# Environmental cohousing: a contribution to sustainable living

**Jan Maskell discusses the potential of environmental cohousing to encourage and support sustainable living. She describes the recently completed Lancaster Cohousing project as an example of what can be achieved.**


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Children play at Lancaster Cohousing's new eco-development

According to the Carbon Trust, the energy used by domestic buildings in the UK accounts for approximately 25% of the UK's total greenhouse gas emissions.[1] One government policy to help reduce these emissions is the target for all new buildings to be carbon neutral by 2019. Lancaster Cohousing (LCH), a recently completed housing development in the North of England, has been built following the model of environmental cohousing.[2] Through its physical design and communal practices, it aims to be one example of how carbon neutral housing can be carried out, while also making a contribution to the wider goal of sustainable living.

## Introducing environmental cohousing

The concept of cohousing began in Denmark in the 1960s. It has been developed in the US and is now taking off in the UK following the success and example of LCH and other projects. Cohousing is typified by four characteristics:[3]

1. designing in order to create intentional neighbourhoods;
2. a minimum provision of essential private and common facilities;
3. a size and scale suitable to foster and sustain the necessary community dynamics; and
4. cohousing residents have the final say about all aspects of their neighbourhood.

Environmental cohousing adds the element of eco-build and a desire for environmental sustainability to the values shared by residents, evident in the LCH vision to: "create an intergenerational cohousing community… built on ecological values… enabl[ing] sustainable travel… designed to facilitate... a full neighbourly community… The project will be a cutting edge example of sustainable design and living. It will act as a catalyst and inspiration for significant improvements in the sustainability of new development".[4]

What then are the design and community aspects of environmental cohousing that enable it to contribute to sustainable living and differentiate it from other forms of development?

## Site location

The site of the LCH project meant that the design could take advantage of a south-facing aspect over the river Lune for solar panels and heating through 'passive solar gain'. A 160 kilowatt (kW) hydro-electric plant will also take advantage of the river, contributing to the carbon neutral aspirations of the project, eventually exporting electricity to the national grid. These design aspects could have applied to any eco-build development on this site, so what makes this different? At LCH, the difference is the contribution the residents make to the choice of location and design and then sharing the benefits of renewable energy generation across the community, rather than for an individual dwelling.

## Site design

The site design and layout of the homes have been developed in ways that maximise social interaction and emphasise community. The overall design concept combines individuals' requirement for private space in their own homes with shared common facilities. LCH has a total of 41 homes from one-bedroom flats to three-bedroom, three-storey houses each costing a similar amount to local comparable properties.

Creating intentional neighbourhoods that encourage community dynamics was a key issue for the design at LCH. The pedestrian street that runs through the site means that residents have to walk past each other's homes and in so doing will interact with their neighbours – contrast this with the usual walk from front door to car. The project has car-free, open spaces between houses which means that children can play safely outside.

The 'common house' is at the heart of cohousing design with communal cooking and eating facilities, laundry and a children's room. The development at Lancaster also benefits from a refurbished mill building offering environmentally-friendly office and work space. Advantageous rents are offered to residents to encourage working close to home and reducing the need to travel.

## Homes design and construction

At Lancaster the decision was made very early in the project to work towards achieving the PassivHaus standard and Level 6, the highest level, of the Code for Sustainable Homes (CSH).

PassivHaus design focuses on three aspects:

- minimising heat loss through super insulation, triple glazing and compact form;
- minimising ventilation heat loss, heat recovery ventilation and airtight construction; and
- optimising solar gain for winter heat.

Through careful attention to these factors, energy use for heating is planned to be 15 kilowatt-hours per sq. metre per annum (kWh/$m^2$.a). The average for UK housing stock is around 200kWh/$m^2$.a with new build ranging from 50-100kWh/$m^2$.a so the savings

are considerable. Hot water and the one radiator in each home are supplied from a central biomass boiler via a district heating network, with locally-sourced woodchip as the fuel, and water pre-heated using solar thermal panels. This offers economies of scale with only one pump and control system needed rather than one for each house. A priority was reducing the energy used in the homes as it is a significant component of their environmental impact.

The U values of the design – the measure of heat loss from the elements of a building – are between 0.09 and 0.89 watts per sq. metre per Kelvin ($W/m^2K$). These are much lower than building regulations requirements, partly through high levels of insulation and partly through careful design to minimise 'thermal bridging'. For example, service pop-ups were taken through the floor rather than the walls and sealed with grommets. Mechanical ventilation, using low power fans, provides fresh air day and night, warmed to room temperature by a heat exchanger transferring the heat from the exhaust air from kitchens and bathrooms. This gives a comfortable and healthy indoor environment with no draughts or cold spots.

Lancaster has also achieved Level 6 of the CSH with 100% of the available credits awarded under this scheme in the mandatory areas of energy/$CO_2$, water, surface water run-off and waste. 71% of the available credits were awarded for materials due to the 'educated guesses' needed for non-standard construction. The materials used at Lancaster include recycled aggregate and 'ground granulated blast furnace slag' as a cement substitute in the strip foundations' concrete, and recycled glass soft mineral insulation.

The private homes are well designed with open plan living areas. One of the aims of a lighter footprint is to downsize and de-clutter through sharing facilities and resources. Not only is there less need for personal storage but there is less need to purchase new items, such as tools, as a neighbour is very likely to have what you need. For example, why would each household need to own a drill that would only get used for an average of eight minutes a year, when the community can own one that gets used more efficiently?

Residents have participated in the design of their homes, working with the design team to meet the standards they required. This was achieved through consensus decision-making processes, workshops and value engineering. A recent Technology Strategy Board 'building user survey' (BUS) was undertaken which revealed that the residents were very positive about how well their houses perform. Responses for


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The pedestrian street

all eight main categories – air quality, comfort, design, perceived health, lighting, needs, noise, and temperature – were all higher than the UK 2011 BUS Housing benchmark. In five of the categories the project was either the highest or second highest performer when compared with other studies.

## Policies

Consensus decision-making applies to all the policies that have been established at the Lancaster project and is a fundamental part of cohousing, contributing to community involvement.

LCH, in spite of being three miles away from the city, has an ambitious travel plan, acknowledging that transport is a significant proportion of most people's carbon footprint. Cars have been kept to the edge of the site with low or no car ownership levels complemented by car and lift sharing schemes, ample cycle storage, cycle paths to the city centre, and increased use of public transport. Having fewer parking spaces also means more green space on the site.

Vegetarian and vegan communal meals are prepared by residents four times a week – contributing to a lower carbon diet. A food co-operative enables bulk buying for these meals and residents' use: reducing packaging and shopping trips, as well as keeping food costs down. Long term, the aim is to grow much of their own food but this is currently hindered by the contaminated soil – a legacy of the oil cloth manufacture on the site.

## Community benefits

According to Meltzer, the sharing and support dimensions of the social relationships in cohousing significantly improves residents' pro-environmental practices.[5] Sharing is a defining feature of cohousing – facilities, cooking, eating, cars, and decisions – as well as the informal sharing of personal possessions. All serve to reduce consumption. Support comes from valuing each other, being useful to one another and sharing a commitment to the common vision. Social, practical and moral support combine to influence practices.

There are personal benefits for residents through sharing that equate to savings in time, money and resources. A sense of belonging to the community helps to meet affiliation needs and contributes to subjective well-being.[6]

## Conclusion

It is clear that in order to achieve the reductions in greenhouse gas emissions at the individual, household and community level needed for a sustainable environment, significant changes must happen. Environmental cohousing offers a viable solution that can reduce impacts through high quality design and construction of homes, considered use of onsite renewable energy technologies, and the communal sharing of resources. For residents there are the benefits of saving time, money and other resources, and the feeling of well-being that comes from knowing that you have made a key contribution to environmental sustainability.

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Other references are available on request from the author at: <jnmskll@gmail.com>