

# 1. BedZed (Sutton - UK)

**Project description**

BedZED (Beddington Zero Energy Development) is the UK's first and largest carbon-neutral eco-community and is located in Sutton, a residential town 40 minutes South East from London.

BedZED consists of 82 residential homes with a mixture of tenures – 34 for outright sale, 23 for shared ownership, 10 for key workers and 15 at affordable rent for social housing – and 1'600 square metres of work space, an onsite shop, café, sport facilities, health centre and childcare facilities with a further 14 galleried apartments for outright sale. Residents have been living at BedZED since March 2002 and currently BedZed is home to 220 residents.

The BedZED design concept was driven by the desire to create a net 'zero fossil energy development', one that will produce at least as much energy from renewable sources as it consumes. Only energy from renewable sources is used to meet the energy needs of BedZED the development is therefore a carbon neutral development - resulting in no net addition of carbon dioxide to the atmosphere.



Aerial view of BedZED, credit Bill Dunster Architect

**Objectives**

The project aims and objectives are:

- **No use of fossil fuels**
- 50% reduction of the energies used for transport
- 60% reduction of the domestic energy compared to the average British households
- 90% reduction of the heating needs
- Usage of renewable energies
- 30% reduction of water consumption
- Reduce waste and encourage recycling
- Use construction materials from local providers (located within less than a 60 km radius)
- Development of local resources (farmer network for local food)
- Develop biodiversity in the natural areas

**Driving factors**



The main driving factor of the BedZed project was **environmental**.

The project was initiated by BioRegional as an example to show that a sustainable way of life is possible while keeping modern standards. BedZed was thought to reduce environmental impact at every level (home including construction, energy and food; work; transports; social life, etc.). The concept emphasises the fact that living in a local circle with local products is possible.

**Financing structure**

BedZED is a mixed-use, mixed-tenure development. It is built on reclaimed land owned by the London Borough of Sutton, sold to Peabody at below market value due to the planned environmental initiatives. Peabody Trust, a London housing association and charity is the main investor of the project with the help of local authorities. The residential homes were sold at standard market prices, the actual price being balanced by the office activities and shop moving in the neighbourhood.

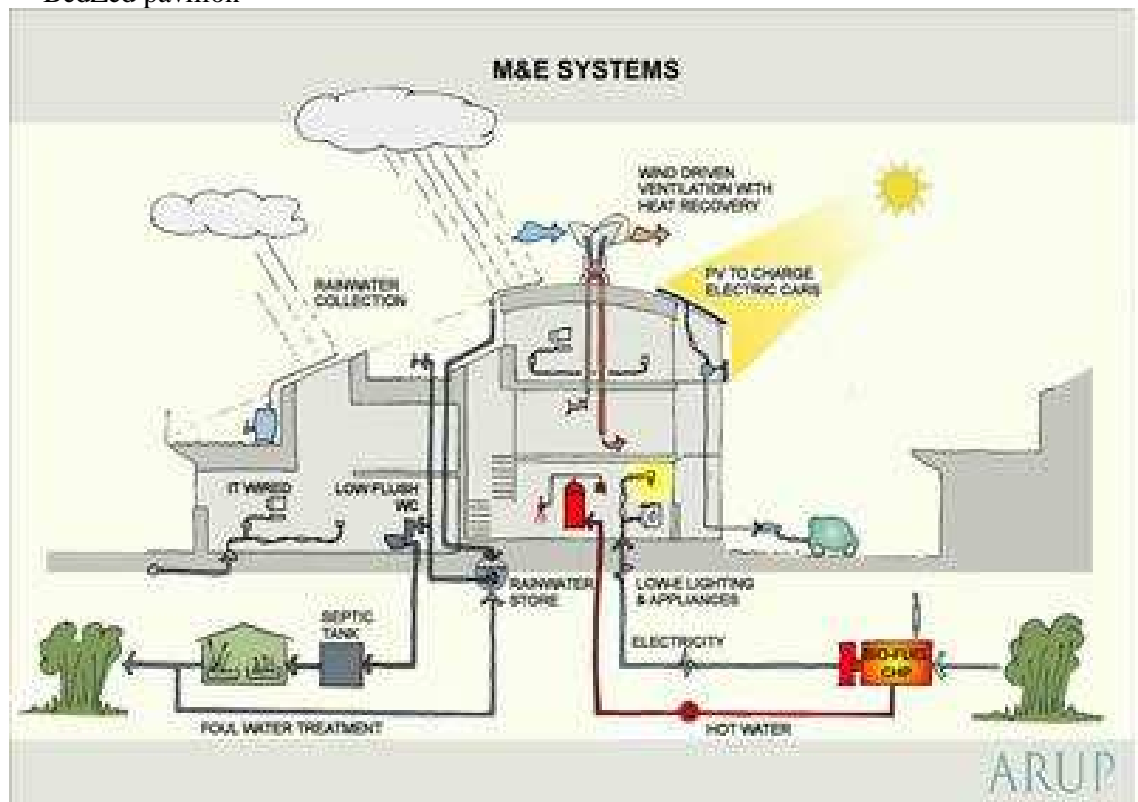


**Partners & Roles**

BedZED was developed by the **Peabody Trust** in partnership with **Bill Dunster Architects (ZedFactory); ARUP** and **BioRegional Development Group**, environmental consultants. BioRegional Development Group and Bill Dunster Architects now promote the concept in the BedZed Centre and the inhabitants are responsible for the neighbourhood activities as well as the management of the common infrastructure. The BedZED Pavilion is a community facility for the Hackbridge area. It was built by a partnership between **Sutton Council** and the Peabody Trust. It consists of a social area with a small beverage server area, a community room / seminar space at mezzanine level for up to 70 people and an outdoor adjoining grassed area.


**Results/  
Achievements**

- **Transport:** A green transport plan promotes walking, cycling and use of public transport. BedZED has good public transport links, including two railway stations, two bus routes and a tramlink. BedZED was the first low car development in the UK to incorporate a car club. A 'pedestrian first' policy with good lighting, drop kerbs for prams and wheelchairs and a road layout that keeps vehicles to walking speed. The BedZED project introduced the first legally binding Green Transport Plan as a condition of planning permission. On-site charging points for electric cars are available in Sutton town centre.
- **Energy:** Buildings are constructed from thermally massive materials that store heat during warm conditions and release heat at cooler times. BedZED houses are arranged in south facing terraces to maximise heat gain from the sun, known as passive solar gain. 777 square meters are covered with solar panels. Each terrace is backed by north facing offices, where minimal solar gain reduces the tendency to overheat and the need for air conditioning. BedZED homes and offices are fitted with low energy lighting and energy efficient appliances to reduce electricity requirements. BedZED receives power from a small-scale combined heat and power plant (CHP). The heat from the CHP provides hot water, which is distributed around the site via a district heating system of super-insulated pipes. To enable residents and workers to keep track of their heat and electricity use, meters are mounted in each home and office kitchen.
- **Water:** Water use is reduced to 76 litres/day; out of which 18% represents rainwater or recycled water; use of aerated taps, low flush toilets, smaller bathtubs. One innovation at BedZED is the use of a reed-water biofiltration system that purifies blackwater into graywater for use in non-potable applications, such as toilet flush or water for gardening.
- **Waste:** separate waste collection system.
- **Local materials:** To reduce the embodied energy of BedZED, construction materials were selected for their low embodied energy and sourced within a 35-mile radius of the site where possible. Where possible, BedZED is built from natural, recycled or reclaimed materials.
- **Social:** 50% of the dwellings are allocated to low income families; construction of the BedZed pavilion



**Difficulties faced  
and solutions  
found**

The total development costs for BedZed sum up to € 17 million: construction costs (€ 14 million); taxes (€ 2,5 million) and planning and audit costs (€ 0,5 million). The costs turned out to be 30% higher than expected. The price of a BedZed home is 20% higher than the average price of an apartment in the same area.

<b>Next Steps</b>	The BedZED Centre is constantly organising site visit tours, hosts exhibitions, the BedZED show home, meeting and seminar facilities and the offices of BioRegional Development Group. Regular training sessions in sustainable development are organised by BioRegional.	
<b>Friendly advice to those who want to build new eco neighbourhoods</b>	<p>After evaluation, it appeared that most of the objectives depend on inhabitants' attitude. Infrastructure should be studied for an easier use. The result is that the environmental footprint of a BedZed inhabitant is of 2 planets instead of the 1 planned and the 3 of average British households.</p> <p>It seems that with only 20% of the investments, 80% of the objectives could have been reached because some infrastructures are too complex and therefore underused or misused. A bigger neighbourhood would also have allowed better profitability of the collective infrastructures.</p> <p>The ZedFactory and Bioregional are constantly developing new concepts to improve environmental efficiency.</p>	
<b>Online information</b>	<a href="http://www.peabody.org.uk">www.peabody.org.uk</a> <a href="http://www.zedfactory.com">www.zedfactory.com</a> <a href="http://www.bioregional.com">www.bioregional.com</a> <a href="http://www.oneplanetliving.org">www.oneplanetliving.org</a> <a href="http://www.arup.com">www.arup.com</a>	
<b>Further information</b>	<p><b>Contact person:</b>  Name: Jessica Hodge  Position: BedZED Centre Manager  Organisation: BioRegional Development Group  Tel: +44 (0)20 8404 4880  E-mail: <a href="mailto:info@bioregional.com">info@bioregional.com</a>; <a href="mailto:jess.hodge@bioregional.com">jess.hodge@bioregional.com</a>  Website: <a href="http://www.bioregional.com">www.bioregional.com</a></p>	