# PlanLoCaL

## Guidance notes for the scale model

The PlanLoCaL model measures 4.0 x 0.8m and is a **tool for engagment and discussion** around spatial planning and the development of a low-carbon future.

The model is not based on a real place, but does demonstrate the typical patterns of British urban settlement. Its **city centre** is a mixture of old and new buildings, along with streets and squares of Georgian, Victorian and Edwardian housing. Beyond this are post-war estates of social and private housing, and outside the town lies a rural hinterland of woodland, fields and farmland. These 'layers' of the town tell an important story about how British settlements have evolved over the years.

You can also see other features of a regular town: railway line, supermarket, garage, school, hospital, recycling centre, sports centre, industrial estate and sewage works, and a tram running down the highstreet.

On the other side of the main road there is a new development, very recently built, which could be called an eco-village. This looks very different to the older residential districts – but not unlike many neighbourhoods of low-carbon housing that can now be found up and down the country as well as in Western Europe and North America.

The model also demonstrates all the main **renewable energy** technologies which are described in more detail overleaf. Above all it helps illustrate that planning frameworks should be making provision for a **mix of energy sources**; it is inappropriate to adopt a single renewable energy source at the expense of all the others.

**The model demonstrates that the means of generating energy will in future be all around us, and we will become more used to seeing the source of the energy that we use: wind turbines, solar panels, fields of miscanthus, etc.**

**This will be a new experience for many of us, particularly if we live in areas that have few, if any, coal, oil, gas or nuclear energy facilities and have become used to other districts effectively providing that service – or 'bearing that burden' – for us.**

# Zones of the PlanLoCaL model

### 1 City centre

Our city centres change as old and redundant buildings are demolished and new developments like homes, offices and public buildings take their place. These new buildings should have very high standards of energy efficiency (heating and cooling systems, lighting and insulation) and generate as much of their own energy as possible. Houses and flats should provide high-density living, whilst maintaining a good quality of life for residents.

The triangular building is loosely based on One Brighton, a modern apartment block designed on 'one planet living' principles that provides residents with balconies, 'green roofs' and spaces for growing food. High levels of sound insulation, intelligent arrangement of living rooms to maximise privacy, quality communal spaces and a range of unit sizes (i.e. not just one and two-bedroom flats) should be the norm for this kind of development.

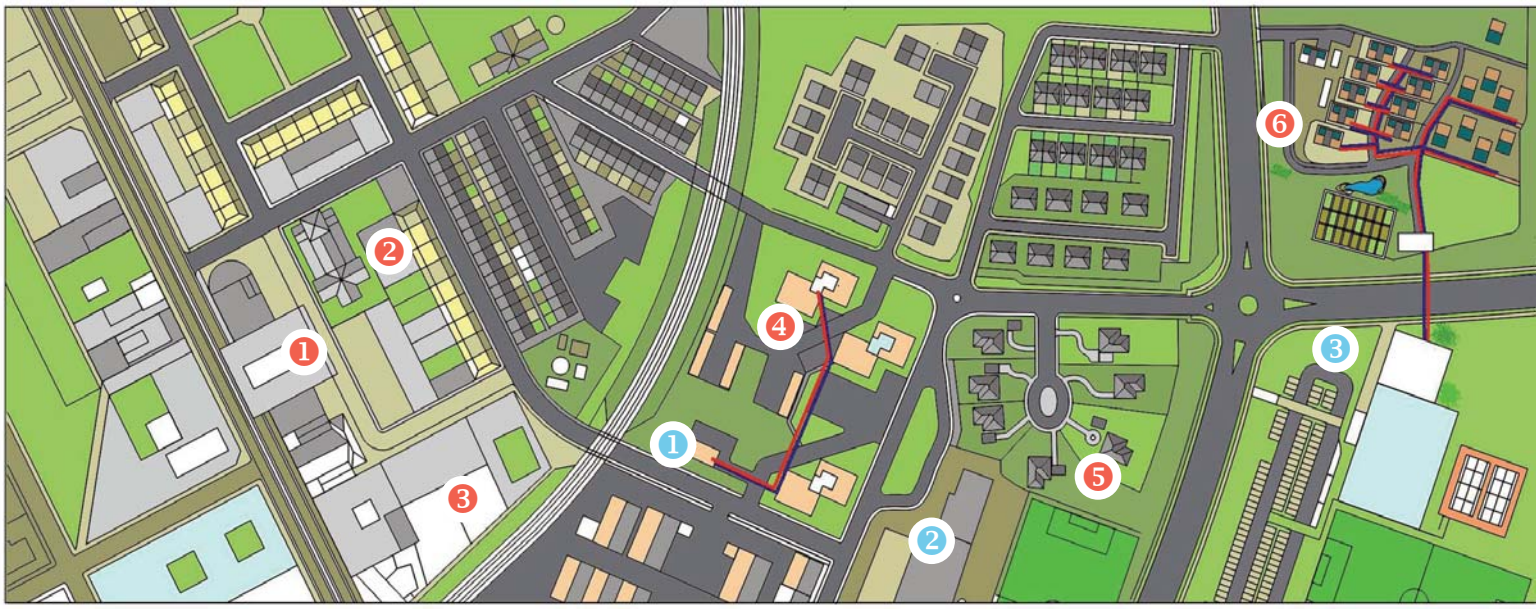
The energy performance of older office buildings can almost always be improved. Some measures, such as installing 'smart-lighting' systems, are outside the remit of the planning system. Others, such as solid-wall insulation and roof-mounted solar arrays should be encouraged by the planning framework.

### 2 Heritage buildings and conservation areas

The Model shows part of a Georgian square, likely to be listed, along with some Victorian terracing, likely to be designated a Conservation Area. We have demonstrated solar thermal systems retrofitted to the valley roofs of certain buildings, or the south-facing roofs that are not visible from the street. Such installations should be positively encouraged by planning policy frameworks.

### 3 Industrial zone

Smarter use of waste products also needs to be part of the energy mix. The Model demonstrates energy from both sewage treatment and the sorting and streaming of waste, with food, agricultural and paper and cardboard wastes being used to generate energy.




# Renewable energy technologies demonstrated on the model

### 1 Biomass heating

The tower blocks are being heated by a biomass district heating system. This is based on the Sheffield Road flats in Barnsley, where wood chips are delivered twice a week in the winter and about once a month in the summer.

### 2 Solar thermal and solar photovoltaics

*Solar thermal* systems use the sun's warmth to heat water for showers, baths, washing up and other purposes – though not usually for central heating. *Solar photovoltaics (PV)* generate electricity. All solar panels perform best when facing due south to catch the sun's rays.

Solar thermal is usually the most cost-effective technology to retrofit to existing buildings, and so the model shows it on the school, hospital, social housing and some private homes, but not on office blocks where the hot water demand tends to be much lower.

### 3 Biomass 'combined heat and power'

The homes in the model's eco-village have solar panels that generate most of the residents' hot water and electricity needs. The remainder is provided by an on-site combined heat and power (CHP) plant fuelled by woodchip, perhaps from the plantation on the edge of town. The excess heat generated by this facility will be used in the greenhouses on the communal allotments and the leisure centre across the road. Mixed-use developments provide a steadier heat load and therefore make the most efficient use of CHP heat production.

### 4 Heat pumps

The network of red and blue lines near the supermarket represents a ground-source heat pump. This uses a network of buried pipes to extract heat from the ground, which in turn warms the water for radiators or underfloor heating. The cost of installing heat pumps is much lower in new developments, where major ground excavation will be happening anyway.

Water source heat pumps extract latent heat from lakes and rivers. The model demonstrates one of these at the hospital, and a real-life example of this is the Lloyds Building on the Floating Harbour in Bristol. Heat pumps are a particularly useful technology for adapting to climate change, since they can be run 'in reverse' to cool buildings during hot periods.

### 4 Social housing
The low-rise social housing has been retrofitted with solar thermal systems. New housing association and local authority homes should incorporate such measures as standard. The tower blocks have been retrofitted with a biomass district heating system.

### 5 Postwar private housing
Much of the housing from this period is detached 'executive-style' or semi-detached, often with large gardens. Whilst these homes are considered desirable, they require a great deal of land and do not encourage community cohesion. Local authorities need to play a part in encouraging high-quality, high-density development to reduce the conflict between the need for new housing and the preservation of greenfield land.

### 6 Eco village
This looks radically different to the older residential developments – houses are closer together with smaller individual plots, but more communal green spaces, and, importantly, productive green spaces. The homes are oriented south, with large areas of highly efficient glazing on those elevations. In such developments, the car is not king – good public transport routes to town should be an essential requirement of planning and there should be provision for safe cycle routes.

### 7 Public transport
The provision of good public transport and cycle routes to and through the city centre should be a priority.

### 8 Rural hinterland
Rural and semi-rural areas provide opportunities for growing energy crops (demonstrated by plantation forestry and the miscanthus field). There is also more opportunity for small-scale renewable energy such as hydro and wind, and, of course, large-scale wind, which has a vital role in a low-carbon energy mix.

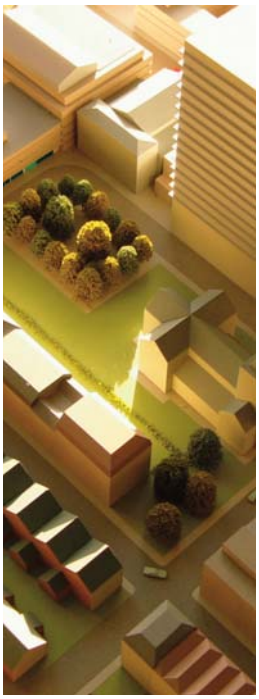

### 5 Energy from waste
The model's energy-from-waste plant is based on the New Earth Solutions facility at Canford in Dorset where food and agricultural wastes are composted to produce a fuel which is burned to generate electricity.

**NB:** This is *not the same* as generating energy from what is called mass-burn incineration which uses the unsorted rubbish collected by, or on behalf of, a local authority as fuel for a power station. In such a basic system, mass-burn incineration can produce even more greenhouse gas emissions than burning coal. Waste incineration *can* bring environmental benefits, but only if two conditions are met: that as much recyclable material as possible is removed from the waste before it is incinerated (including metal, glass, organic material and some of the plastic), and that, in addition to generating electricity, the surplus heat is usefully exploited – in a district heating system for example.

### 6 Energy from sewage
This facility is based on Severn Trent's Strongford Wastewater Treatment Works near Stoke. Sewage sludge from the works is fed into anaerobic digesters to produce methane that fuels a CHP plant which generates enough electricity for the works to be self-sufficient and for a significant surplus to be sold to the grid.

### 7 Hydro
A small-scale hydro plant is generating electricity for the farm on which it is located, and feeding the excess into the grid. This is an 'archimedes screw' hydro system, which can operate at much lower 'head' than other hydro installations (i.e. where the river water doesn't fall so far). It is also proven to let fish pass through unscathed. Hydro systems must be licensed by the Environment Agency.

### 8 Wind turbines
There are two turbines on the model. The smaller one, near the farm, has a 15 kilowatt capacity, a hub height of 15m and a rotor diameter of 9m. It generates the same amount of electricity over a year as that used by around 3 average houses. The larger one is based on the 2 Megawatt turbine on the M4 near Reading which has a hub height of 85m and a 70m rotor. This turbine generates enough power for around 1,000 average houses.





PlanLoCaL is a project designed and delivered by the Centre for Sustainable Energy, a Bristol-based national charity that helps people and organisations from the public, private and voluntary sectors meet the twin challenges of rising energy costs and climate change.

The PlanLoCaL model was built by architectual technicians, Amalgam, to a scale of 1:250 (in which a car is about 1cm long). It is 4m in length, equivalent to 1km.

Local authorities and their communities undertaking their own low-carbon or renewable energy consultations may borrow the model for use as a public engagement tool. Email rachel.coxcoon@cse.org.uk for details.

PlanLoCaL
planning for low carbon living

www.planlocal.org.uk

Centre for Sustainable Energy

3 St Peter's Court
Bedminster Parade
Bristol
BS3 4AQ

0117 934 1400
info@cse.org.uk
reg charity 298740

We are a national charity that shares our knowledge and experience to help people change the way they think and act on energy.

More energy advice at cse.org.uk