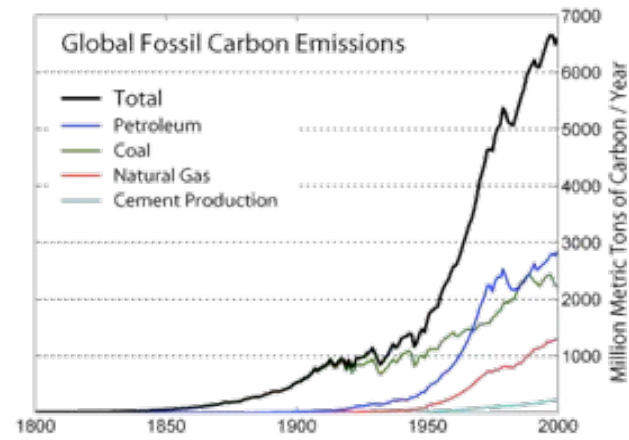


Our carbon footprint has risen rapidly



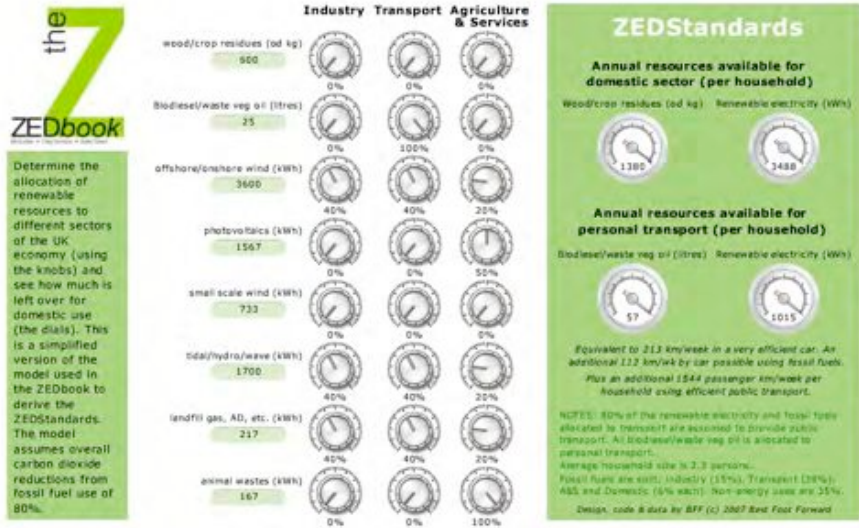
Source: Marland, G., T.A. Boden, and R. J. Andres. 2003

Human cost of climate change

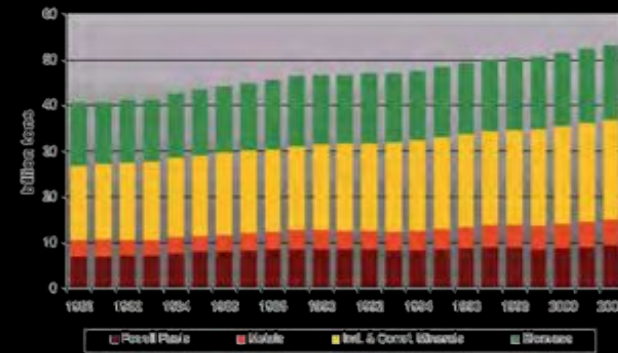
Human cost of climate change

For every person who lives a high carbon lifestyle, at least ten others will be killed or affected by a climate change related event during their lifetime

the ZEDstandards: designing within limits



Rising material use



Source: MOSUS (www.mosus.net)

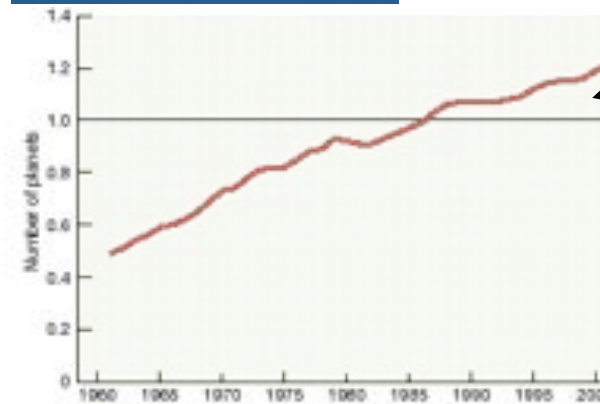
Ecosystems in Decline



“nearly two thirds of the services provided by nature to humankind are found to be in decline worldwide”

Source: Millennium Ecosystem Assessment 2005
 www.millenniumassessment.org

Rising ecological footprint



Declining Happiness

ZEDbook: basics

Obtain political mandate

Make Carbon History campaign



Identify natural limits

Design Out Fossil Fuels



ZEDliving principles

Reduce Demand – Run on Native Renewables



ZEDstandards

Enable a High Quality of Life on a Low Footprint

Back to basics

Identify natural limits

Constraints on natural resource consumption, finite capacity of ecosystems to absorb pollutants.



ZEDliving principles

Quantify UK's renewable energy resources and carbon reduction targets



ZEDstandards

Translate these into guidelines and standards for building sustainable communities



ZEDphysics

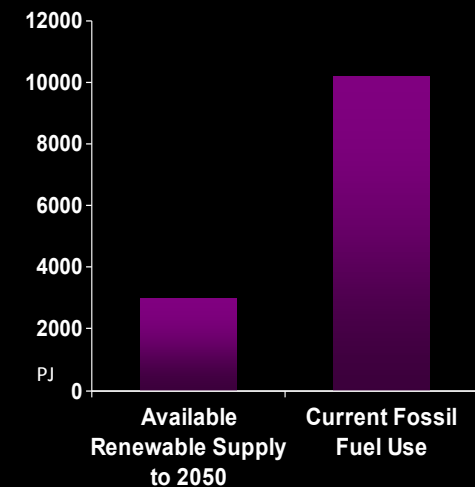
*ZED design solutions
case studies*

Reduce Demand – Run on Native Renewables

It is not just fossil fuels that are finite

Solutions must be scalable

Make best use of local energy resources



Designing within limits

What specific energy resources are available?

How should these be allocated between economic sectors?

How does this inform building design and transport provision?

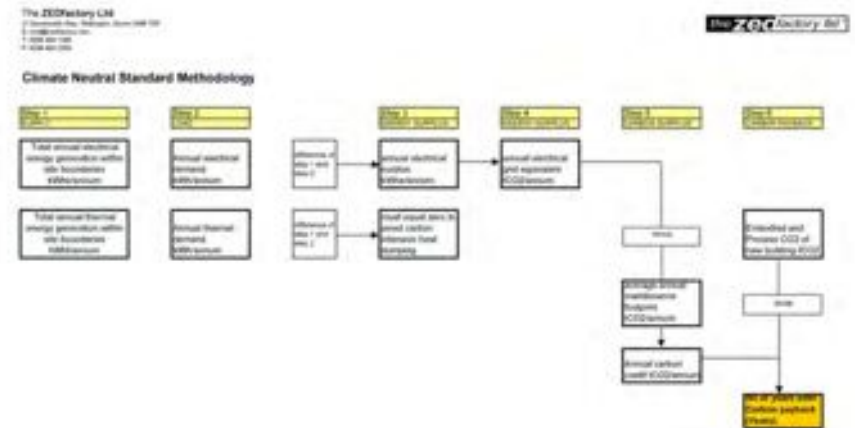
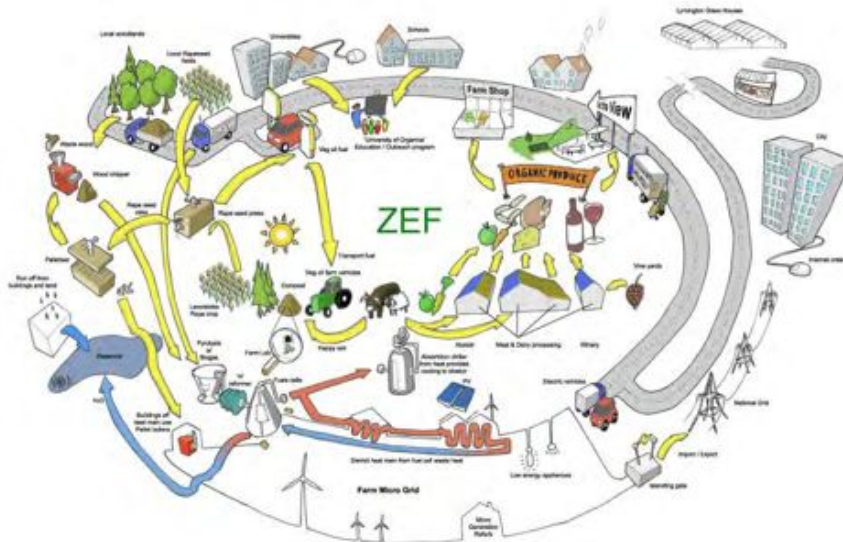
What impact will carbon reduction targets have?

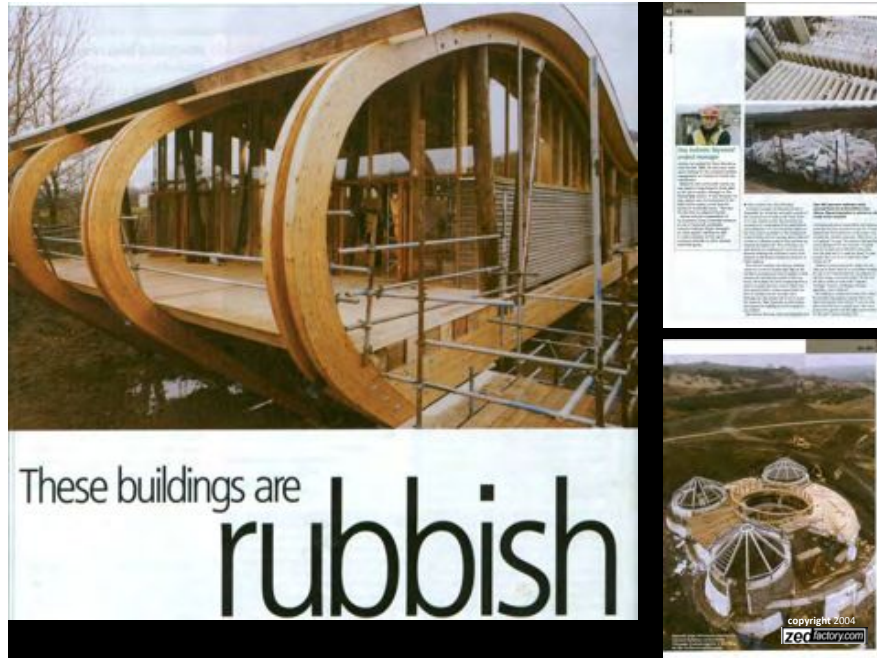
Make Carbon History

Design Out Fossil Fuels

Reduce Demand – Run on Native Renewables

Enable a High Quality of Life on a Low Footprint

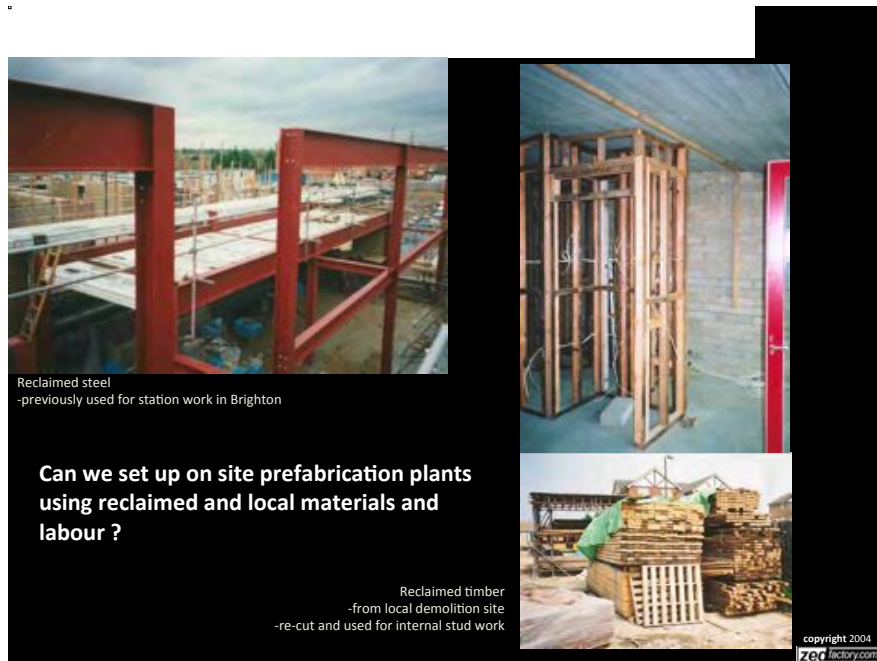


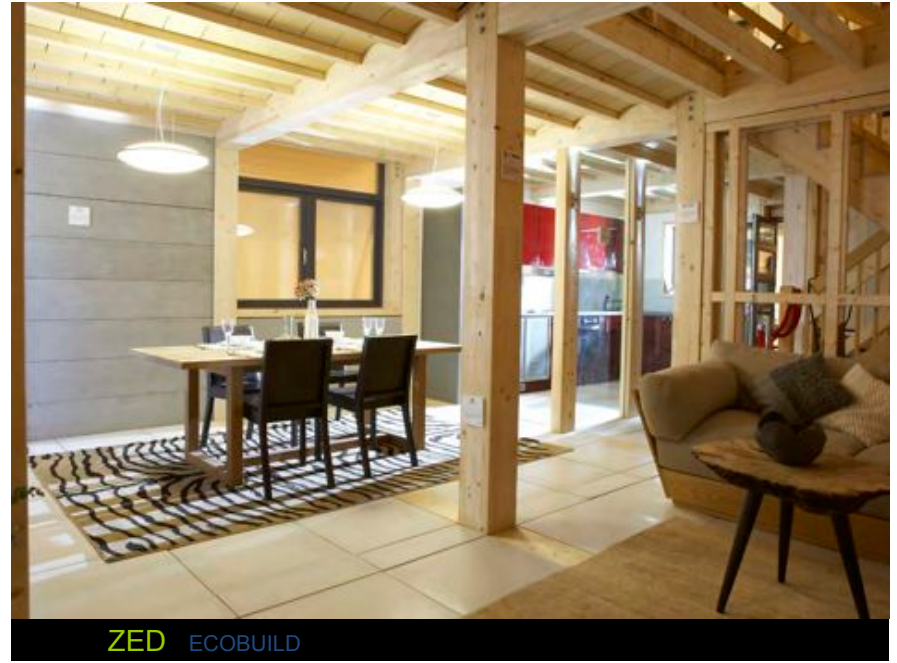


Environmental benefits of material type, spec and source achieved at BedZED

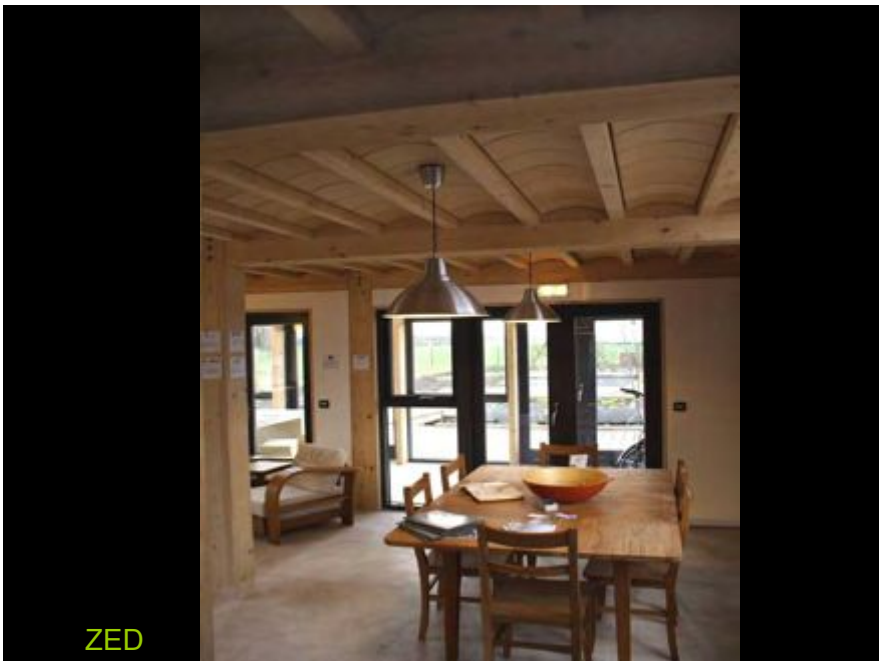
BEDZED material	alternative	embodied CO2 saving	ecop't saved
Local oak weatherboarding	brick cladding	4,630kg	2,300
Reclaimed timber studwork	new softwood	63,460kg	380
Reclaimed floorboards	new softwood	2370kg	14
Timber framed windows	upvc windows	793,900kg	4,800
Beechblock worktop	melamine chipb'rd	107,700kg	462
Reclaimed doors	new fsc timber	5,370kg	36
Reclaimed steel	new steel	181,580kg	1,000
Reclaimed paving slabs	new slabs	56,549kg	na
Hollow core conc floors	in situ conc slab	392,600kg	5,940
Recycled aggregate	virgin aggregate	8,840kg	1,170
Recycled sand	virgin sand	1,330kg	320
Local concrete blocks	national average	21,970kg	147
Local bricks	national average	10,221kg	68.5
HCEC and HEC free insula'n	HCEC blown insul	978,000kg	na

copyright 2004 zed factory.com





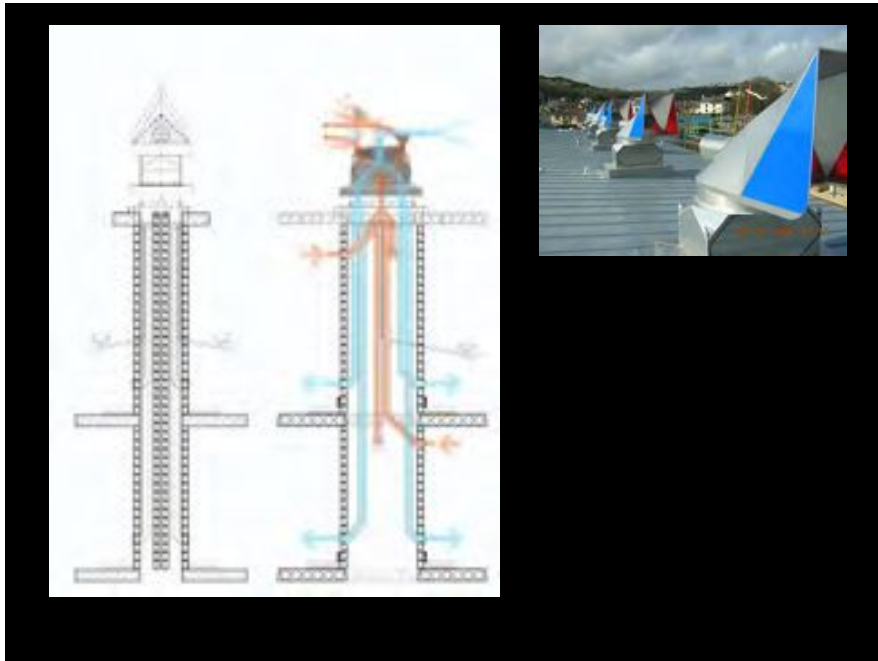
ZED ECOBUILD



ZED



Passive heat recovery wind cowl ventilators



ZEDfactory ZEDstore(district)
(ZEDstore Mark III)

- The Resol solar controller
- Hot feed to DHW heat exchanger
- Connection for wood stove/boiler
- Heat output side**
- Lug for optional immersion heater
- DHW heat exchanger
- Pump for DHW heat exchanger feed
- Flow switch on mains supply



- Heat
- DHW instantaneous immersion heater
- Solar pressure relief valve
- Return to solar thermal panels
- High temperature solar input
- Return to district heat main
- District heat main heat exchanger
- Heat input side**
- Heat meter flow meter
- Pump for district heat exchanger
- Low temperature solar input
- Supply from solar panels
- Solar heat exchanger
- TS sensor
- Cold feed to solar heat exchanger

Integrated exhaust Air Source heat pump providing all year round solar thermal DHW



- Integrates with solar thermal collectors
- Highly efficient water heating (COP3.5)
- 285L capacity tank
- Only cuts in when needed
- Powered by the excess PV production
- Avoids need for back up biomass combustion in zero heating spec homes



Exus energy – prefabricated biomass chp module





THE CODE FOR SUSTAINABLE HOMES

FINAL CERTIFICATE
(Issued at the Post Construction Stage)

ISSUED TO:
19 Mill Pond Drive,
Upton,
Northampton,
Northants NN5 4EW

The sustainability of this home has been independently assessed at the Post Construction Stage and has achieved a Code Rating of 6 out of 6 stars under the April 2007 version

★ ★ ★ ★ ★ ★

Always Exceeds Mandatory Standards | Current Best Practice | High Sustainability and Low Carbon

The next page sets out how this home achieved its rating in the five categories.

Issued At: 19 Mill Pond Drive, Upton, Northampton, Northants NN5 4EW

Client: Maxwell Construction Services Limited | Developer: Metropolitan Housing Partnership

Assessor: Bill Donohue Architects ZEDFactory Ltd | Certificate Number: 505-6-CH-0206-1-0002

19th May 2008 | Signed for and on behalf of BNE Global Ltd

Communities & Local Government | breglobal

THE CODE FOR SUSTAINABLE HOMES

FINAL CERTIFICATE
(Issued at the Post Construction Stage)

Certificate Number: 505-6-CH-0206-1-0002 | Stars: 6/6

What Your Code Star Rating Means

Code Rating	1	2	3	4	5	6
1	★	★	★	★	★	★
2	★	★	★	★	★	★
3	★	★	★	★	★	★
4	★	★	★	★	★	★
5	★	★	★	★	★	★
6	★	★	★	★	★	★

Major 2006 Points Achieved

Category	Percentage of Category Points achieved	What is covered in the category
Energy	100%	Energy efficiency (EPC) rating, renewable energy
Water	100%	Water and water reuse rating, rainwater
Materials	100%	The sourcing and environmental impact of materials used to build the home
Surface Water Runoff	100%	Management of surface water (SUDS) and surface water runoff (SUDS)
Waste	100%	Storage of hazardous waste and control of waste, recycling, reuse and reuse of materials
Pollution	100%	The use of hazardous materials and building systems that avoid risk to global warming
Health & Wellbeing	100%	Provision of good design, public participation, health, safety, accessibility and usability
Management	100%	Achieving best practice, designing for health and safety, and ensuring the impact of construction
Ecology	100%	The impact on environment of the construction of the site and efficient use of building land

CO₂ Rating

The CO₂ rating is a measure of a home's Carbon Dioxide (CO₂) emissions. This rating is shown on your Energy Performance Certificate as the Environmental Impact Rating. The table below explains how this rating is calculated and also includes information on how to improve the home's performance.

The table explains the sustainability of a home as a carbon footprint, available for each of the categories of energy use and as an overall carbon footprint, based on the building's energy use.

The CO₂ rating is a measure of a home's Carbon Dioxide (CO₂) emissions. This rating is shown on your Energy Performance Certificate as the Environmental Impact Rating. The table below explains how this rating is calculated and also includes information on how to improve the home's performance.

The table explains the sustainability of a home as a carbon footprint, available for each of the categories of energy use and as an overall carbon footprint, based on the building's energy use.

EPC Number: 505-6-CH-0206-1-0002 | Communities & Local Government | breglobal

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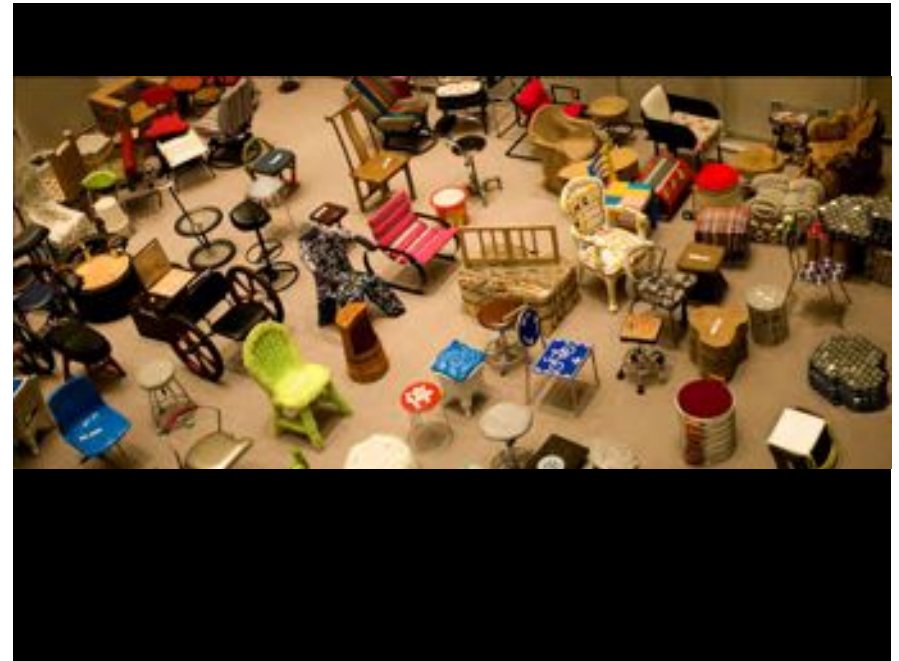
Urban Best Practice Demonstration Area
Shanghai EXPO exhibition

EXPO 2010
SHANGHAI CHINA









Energy Monitoring

Building Energy Dashboard

Or do you have the technology and the building fabric to make a difference. How about monitoring your schools energy consumption?

A product like the Wattson shown allows a class to monitor their energy consumption and make informed decisions on how they use appliances.

How it works

Wattson enables you to learn about your own personal energy use through interactive play. The display shows the power being used across the home and reacts instantly to any changes.

Turning any appliance On, Off or to Standby creates an immediate and understandable effect, showing how much power that appliance uses, and how much it costs to run.

Electricity changes from being an invisible, intangible utility to a visible, tangible entity with real and quantifiable consequences for using it.

You have a choice of energy instantaneous power at that moment in Watts or in Pounds Per Year - how much it would cost if everything was left as it is for a year. This allows people to understand how much appliances cost to run even when on standby.

Wattson has a non-vital display, designed to be understood intuitively. Coloured light and patterns shine through the underside of Wattson. Your behaviour reflects the power consumption and the long term energy use of your home. Wattson provides an instant awareness of the energy 'label' of your house.

from www.dhplabs.com

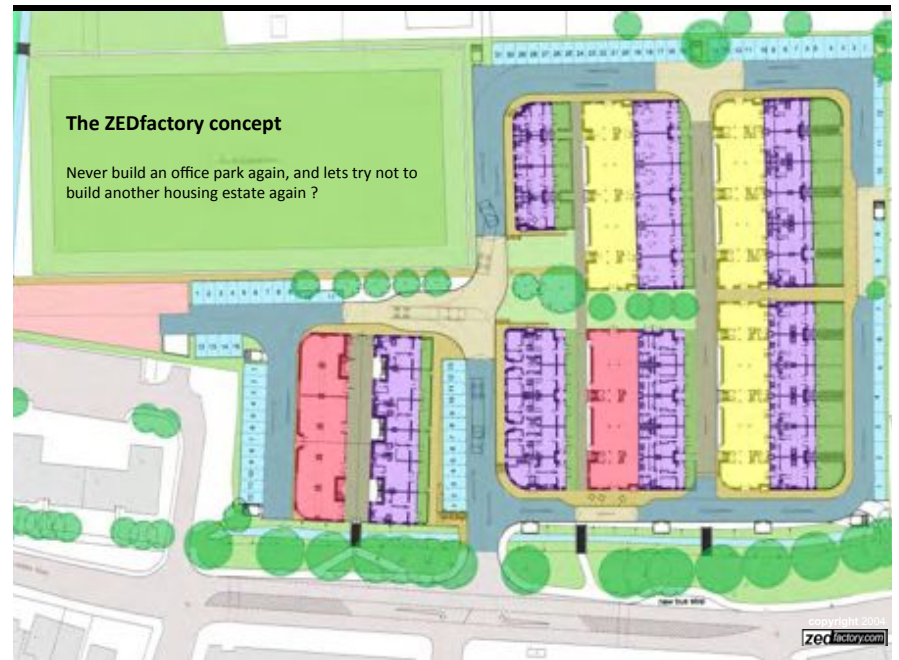
We would suggest a Wattson in each classroom so that each class gets to monitor their energy use.

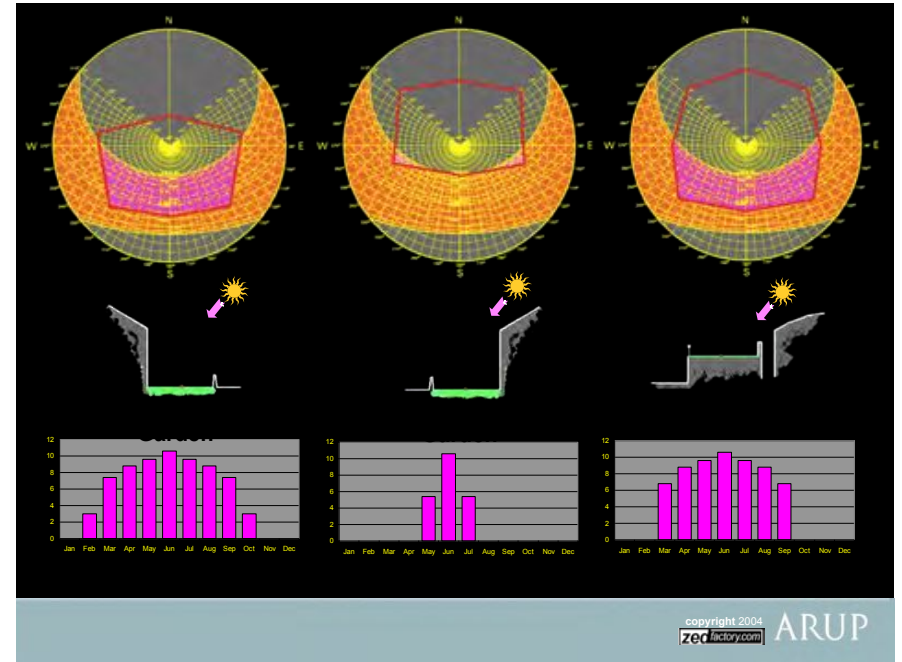
Taking this idea further a school could benefit from a site wide energy display to inform the campus of their overall performance.



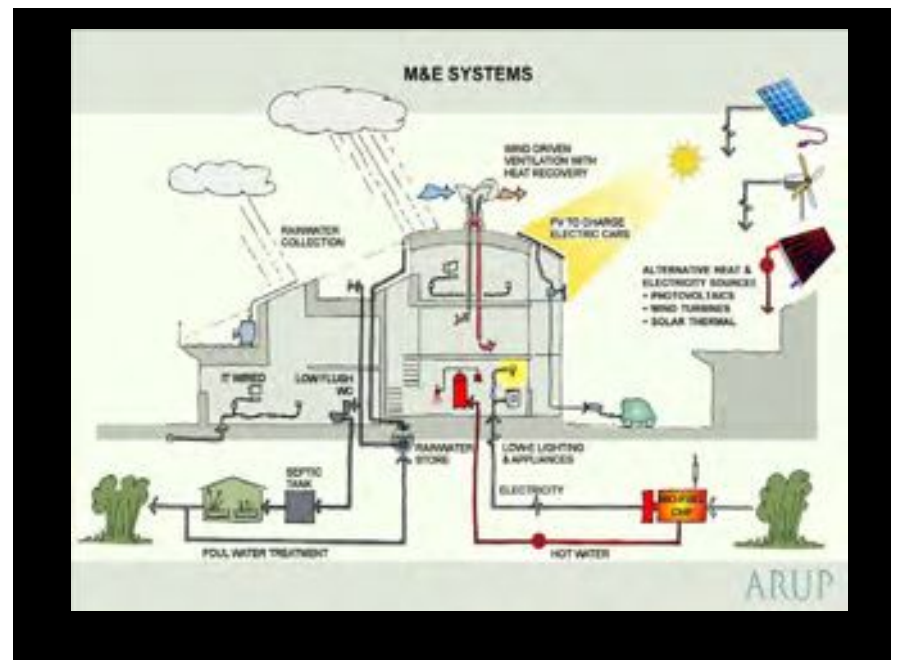
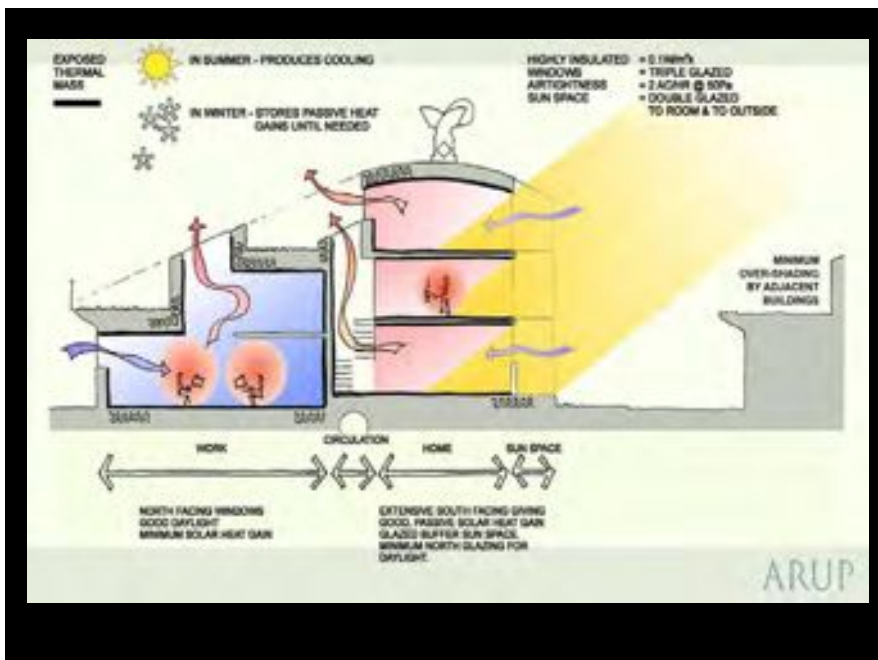
The ZEDfactory concept

Never build an office park again, and lets try not to build another housing estate again ?









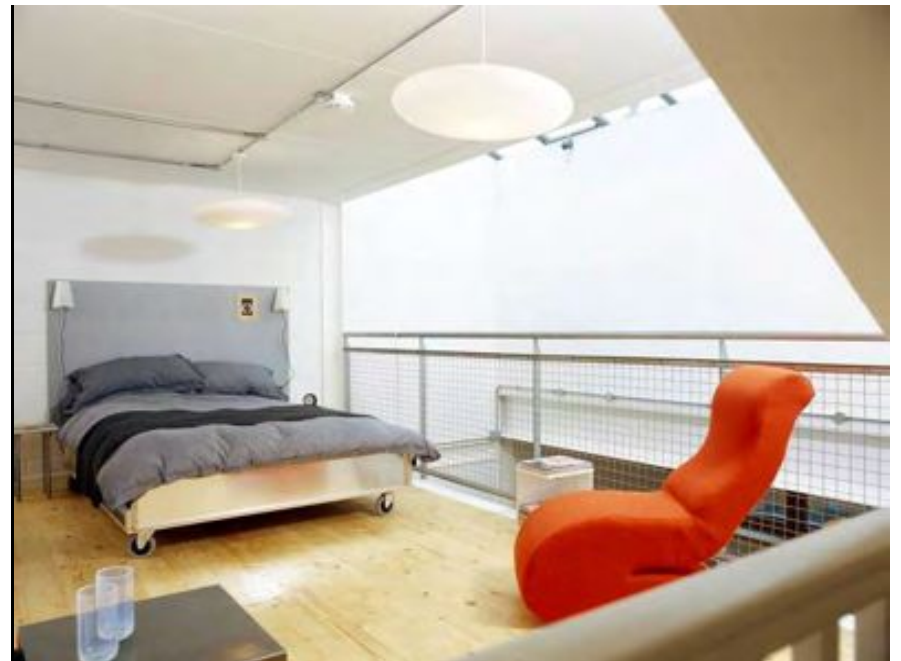


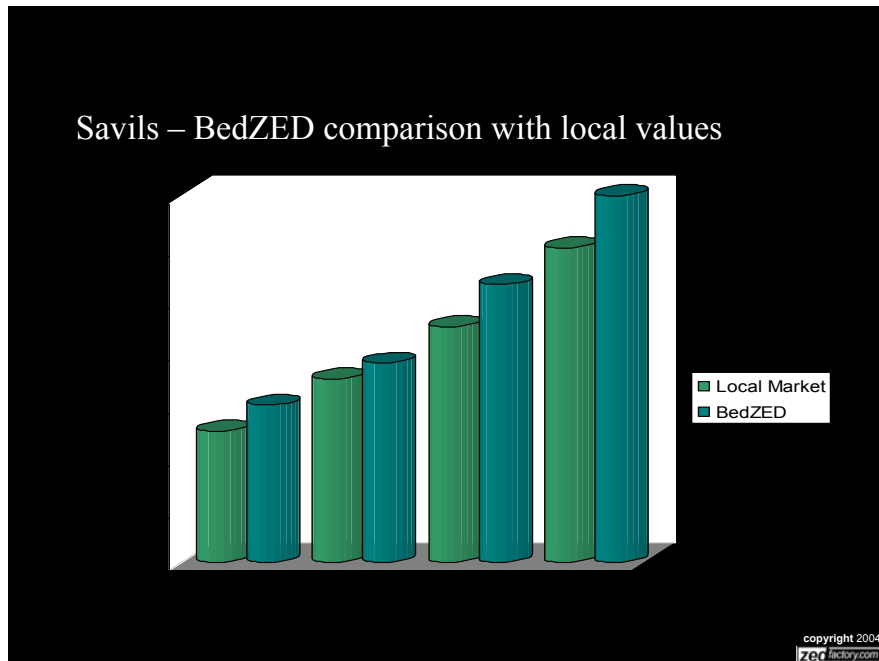
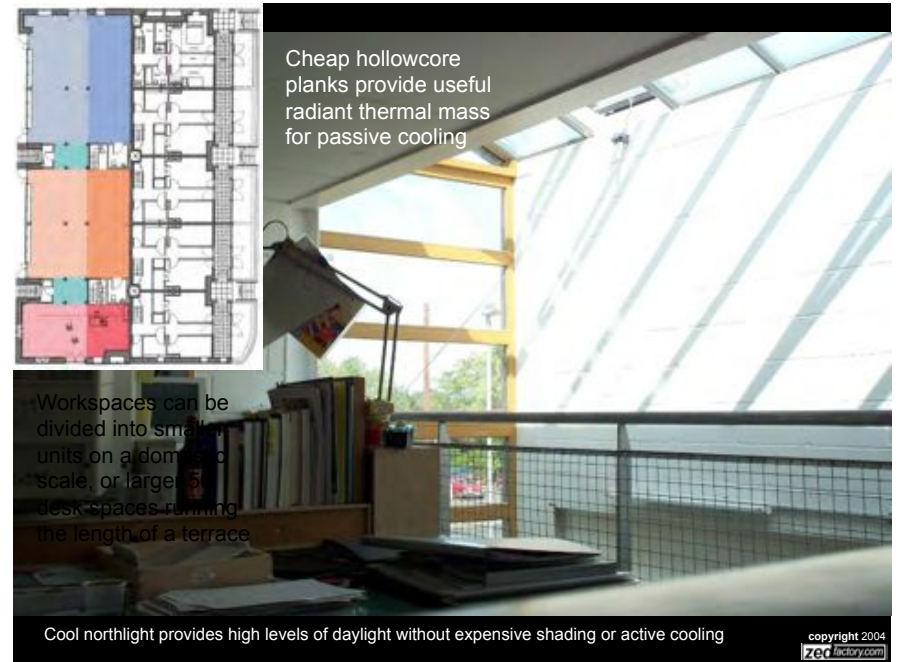
case studies - BedZED

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zed
factory.com



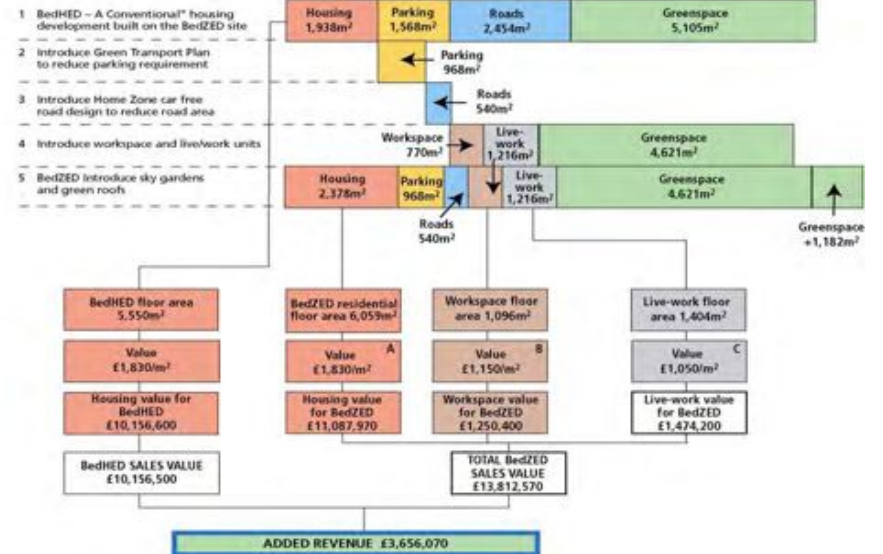


Which side of the fence would you rather live ?

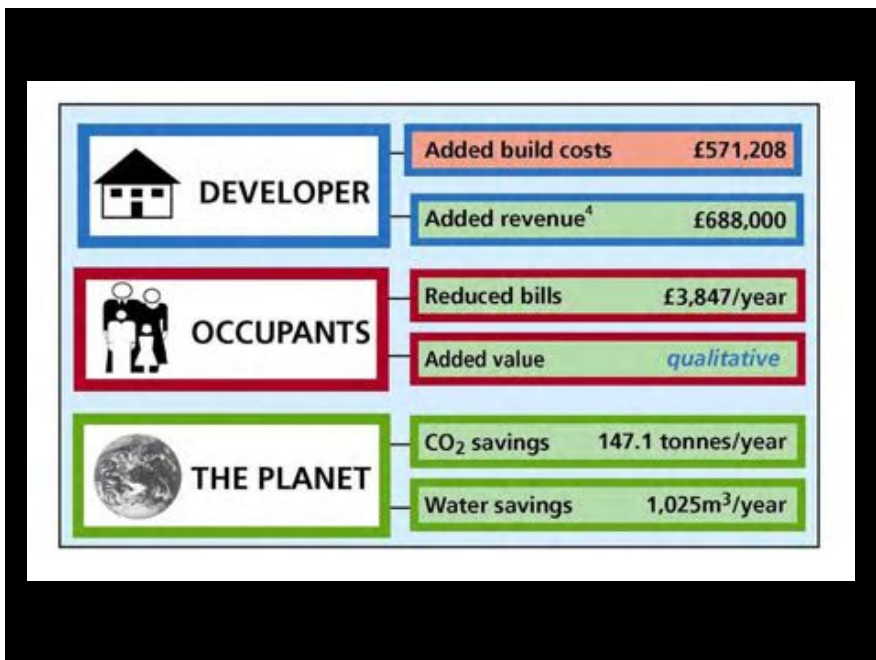


copyright 2004
Zec factory.com

Planning Gain



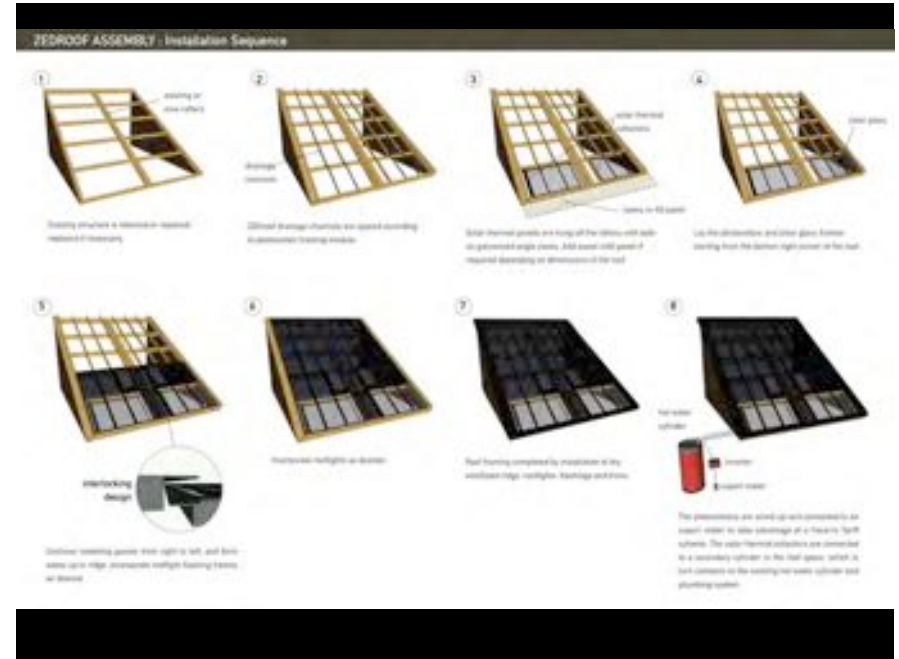
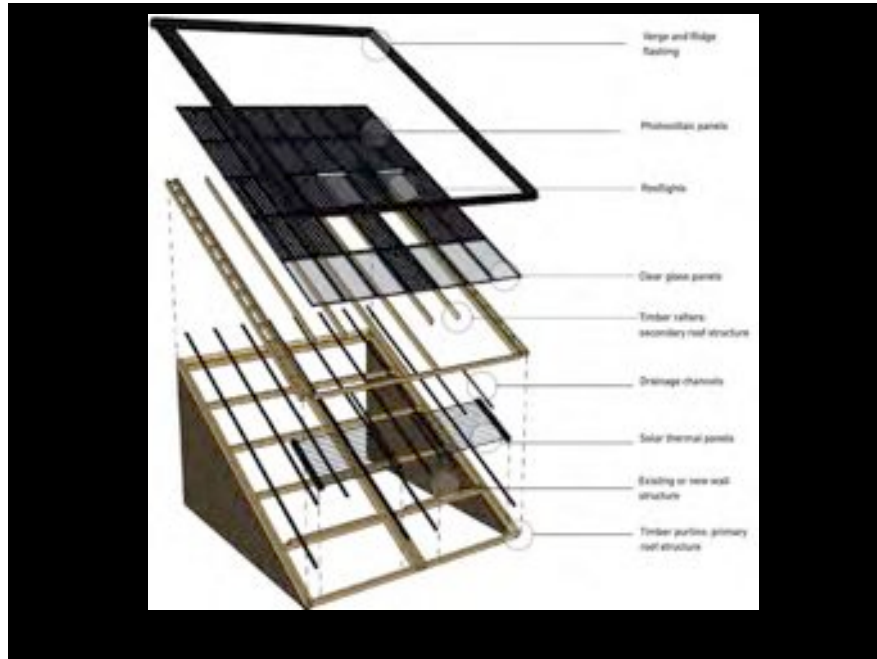
copyright 2004
Zec factory.com



Imagine that 4.5 kw peak of large translucent photovoltaic roof tiles fixed to 100x50 mm batons could be installed and grid connected for around £10,000-00

Panel prices have dropped to £1-50 / watt peak for building integrated roofs

This generates an annual FITS income of around £1,500-00



Integrated exhaust Air Source heat pump providing all year round solar thermal DHW

- Integrates with solar thermal collectors
- Highly efficient water heating (COP3.5)
- 285L capacity tank
- Only cuts in when needed
- Powered by the excess PV production
- Avoids need for back up biomass combustion in zero heating spec homes

The cost of the FITS eligible solar roof is far lower because the tiles are large, they are fast to fit, and they replace the need for a conventional roof – in fact the completed roof is not much more expensive than a high quality slate or tile roof -

The ZEDroof is a new energy roof system which fits daylight into a raft to create a supplementary in your south-facing roof space whilst generating electricity and hot water.

- PV panels:** Photovoltaic panels generating electricity
- Reeflight:** Provides a clear view of the roof structure
- Solar thermal panels:** Generating hot water for about 80% of the year

It's important to add solar thermal collectors to give summer domestic hot water demand



ZEDroof testing at BedZED 2011

Ecobuild

the ZED factory ltd
stramitZED
SOLAR GLASS ROOFS



By making the space between the durable monocrystalline silicon wafers translucent, and allowing sunlight in as well as incorporating Velux rooflights for ventilation - the previously low value loft space can become a rooftop conservatory adding extra sheltered unheated amenity space



Which can be used for upgrading existing buildings of all ages, providing insulation is placed above the top floor ceiling

Retro-fitting existing properties

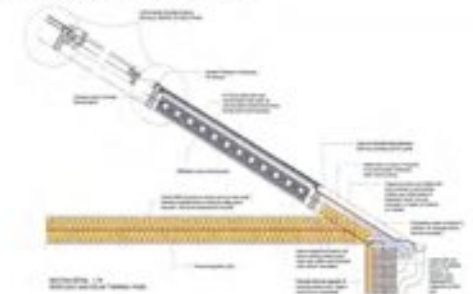


Chalkwell Hall, Southend on Sea
Grade 2 listed

Installing a Zedroof onto an existing victorian terraced house



Detailed section of a Zedroof refurbishment of a victorian house



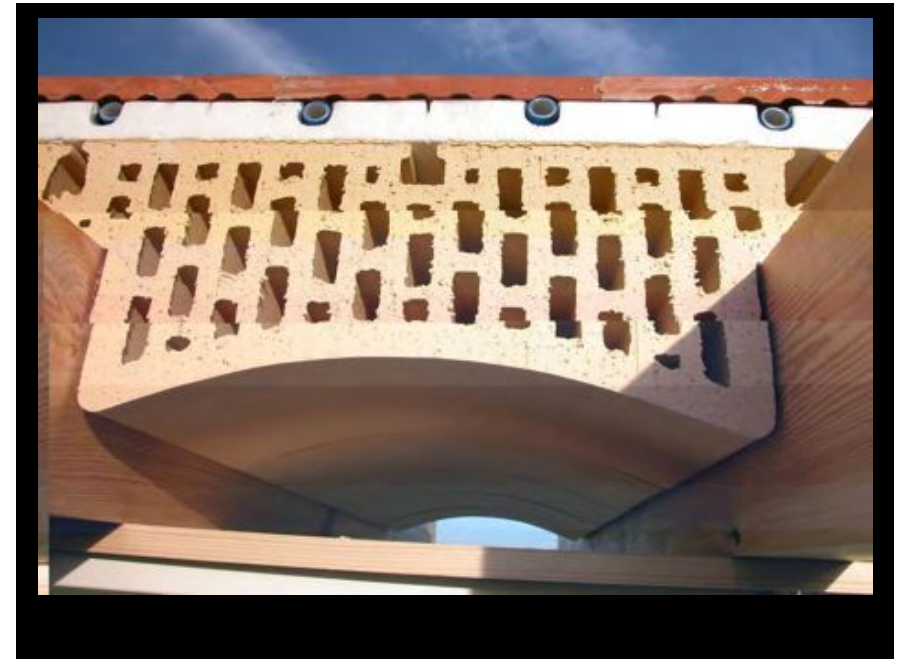
Plan of a Zedroof refurbishment of a victorian house





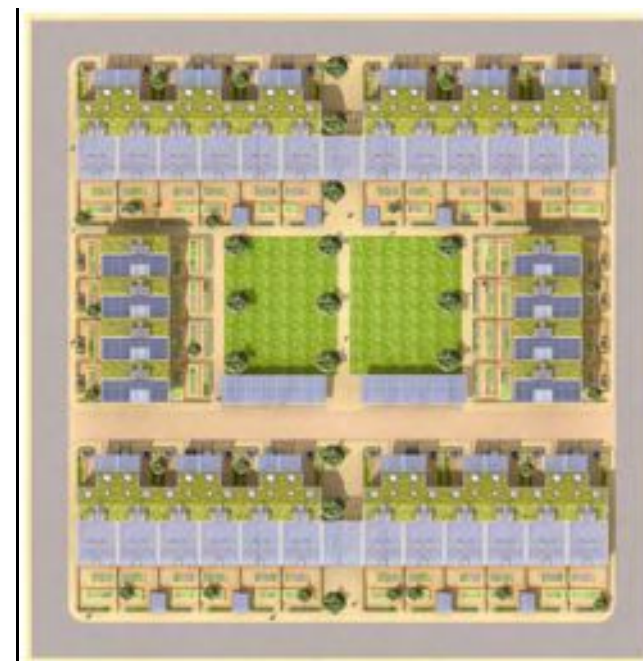
And if new homes or offices or even schools are planned to have large southish facing roofs – sitting on top of very energy efficient superinsulated and draughtproofed Accommodation

The cost of this spec including energy roof, kitchen and foundations is around £1250-00/ m² gross internal floor area



If we then add optional additional solar electric porches and car ports, we can generate enough annual electricity to power normal annual mileages of lightweight electric vehicles – running up to 7500 ,miles a year/ home or further if e bikes and scooters are used.

The street of the future will look different on each side of the road.



Its completely possible to reconcile the place making agenda with zero carbon urbanism – creating delightful human scale streetscape and public open space





By adapting to climate inevitable change rather than hoping it wont happen



Then a potential disaster becomes a manageable risk with far less damage to the community







This 190 watt pv panel could approximately power an electric trike for around 1000 miles/ year in the uk and an electric car half this distance – making zero carbon personal transport possible in suburban and rural areas with low PTAL ratings.

