



## Innovation: designing for a sustainable future

*The design of Hockerton.*

Narrator

This is the Hockerton Housing Project, embedded into the landscape north of Nottingham.

It's the UK's first earth-sheltered, self-sufficient ecological housing development.

Nick Martin

One element about the houses was they had to be economic; a lot of other earth shelter designs are one offs designed specifically for one person and usually with a fairly high budget. This had to be fairly low budget, had to be very build-able in the sense that we weren't going to have specialists in to do any of the work, which is why we came to the form of a terrace rather than 5 separate houses.

Everything for the houses had to come off the shelf at the builders merchants, it had to be a very low tech solution so it wouldn't be in the realms of the specialist, anybody could go and do it, just go down to the local builders merchants, get the materials, get them delivered and get on with it.

Narrator

The houses, with their distinctive 19 metre long conservatories, are amongst the most energy-efficient purpose built dwellings in Europe.

Nick Martin

The principle governing were that a) it had to have no heating requirements and once you start off with that requirement then the design, built form was going to revolve around that and then you've got to look at the orientation, you've got to look at the construction materials, everything about the house has to be geared to the heating requirement.

Narrator

The roof, floor and rear wall are all insulated using polystyrene foam that's been blown without the use of CFCs or HFCs.

Nick Martin

We were then able to moderate the external environment of the houses by the buffer zones along the front with the conservatories and the earth sheltering at the back.

And what that in reality means is that there's no part of the house that will ever see freezing but also in summer the earth has a cooling effect so it will never overheat.

Narrator

The houses were designed to be heated by body heat from the occupants, waste heat from appliances like fridges, freezers and TV sets, and solar gain from the conservatories.

Broadly speaking it's about a third from the occupants, a third from the appliances, and a third from the sun.

On cooler days, a heat recovery unit transfers 80% of the heat in outgoing air to warm the air being taken into the house.

And a heat pump takes heat from the conservatory and uses it to heat water for baths and washing.

Trudi Macagnino

We love living in the house. It's very spacious, it's very light, it's very warm when you want it to be warm and cool when you want it to be cool. There's lots of space for the children, there's lots of nice areas you can relax in and it functions really well – it does what it's supposed to do.

Narrator

Because there's no heating system, there are no automatic controls.

Trudi Macagnino

You find yourself just reacting without having to think about it. It's not a great effort. You notice the temperature going up or down and you react accordingly. You either open skylights or you close doors but it becomes a very natural way of being in the house.

Narrator

Living at Hockerton involves more than just being in tune with the house – it's about living in harmony with the environment.

Trudi Macagnino

I think the thing about Hockerton is that the lifestyle encompasses so many different aspects of sustainability and so there are lots of things we have to think about. We have to think about how we manage the 26-acre site in an environmentally friendly way, we have to think about how we grow enough food for the five houses. We have to think about what kinds of detergents and toiletries we use.

Narrator

From the start, the community has had very little reliance on external services.

Nick Martin

Once you've done away with need for oil or gas for heating, then you start thinking about trying to get away without electricity being supplied by outside suppliers, and then it follows you start looking at water and sewage treatment.

Narrator

Drinking water is rainfall collected from the roofs.

The underground storage tank holds enough water for up to 250 days.

It's filtered then sterilised with ultra-violet light before use.

The reservoir takes water from fields and the road. It's filtered through sand before being used for washing and other domestic or agricultural purposes.

Wastewater is treated using reed beds. Bacteria on the roots feed on the effluent material, leaving water that is close to bathing water quality. The purified water flows into the reservoir to maintain supplies even in dry weather. The community is also moving towards being self sufficient in electrical energy.

Two small wind turbines have recently been installed in the field to the east of the site.

And the roofs now have sets of south-facing photovoltaic panels.

The renewable sources are supplying about seventy percent of the sites electricity needs. But it still relies on fossil fuel to power at least some of its transport needs.

Trudi Macagnino

One of the conditions of the leases on the houses is that each family can only have one fossil fuel car, and even then you question each journey you make in that fossil fuel car.

Narrator

Car sharing is an established part of Hockerton community life, and now they're generating their own electricity, they have been trying out electric and dual fuel vehicles. But most local journeys continue to use pedal power. Even the approach road is part of the project's low energy plan.

Nick Martin

The plan was always to have 5 dwellings of some sort because that would mean that we wouldn't have to go for an adopted road which involves street lighting and tarmac and all the rest of it. We didn't want a situation where we had very low impact houses and a very high impact road down to them.

Narrator

Although 5 dwellings remain the limit for the Hockerton site, the project offers many pointers to a more sustainable lifestyle.

Trudi Macagnino

For other people who may be thinking about the way they live, the kind of changes they make, they can do things on a more limited scale. It doesn't have to be this big. There are smaller things, smaller changes that people can do that really make a big difference in terms of the environment and the way we live. And so you know it doesn't have to be this way, this is just one model but you could take any one aspect and incorporate that into your lifestyle and you would be making a difference.