

A Sustainable Site & Building

BedZED

CX3 - Deona Swager - Megan Cosdon



Building Description

BedZED is known for being the UK's largest sustainable housing unit

- Formally named the Beddington Zero Energy Development (BedZED)
- Using zero energy, this building was designed to feature a sustainable lifestyle for the residents
- Old Brown Field Site
- Located in Beddington, London, UK
- 100 homes with aprox. 220 residents



Wind Cows

Window Ventilation

Monocrystalline Silicon Solar Panels

Natural Daylighting from South Facade

Low Impact Materials

Hidden Entrance

Personal Garden

Sustainable Features

A1 Performance Analysis

Using the SBSE version chart, we decided that our building uses a variety of sustainable features

BedZED leans more on the regeneration side due to its design that promotes energy and green living

Regeneration-Based Checklist for Design and Construction

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		Project: BedZED								
		degeneration			sustainability				regeneration	
		-100 always	-75 usually	-50 sometimes	-25 a bit	0 balances	25 a bit	50 sometimes	75 usually	100 always
the site	pollutes air									cleans air
	pollutes water									cleans water
	wastes rainwater									stores rainwater
	consumes food									produces food
	destroys rich soil									creates rich soil
	dumps wastes unused									consumes wastes
	destroys wildlife habitat									provides wildlife habitat
	imports energy									exports energy
	requires fuel-powered transportation									requires human-powered transportation
	intensifies local weather									moderates local weather
the building	excludes daylight									uses daylight
	uses mechanical heating									uses passive heating
	uses mechanical cooling									uses passive cooling
	needs cleaning and repair									maintains itself
	produces human discomfort									provides human comfort
	uses fuel-powered circulation									uses human-powered circulation
	pollutes indoor air									creates pure indoor air
	is built of virgin materials									is built of recycled materials
	cannot be recycled									can be recycled
	serves as an icon for the apocalypse									serves as an icon for regeneration
is a bad neighbor									is a good neighbor	
is ugly									is beautiful	

negative score 2200 possible	positive score 2200 possible
175	1,325

final score:
1,150

A1 Performance Analysis

excludes daylight										uses daylight
uses mechanical heating										uses passive heating
uses mechanical cooling										uses passive cooling
needs cleaning and repair										maintains itself
produces human discomfort										provides human comfort
uses fuel-powered circulation										uses human-powered circulation

BUILDING:

Daylighting +100

Building faces South to take advantage of solar gain

Mechanical - Passive Heating -75

Having South facing windows overheated the building in summer but was nice the rest of the year

Mechanical - Passive Cooling +75

Wind cooling stacks on roof allow for ventilation and passive cooling

Maintenance +100

Human Comfort +100

Residents work together to maintain comfort within buildings

Circulation +100

Stairs and ramps used throughout to encourage exercise, pedestrian interaction and reduce fossil fuel use



A1 Performance Analysis

pollutes indoor air										creates pure indoor air
is built of virgin materials										is built of recycled materials
cannot be recycled										can be recycled
serves as an icon for the apocalypse										serves as an icon for regeneration
is a bad neighbor										is a good neighbor
is ugly										is beautiful

BUILDING:

Pollutes - Pure Indoor Air +?

With cross ventilation, the indoor air is continually switched out for fresh outdoor air

Materiality +100

Building uses low impact materials that come from sources that are renewable and recycled from within 35 miles of site

Recyclable +100

Where possible, BedZED is built from natural, recycled or reclaimed materials.

Serves as an Icon for Regeneration +100

Many people use this building as a precedent for sustainability

Bad or Good Neighbor +100

It was received well by other surrounding neighbors

Beautiful or Ugly +50

There are mixed feelings about exterior



TOTAL:1,150

A2 Performance Analysis

We rated our building with a "GOLD" standing.

Gold standing ranges from 60 to 79 points

Y ? N		Crédit	Points	Category	Possible Points
		Integrative Process	1		
24	8	0		Location and Transportation	16
10	6	0	16	LEED for Neighborhood Development Location	16
1	0	0	1	Sensitive Land Protection	1
2	2	0	2	High Priority Site	2
5	0	0	5	Surrounding Density and Diverse Uses	5
5	0	0	5	Access to Quality Transit	5
1	0	0	1	Bicycle Facilities	1
1	0	0	1	Reduced Parking Footprint	1
1	0	0	1	Green Vehicles	1
6	4	0		Sustainable Sites	10
Y	Prereq	Required	Required	Construction Activity Pollution Prevention	Required
1	0	0	1	Site Assessment	1
2	0	0	2	Site Development - Protect or Restore Habitat	2
1	0	0	1	Open Space	1
1	2	0	3	Rainwater Management	3
2	0	0	2	Heat Island Reduction	2
1	0	0	1	Light Pollution Reduction	1
4	3	3		Water Efficiency	11
Y	Prereq	Required	Required	Outdoor Water Use Reduction	Required
Y	Prereq	Required	Required	Indoor Water Use Reduction	Required
Y	Prereq	Required	Required	Building-Level Water Metering	Required
1	0	0	2	Outdoor Water Use Reduction	2
3	3	0	6	Indoor Water Use Reduction	6
2	0	0	2	Cooling Tower Water Use	2
1	0	0	1	Water Metering	1
13	15	3		Energy and Atmosphere	33
Y	Prereq	Required	Required	Fundamental Commissioning and Verification	Required
Y	Prereq	Required	Required	Minimum Energy Performance	Required
Y	Prereq	Required	Required	Building-Level Energy Metering	Required
Y	Prereq	Required	Required	Fundamental Refrigerant Management	Required
6	0	0	6	Enhanced Commissioning	6
10	8	0	18	Optimize Energy Performance	18
1	0	0	1	Advanced Energy Metering	1
2	0	0	2	Demand Response	2
1	0	0	3	Renewable Energy Production	3
1	0	0	1	Enhanced Refrigerant Management	1
2	0	0	2	Green Power and Carbon Offsets	2
11	2	0		Materials and Resources	13
Y	Prereq	Required	Required	Storage and Collection of Recyclables	Required
Y	Prereq	Required	Required	Construction and Demolition Waste Management Planning	Required
5	0	0	5	Building Life-Cycle Impact Reduction	5
2	0	0	2	Building Product Disclosure and Optimization - Environmental Product Declarations	2
2	0	0	2	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2	0	0	2	Building Product Disclosure and Optimization - Material Ingredients	2
2	0	0	2	Construction and Demolition Waste Management	2
10	4	2		Indoor Environmental Quality	16
Y	Prereq	Required	Required	Minimum Indoor Air Quality Performance	Required
Y	Prereq	Required	Required	Environmental Tobacco Smoke Control	Required
2	0	0	2	Enhanced Indoor Air Quality Strategies	2
3	0	0	3	Low-Emitting Materials	3
1	0	0	1	Construction Indoor Air Quality Management Plan	1
1	1	0	2	Indoor Air Quality Assessment	2
1	0	0	1	Thermal Comfort	1
1	1	0	2	Interior Lighting	2
2	1	0	3	Daylight	3
1	0	0	1	Quality Views	1
1	0	0	1	Acoustic Performance	1
5	1	0		Innovation	6
5	0	0	5	Innovation	5
1	0	0	1	LEED Accredited Professional	1
0	4	0		Regional Priority	4
1	0	0	1	Regional Priority: Specific Credit	1
1	0	0	1	Regional Priority: Specific Credit	1
1	0	0	1	Regional Priority: Specific Credit	1
1	0	0	1	Regional Priority: Specific Credit	1
73	41	8		TOTALS	Possible Points: 110
					Certification: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

A3 Performance analysis

ZERO ENERGY DEVELOPMENT

The building's goal of being a sustainable building is achieved. Many features that promote green living have been developed due to the influence of BedZED. Having residents that support this style of living helps maintain a better quality of building and lifestyle within the development.



B1 Building Redesign



-Fix CPH & “Living Machine”

-Clean up green area for better use and more garden space

-Add curtains to South facing windows to prevent solar gain in summer and keep warmth in winter

B1 Building Redesign

Problems

Biomass gasifier is not in operation
-forcing it to use gas boiler instead

Natural sewage-recycling system out of commission
-has not been replaced because of expense

Rooftop and community garden areas struggling & not used to full potential
-automatic supply pumps not working, danger of overwatering/underwatering

The passive heating from the sunspaces had been insufficient
- too cold for comfort in winter and over in summer

Solutions

Ensure infrastructure is planned and installed at earliest opportunity

Fix “Living Machine”
Alternative stormwater and grey water recycling on site

Allow generous contingency sum in initial budget for vegetation & gardens. Outsource local companies for maintenance

Install curtains and blinds
Educate residents

B1 Building Redesign

Planning for Biomass Gasifier
revert back to zero carbon goal

Replacement for "Living Machine"
form of ecological sewage treatment
designed to mimic the cleansing
functions of wetlands

Restore rooftop and community garden areas

Decrease energy use by installing curtains and
blinds. Encourage residents to use passive heating
& cooling in sunrooms (opening windows)



B2 Redesign Performance Analysis

Following the SBSE version chart, we've increased the overall regenerative nature of BedZED.

BedZED now leans almost completely on the side of regeneration, increasing the score by 350 points

From 1,150 to 1,500

Regeneration-Based Checklist for Design and Construction

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Project: BedZED

	degeneration		sustainability			regeneration					
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										destroys wildlife habitat	provides wildlife habitat
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										serves as an icon for the apocalypse	serves as an icon for regeneration
										is a bad neighbor	is a good neighbor
										is ugly	is beautiful

negative score 2200 possible	50	positive score 2200 possible	1,550
final score:		1,500	

B2 Redesign Performance Analysis

With our redesign, BedZED was able reach LEED platinum

LEED v4 for BD+C: Hospitality Project Checklist

Y	?	N	Cr+Pr	Integrative Process	1
#	6	0		Location and Transportation	16
12	4		Cr+Pr	LEED for Neighborhood Development Location	16
1			Cr+Pr	Sensitive Land Protection	1
2			Cr+Pr	High Priority Site	2
5			Cr+Pr	Surrounding Density and Diverse Uses	5
5			Cr+Pr	Access to Quality Transit	5
1			Cr+Pr	Bicycle Facilities	1
1			Cr+Pr	Reduced Parking Footprint	1
1			Cr+Pr	Green Vehicles	1
8	2	0		Sustainable Sites	10
Y			Pr+Pr	Construction Activity Pollution Prevention	Required
1			Cr+Pr	Site Assessment	1
2	0		Cr+Pr	Site Development - Protect or Restore Habitat	2
1			Cr+Pr	Open Space	1
1	2		Cr+Pr	Rainwater Management	3
2			Cr+Pr	Heat Island Reduction	2
1			Cr+Pr	Light Pollution Reduction	1
4	3	3		Water Efficiency	11
Y			Pr+Pr	Outdoor Water Use Reduction	Required
Y			Pr+Pr	Indoor Water Use Reduction	Required
Y			Pr+Pr	Building-Level Water Metering	Required
1			Cr+Pr	Outdoor Water Use Reduction	2
3	3		Cr+Pr	Indoor Water Use Reduction	6
2			Cr+Pr	Cooling Tower Water Use	2
1			Cr+Pr	Water Metering	1
13	#	3		Energy and Atmosphere	33
Y			Pr+Pr	Fundamental Commissioning and Verification	Required
Y			Pr+Pr	Minimum Energy Performance	Required
Y			Pr+Pr	Building-Level Energy Metering	Required
Y			Pr+Pr	Fundamental Refrigerant Management	Required
6			Cr+Pr	Enhanced Commissioning	6
10	8		Cr+Pr	Optimize Energy Performance	18
1			Cr+Pr	Advanced Energy Metering	1
2			Cr+Pr	Demand Response	2
1			Cr+Pr	Renewable Energy Production	3
1			Cr+Pr	Enhanced Refrigerant Management	1
2			Cr+Pr	Green Power and Carbon Offsets	2
13	0	0		Materials and Resources	13
Y			Pr+Pr	Storage and Collection of Recyclables	Required
Y			Pr+Pr	Construction and Demolition Waste Management Planning	Required
5			Cr+Pr	Building Life-Cycle Impact Reduction	5
2			Cr+Pr	Building Product Disclosure and Optimization - Environmental Product Declarations	2
2			Cr+Pr	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Cr+Pr	Building Product Disclosure and Optimization - Material Ingredients	2
2			Cr+Pr	Construction and Demolition Waste Management	2
12	3	1		Indoor Environmental Quality	16
Y			Pr+Pr	Minimum Indoor Air Quality Performance	Required
Y			Pr+Pr	Environmental Tobacco Smoke Control	Required
2			Cr+Pr	Enhanced Indoor Air Quality Strategies	2
3			Cr+Pr	Low-Emitting Materials	3
1			Cr+Pr	Construction Indoor Air Quality Management Plan	1
1	1		Cr+Pr	Indoor Air Quality Assessment	2
1			Cr+Pr	Thermal Comfort	1
1	1		Cr+Pr	Interior Lighting	2
2	1		Cr+Pr	Daylight	3
1			Cr+Pr	Quality Views	1
1			Cr+Pr	Acoustic Performance	1
5	1	0		Innovation	6
5			Cr+Pr	Innovation	5
1			Cr+Pr	LEED Accredited Professional	1
0	4	0		Regional Priority	4
1			Cr+Pr	Regional Priority: Specific Credit	1
1			Cr+Pr	Regional Priority: Specific Credit	1
1			Cr+Pr	Regional Priority: Specific Credit	1
1			Cr+Pr	Regional Priority: Specific Credit	1
81	#	7		TOTALS	110
				Certified: 40 to 49	Platinum: 80 to 110
81	34	7		TOTALS	110
				Certified: 40 to 49	Platinum: 80 to 110

B3 Redesign Performance analysis

After fixing three large issues at BedZED

- Waste and water regeneration
- Plant and garden functionality
- Sunspace efficiency

We determined that BedZED would create zero carbon emissions again, the water treatment plant would once again function, the site overall would appear better maintained and more visually appealing. And last, the sunspace would heat and cool the house, as they are designed to do.



Conclusion

Residents of BedZED report a high level of happiness and community connection. A few issues of living facility include; the CHP & the original onsite water treatment system. These are major problems that BedZED was founded upon. BedZED is considered successful because of the fact that residents can reduce their ecological footprint by around half and yet improve the quality of their lives. With the integration of newer technology, zoning and planning and resident programs can increase the score on the Malcom Wells Checklist.

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