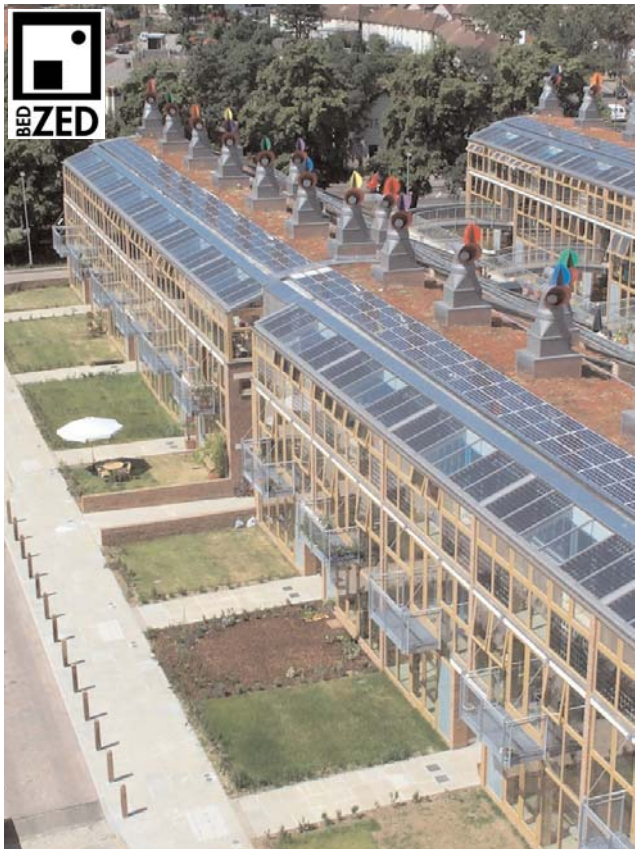

aerial view of the south of the scheme - sunspaces and pv's

first floor bridge to sky garden

rooftop pv's and windcowls

aerial view of the north facing sky gardens and skylights to workspaces

Introduction

The BedZED scheme in South London provides affordable, energy efficient housing and workspace using innovative technologies and an innovative construction approach, making a more sustainable urban life-style not only practicable but attractive and desirable.
BedZED is a mixed use development solar urban village funded by the Peabody Trust in collaboration with BioRegional Development Group. On a brownfield wasteland site in the London Borough of Sutton the development will provide 82 dwellings in a mixture of flats, maisonettes and town houses and approximately 2,500m² of workspace/office and community accommodation including a, nursery, organic café/shop and sports clubhouse.
Central to the aims of BedZED are that the project clearly addresses some of the key environmental issues for urban communities (as identified with Agenda 21 and the Urban Task Force) of mobility, energy and pollution whilst also providing a sustainable high quality of life.

Context

The 1.65 hectare site was originally a brownfield site - a disused sewage works. The busy London Road runs parallel to the eastern boundary while to the south and west there are relatively new three storey residential developments. The northern boundary of the site is an existing drainage ditch; beyond this is a land fill site that will in time become an ecology park. The sub soil is gravel. Existing topsoil was marginally contaminated and was cleared and used as backfill to the gravel extraction. The local vernacular is a mixture of unremarkable pre and post war terraces, however, a height restriction of three storeys was imposed upon the design by the Planning Authority.

Timetable

Bill Dunster architects and **BioRegional Development Group** found the vacant site in 1996 and developed the initial scheme. **Peabody Trust** were contacted in 1997 and appointed the design team in 1999. Planning Approval was obtained in November 1999, construction commenced in March 2000 with completion in September 2002.

Even allowing for the entire BedZED site including playing field, parking, CHP/LM plant and community buildings, around 50 homes per hectare is achieved.

If these standards were commonly adopted it could be possible to reduce UK urban sprawl to about 25 % of its current footprint over the next century.

This means that almost all of the new homes can be provided by brownfield site regeneration, saving valuable agricultural land and green belt for biodiversity, leisure and locally produced organic food.

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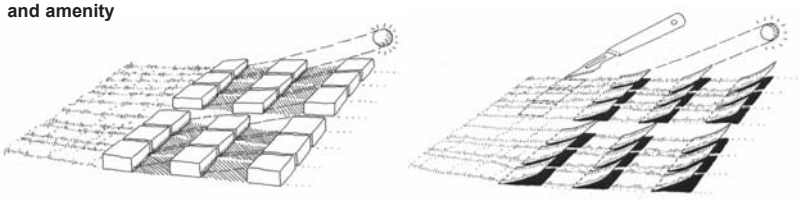
site plan - 7 blocks containing a mixture of flat sizes and tenures as well as workspace and amenity



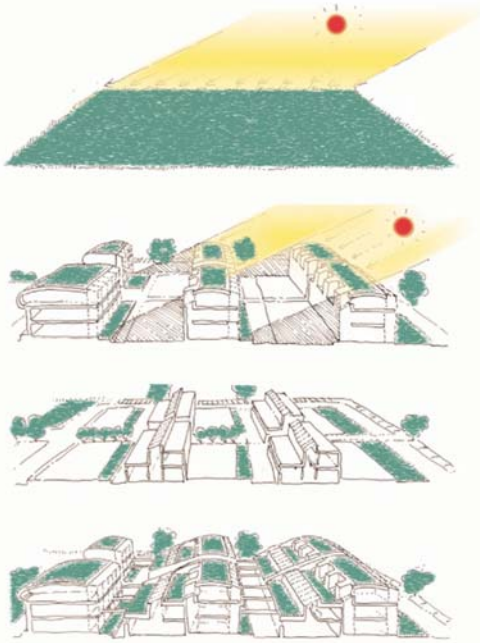
concept of the 'shade zones' minimized by the BedZED section

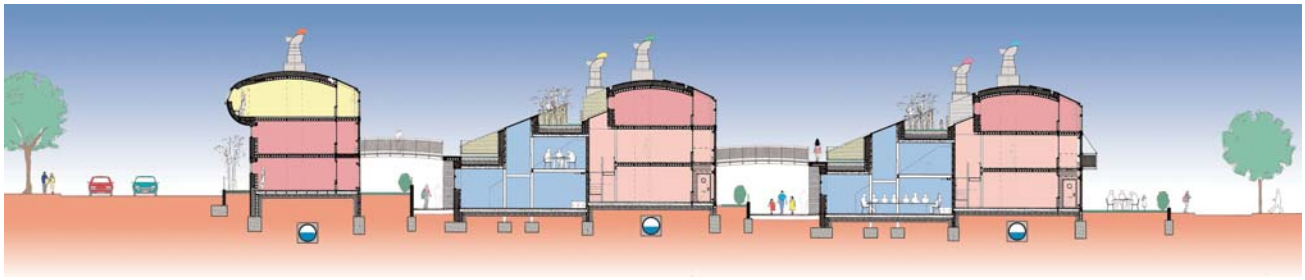
Site Organization - Planning Gain...

The site layout has been organized to obtain maximum benefits from both passive and active solar gain, so all the dwellings face south. Arranged as a series of terraces to optimize construction costs and minimise heat loss the three storey buildings provide typically a 2 storey 4 person/3 bedroom maisonette on the ground and first floor and a 2 person/1 bedroom flat on the second floor.

Although the dwellings are in fact single aspect, the all glazed southern facade and extensive roof lights to the north ensure that they have very high levels of daylight and sunlight making the modest space standards appear much more generous and airy. The sunspace 'buffer zone' on the south of all the buildings provides an extremely attractive addition to the living area while also collecting passive solar heat gain.

below, a green field sites use can be maximised by combining 3 storey residential with workspace in the shaded north facing zone - housing and business park in one





section through blocks B, D and F at BedZED showing the relationship between residential (pink and yellow), and workspace (blue)

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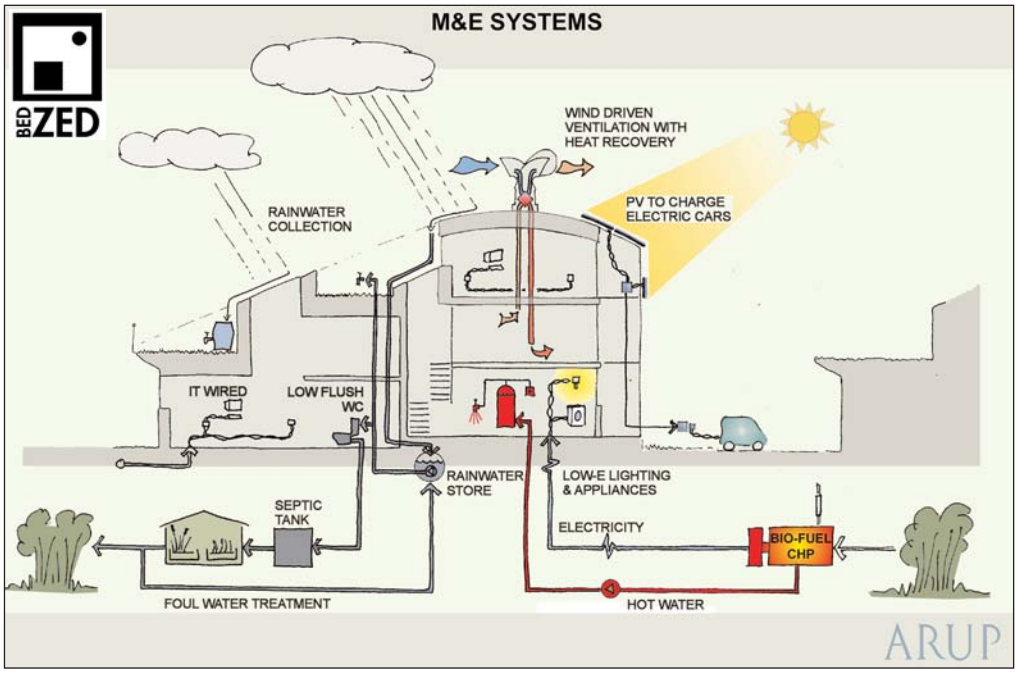
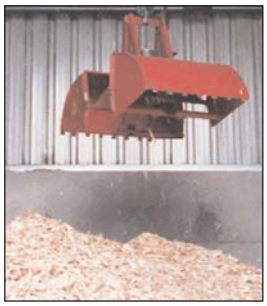
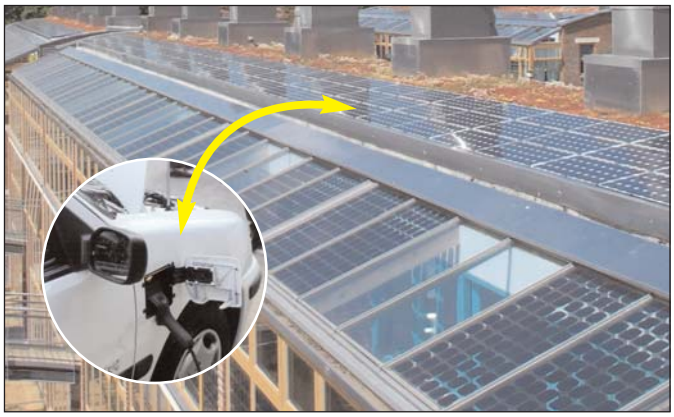


M&E Systems Diagram By **ARUP -** The diagram shows how the wind driven ventilation, solar heating, water and combined heat and power plant form the BedZED energy strategy. These components enable BedZED to meet it's 'zero' energy targets and are combined with heavy weight construction.

passive ventilation with heat recovery at BedZED



fully automated woodchip fuelled combined heat and power plant supplying hot water and power to BedZED



In order to avoid over sizing the CHP unit 1,138 photovoltaic cells have been installed at BedZED providing 109kW at peak output (the equivalent of enough electricity to power 40 electric cars to run 10,000 miles each a year. Photovoltaics are expensive to install compared with conventionally generated electricity this project demonstrates what can be done by using their three-fold functions of energy generation, solar shading and external cladding i.e. providing the "skin" of the building.

living machine technology

super-insulated masonry walls even out temperature differences in the buildings to negate the need for a conventional heating system

Water Conservation

The project aims to reduce the amount of mains water used on the scheme. This has been achieved in several ways:

- Mains water consumption on the scheme will be reduced substantially by incorporating low flush WC's and spray taps. (Dual-flush WCs use either 2 or 4 litres).
- Rainwater is collected from the upper most roofs and stored in tanks below ground for use in flushing the WC's and for irrigation to the sky gardens.
- Black and grey water is treated in a 'Living Machine'. Once treated this water is pumped into the rainwater storage tanks from where it is again used to flush WCs.
- Surface water from the scheme drains into the existing ditch along side the London Road maintaining a linear pond that has been planted with native wild flowers and grasses.

Ventilation System

The buildings are all naturally ventilated. A passive stack principle has been employed which is driven by wind. The specifically designed cowls rotate to catch the slightest breeze and thus pull stale air out of the buildings. There are no mechanical parts and no motors. A simple heat exchange is located below the vent cowls.

Photovoltaics

At peak times the PV cells will generate 309kWp of clean "green" electricity and save over 200 tonnes of carbon dioxide emissions each and every year for the life of the development. For a short while BedZED will be the largest solar housing development in the UK.

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sunspace with the dappled light through the photovoltaics

the living / dining room at the BedZED showflat - light and simple

Landscape

Central to the aims of the scheme has been the desire to create a high-density development whilst also providing high levels of green/open space. The terraces of housing and workspace are grouped around an open square at the heart of the development providing a focus for the community. Each dwelling has access to their own external space, which is either a garden, a sky garden or an external balcony.

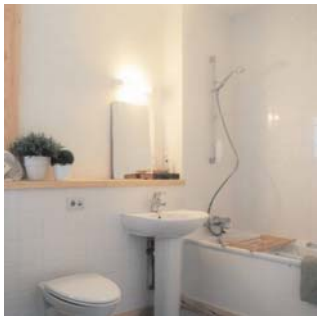
Planting around the perimeter of the site is indigenous to encourage and promote wildlife habitats and thus increase biodiversity. Aromatic and drought tolerant plants such as lavender and rosemary have been used in the Village Square and the perimeter of the land gardens.

Trees are planted at the ends of all access routes around the site providing a strong natural visual focus and a sense of scale. An avenue of trees will define the main north/south pedestrian axis crossing the Village Square and extending into the Ecology Park.
A playing field with associated club house/changing rooms is a major element of the scheme and its inclusion in the project is part of the Section 106 Agreement with the Local Authority.

Transport

Central to reducing carbon emissions and reducing pollution in urban areas is the need to reduce the use and dependency of the petrol fuelled transport. Through the design of the scheme and its location the BedZED development offers an alternative lifestyle without compromising mobility.
The scheme as conceived reduces the need to travel by providing for live/work on site. A café/shop, doctor's surgery and pre school nursery are also on site.

A car pool has been incorporated into the scheme (the provision of which has been included in the Section 106 Agreement with the Local Authority and has permitted a much lower level of car parking spaces to be accepted - 84 car spaces in total). The car pool (ZEDcars) is being run and managed by BioRegional Development Group.The road layout and landscaping give priority to pedestrians and cyclists. Secure bicycle stores are provided in all dwellings and workspaces. Within walking distance there are links to various public transport networks - there is a bus stop adjacent to the site and pedestrian path to both Mitcham Junction and Hackbridge train stations and the tram network.



water saving in each bathroom

an 'eco-kitchen' at BedZED

building integrated features paid for by planning gain

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