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## Is this the greenest city in the world?

Eco housing, car-free streets and socially conscious neighbours have made the German city of Freiburg a shining example of sustainability. But this brave utopian vision of clean living has its fair share of dirty linen, finds Andrew Purvis

It is 6C outside, and a dusting of snow can be seen on the Schauinsland - the low hill overlooking Freiburg, where the good burghers of the southwest German city take their children hiking. In Meinhard Hansen's apartment, however, it is perpetual summer; the sun streams in through tall, south-facing windows and a gauge on the wall reads '24C'. Next to it, the words 'Heizung 0' appear in a small glass window. 'Heating, zero,' Meinhard translates. 'In fact, we haven't switched the heating on for weeks.'

While a typical home in Germany (or Britain, for that matter) squanders 220 kilowatt hours of energy a year for each square metre of floor space, this one wastes 15kWh/m<sup>2</sup> a year. 'My mother-in-law has an old house in the country,' says Meinhard, 'and she uses 6,000 litres of oil a year to heat it. We use 150 litres.' On one wall there is a radiator, but it is stone cold. 'It's just for psychological reasons,' he says, 'because my wife never believed this was possible.'

The impossible dream was a 'passive house' where no active system is needed to maintain a comfortable temperature. Super-insulated with foam and lagging up to 30cm thick, the flat is triple-glazed and externally sealed. Fresh air enters at ceiling level and is sucked out through a funnel on one wall. 'The heat from the warm air going out is transferred to the cold air coming in,' says Meinhard, Freiburg's chief architect and a world authority on passive houses. So far, his company has built about 100.

Opening a cupboard, he shows me how the cold and warm ducts meet in a knot of corrugated silver piping. The result? An almost constant temperature without the need for heating - because warmth is provided by cooking, lighting, even warm-blooded mammals. 'My wife and I produce 100W of energy each, the dog another 20W,' says Meinhard, bending down to check the animal is still breathing. 'If we hold a dinner party, we have to open the windows.' By his calculation, the entire flat could be heated with 30 candles.

These ideas are not very complicated,' Meinhard insists - though designing the ducts and ventilation systems 'requires a bit of thinking'. The proof, he says, is in the economics. While a passive house costs 10 per cent more to build, it reduces energy loss - and utility bills - by a staggering 90 per cent.

In Freiburg, passive houses like this are relatively few, but energy-saving houses are the norm. Elsewhere in Germany, the law states that every new house built must waste no more than 75kWh/m<sup>2</sup> per year (roughly a quarter of the energy lost from a typical Victorian house in Britain) but the specification in Freiburg is radically lower. 'It used to be 65kWh per year,' says Meinhard, 'but we are now discussing a new Freiburg law of 55, 50 or even 40kWh.'

It is part of Freiburg's unrelenting quest to be one of the greenest cities in the world, helped by the (uncomfortable) fact that it was flattened by Allied bombers in the Second World War and rebuilt on enlightened, energy-saving principles. Now, as Gordon Brown announces plans to build 10 new eco towns in Britain - in places such as Oakington in Cambridgeshire, and Long Marston, near Stratford-upon-Avon - perhaps it is time to learn from the city we destroyed.