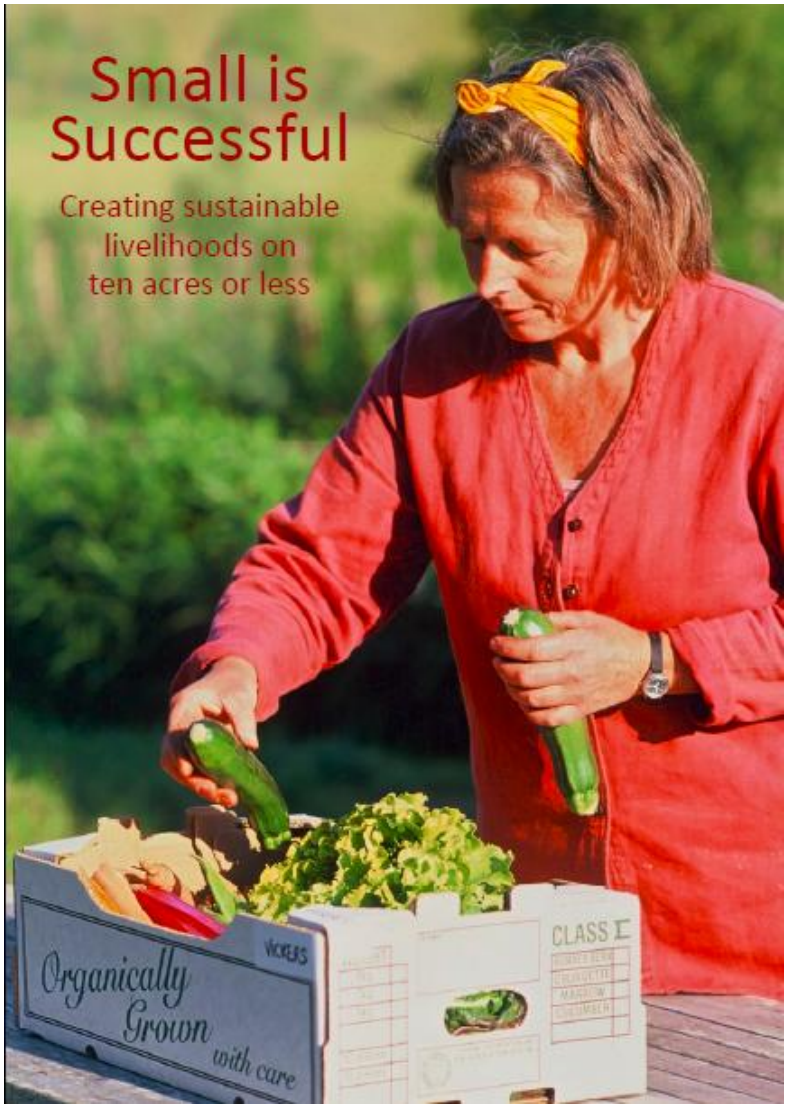
OTHER ASPECTS: Gender

- Eco-building is gendered in that is it perceived to be a male domain where men are presumed to be better builders, more men than women actually build and women find their ideas and contributions to eco-building are often belittled
- It was rarely acknowledged how much work women were doing on build sites
- The assumptions about male skills and strengths which might not necessarily be true, are perpetuated.
- Female voices are excluded from design discussions and women's ideas about eco-building are often ignored, not acknowledged and not listened to
- The history of women-led building (for example in Pueblos in New Mexico, USA) is often not acknowledged
- Socially constructed notions of gender have determined that strength is the most important attribute required

Comfort

"A minority of environmentalists are indeed fools who indulge in fantasies usually involving back-to-the-land romanticism ... and a hatred of the **very industrially derived comfort** that feeds them and affords them the cyberspace in which to spout their nonsense"
(Mark Lynas, 2012)

Income



- Require changing work patterns
- Back-to-the-land?
- Work by Ecological Land Co-operative been looking at how to live sustainably from land, and how much land one would need – only need 10 acres for economically viable projects, even on marginal land
- Need enterprise diversity
- Horticulture rather than livestock
- Could have changed gender relations, but rarely has

Permaculture

- Eco-construction cannot be dealt with apart from many other environmentally-friendly principles.

- Many of the LIDs and eco-villages have incorporated ways of live which involve a consideration of what community means, alternative education systems and adopting the principles of permaculture

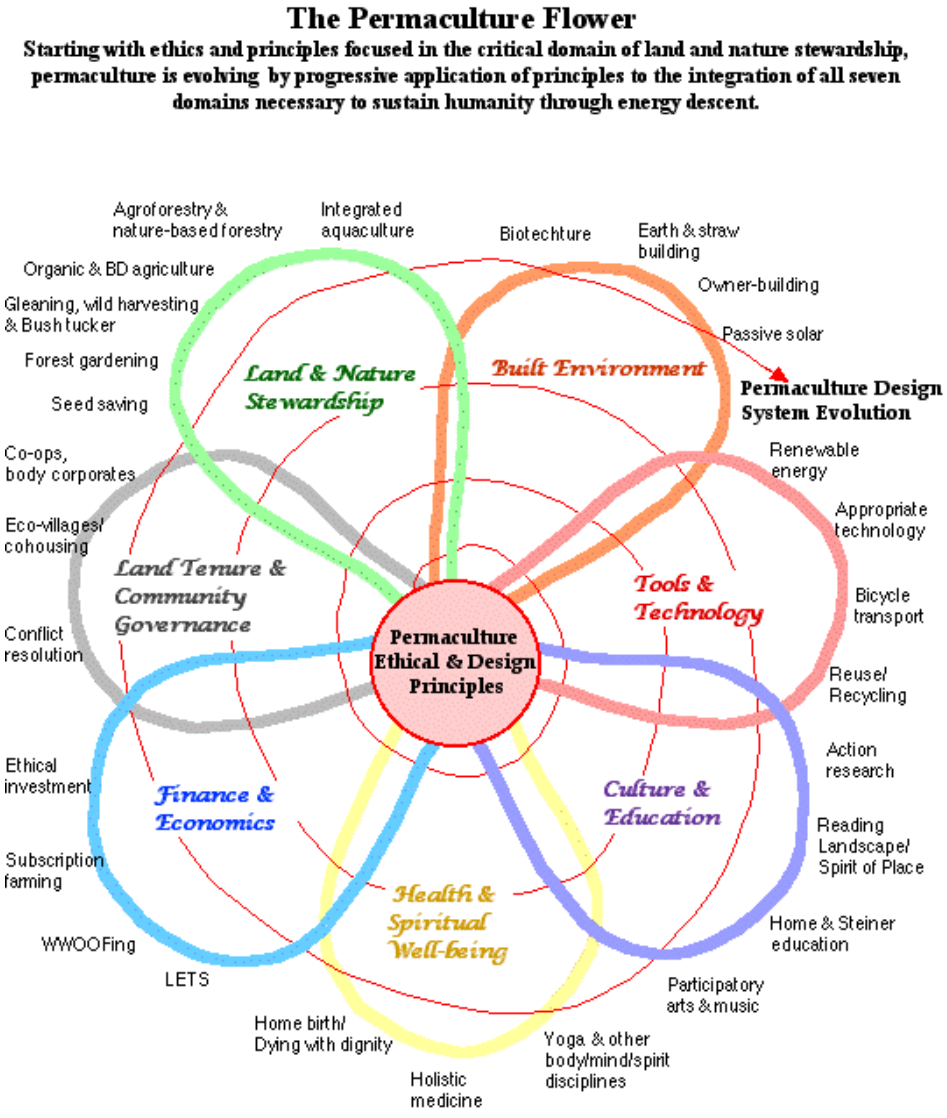
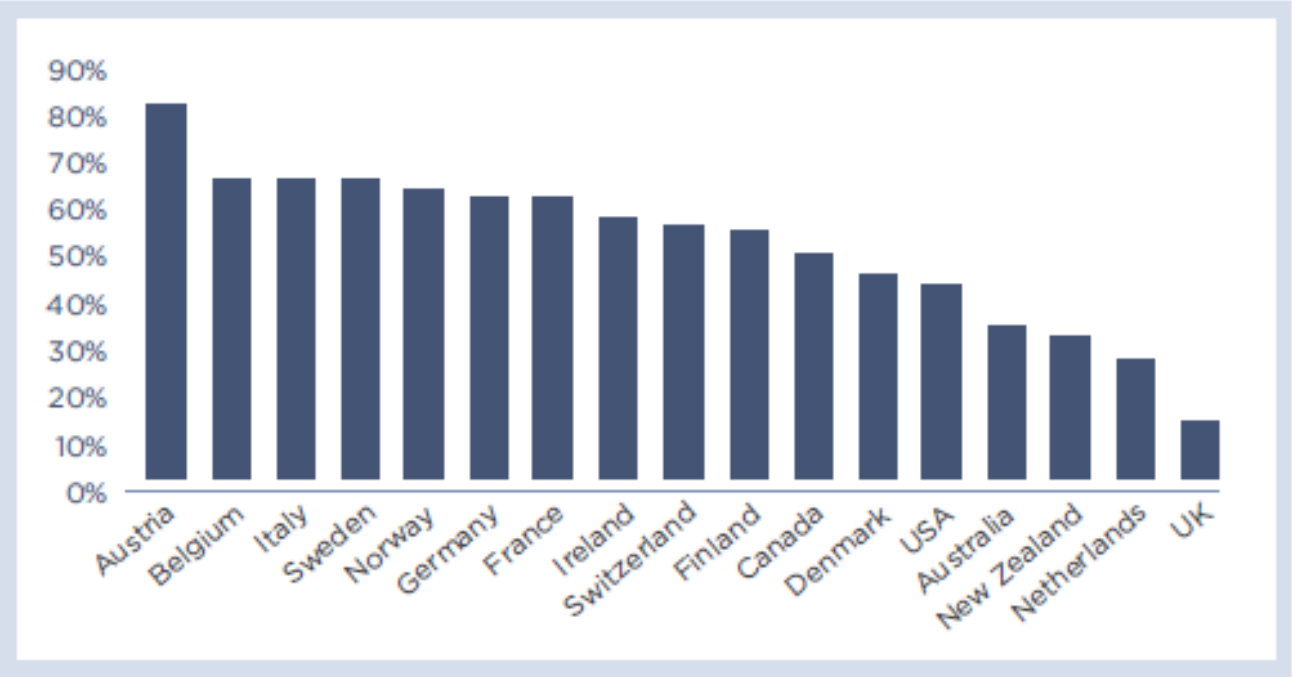


Figure 1 Introduction, Permaculture: Principles & Pathways Beyond Sustainability 2002

Self-build



- Percentage of houses built through self-build route (NaSBA, 2008)
- Increasing pressure for more support for self-building in UK

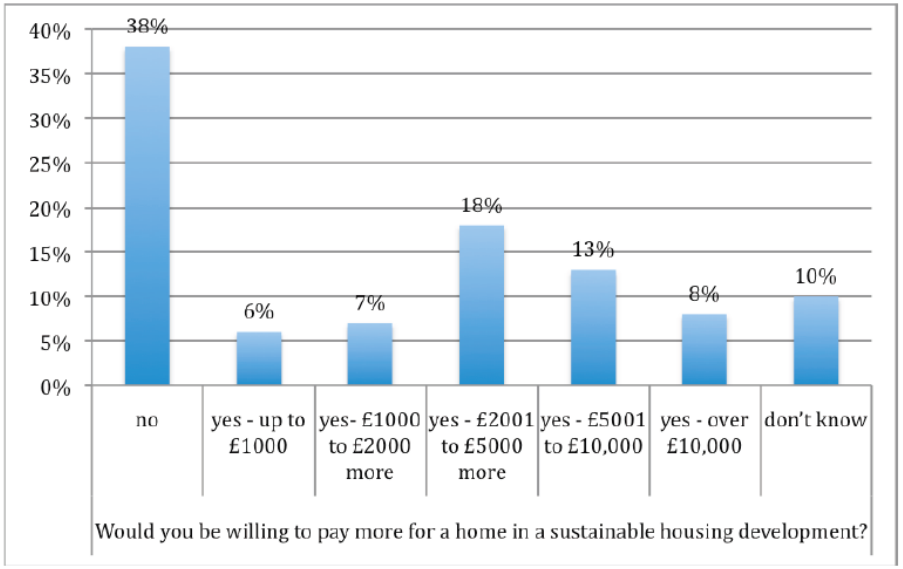
Barrier	Type of barrier
Resistance to greater up-front investment in housing in return for cheaper life-cycle costs	Financial
High cost of land available for building	Land ownership and planning
High cost of professionals and experts	Financial and regulatory
Lack of appropriately trained professionals	Education
Cost of adhering to planning and building regulations	Legislative
Perception that expensive technology is required to build an eco-house	Myth and education
Perceived need for privacy and opposition to sharing facilities	Social and cultural
Emphasis upon individual private construction and ownership	Social, cultural and financial
Lack of practical build skills and undervaluing of manual skills in building	Practical education
Competitive tendering process in construction which encourages poor quality building and prioritises profit	Financial

What can we learn from low cost eco-housing?

- How to overcome problems encountered in eco-building
- The importance of talking about failure
- Why people resist eco-housing
- How cheaply we could build houses
- What we need houses to do for us
- The importance of diversity in eco-building
- The need to understand the technical and structural aspects of eco-housing alongside the sociological approaches

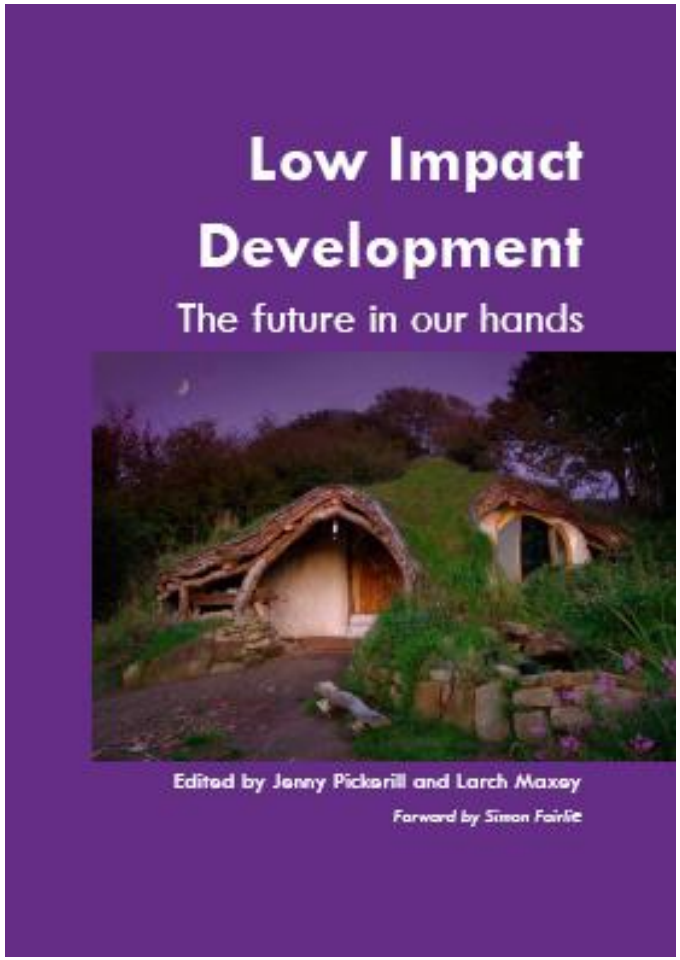
Impact on mainstream

Figure 1. Willingness to pay more for a home in a sustainable housing development—responses from UK residents (Source: 7).



- Are LIDs and eco-villages viable and suitable for current house desires?
- Broer and Titheridge (2010), table 6 (p.2109), argue that eco-self-build does in main satisfy home buyers priorities

Lecture summary



- Changes to houses require radical changes to how we live, beyond just the house structure
- Planning approvals: shift in trend towards acceptance of radical housing solutions?
- Can we take aspects of LID and eco-village living, or do we have to have holistic approach?
- NEXT WEEK: Transition and replication

- Would you live in a low impact development, if not why not?

Key reading this week

- Broer, S and Titheridge, H (2010) Eco-Self-Build Housing Communities: Are They Feasible and Can They Lead to Sustainable and Low Carbon Lifestyles? *Sustainability*, 2, 7, 2084-2116

- Fosket, J and Mamo, L (2009) *Living Green: Communities that Sustain*. New Society Publishers, Canada. (Chapter: Living Green – an Introduction)