



**Zero Carbon Hub Conference 2012**

**Peter Youll**

# Graylingwell Park

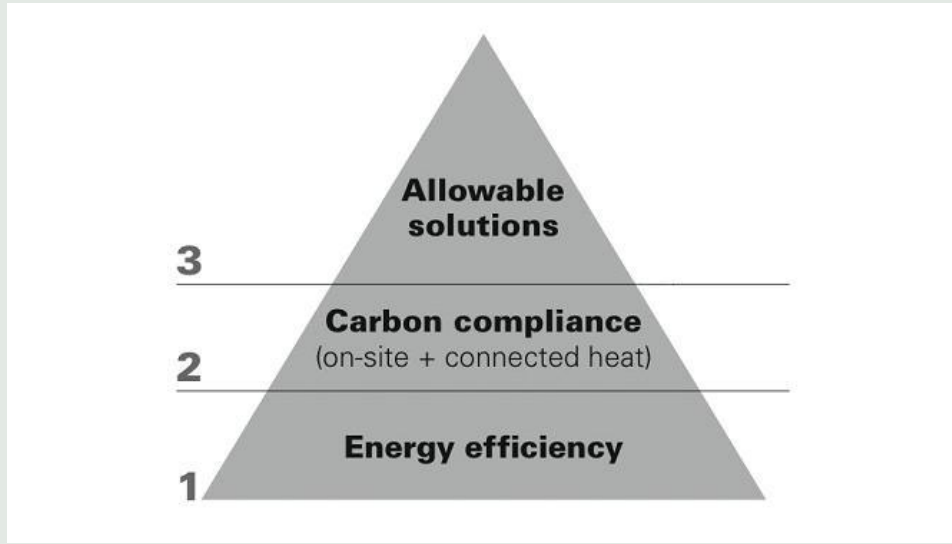


# Graylingwell Park

## Building Requirements / Criteria for Development

- CSH Level 4 for all new build residential units
- 100% DER improvement over TER for all residential units
- EcoHomes Excellent for all refurbished residential homes
- BREEAM Excellent for all non-residential buildings
- HLP = 1.3 W/m<sup>2</sup>K for residential units (aggregate)
- All targets independently verified / certified
- Asses as we go phase by phase

# Graylingwell Park

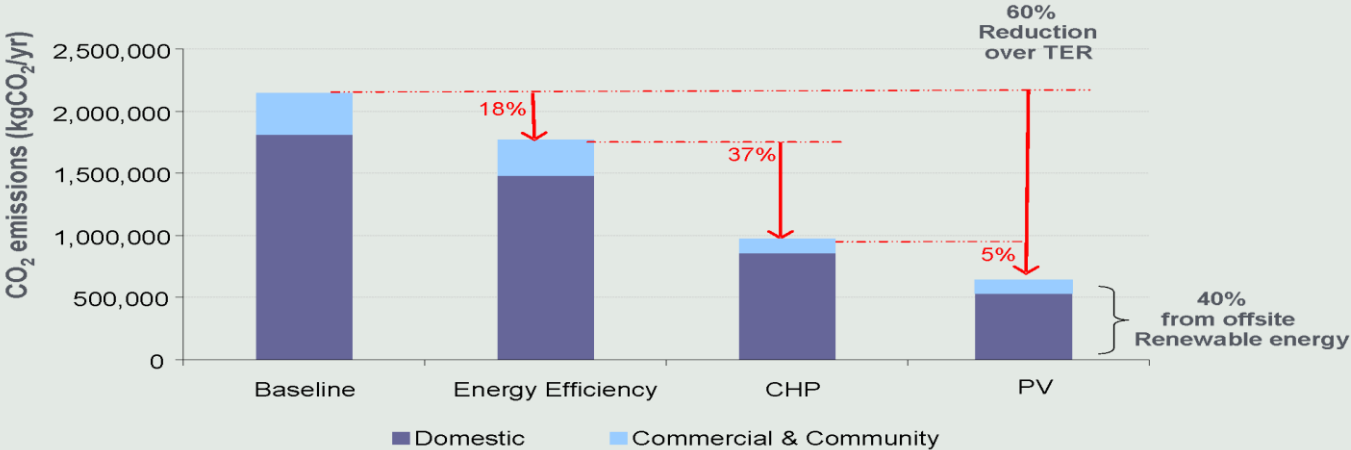


## Graylingwell Park



**100 %**

# Graylingwell Park - Net Zero Carbon Strategy



I will run through the following areas:

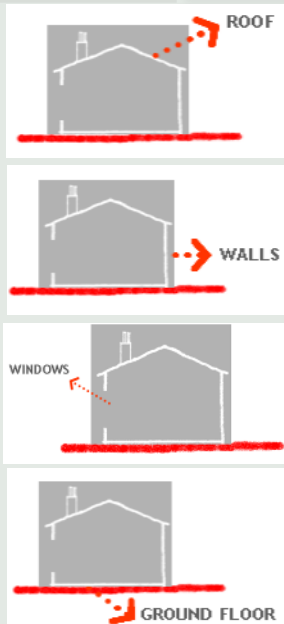
1. Energy Efficiency of Homes
2. Energy Centre & District Heating System
3. Photovoltaic's
4. Allowable Solution

## 1. Energy Efficiency of Homes

# Graylingwell Park

## Improving Building Fabric (U-values)

Element	Part L 2006 (W/m <sup>2</sup> K)	Graylingwell (W/m <sup>2</sup> K)	% Uplift
External Walls	0.35	0.17	50%
Floors	0.25	0.15	40%
Roofs	0.25	0.13	50%
Windows	2.20	1.20	45%
Air Leakage m <sup>3</sup> /(h/m <sup>2</sup> ) @ 50Pa	10	3	70%





# Graylingwell Park

## Energy Performance Certificate

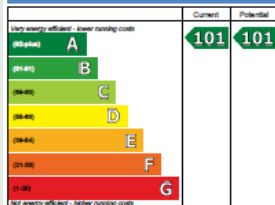


1, Lloyd Road,  
CHICHESTER,  
PO19 6AY

Dwelling type: End-terrace house  
Date of assessment: 13 September 2010  
Date of certificate: 13 September 2010  
Reference number: 0475-3857-6018-9190-5745  
Type of assessment: SAP, new dwelling  
Total floor area: 93 m<sup>2</sup>

This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO<sub>2</sub>) emissions.

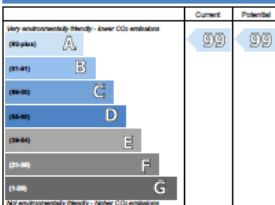
### Energy Efficiency Rating



England & Wales

EU Directive  
2002/91/EC

### Environmental Impact (CO<sub>2</sub>) Rating



England & Wales

EU Directive  
2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of Carbon Dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

### Estimated energy use, carbon dioxide (CO<sub>2</sub>) emissions and fuel costs of this home

	Current	Potential
Energy use	-2 kWh/m <sup>2</sup> per year	-2 kWh/m <sup>2</sup> per year
Carbon dioxide emissions	0.1 tonnes per year	0.1 tonnes per year
Lighting	£49 per year	£49 per year
Heating	£199 per year	£199 per year
Hot water	£78 per year	£78 per year

### Summary of this home's energy performance related features

The following is an assessment of the key individual elements that have an impact on this home's performance rating. Each element is assessed against the following scale: Compliant / Average / Good / Very good.

Elements	Description	Current performance	
		Energy Efficiency	Environmental
Walls	Average thermal transmittance 0.17 W/m <sup>2</sup> K	Very good	Very good
Roof	Average thermal transmittance 0.13 W/m <sup>2</sup> K	Very good	Very good
Floor	Average thermal transmittance 0.15 W/m <sup>2</sup> K	Very good	Very good
Windows	High performance glazing	Very good	Very good
Main heating	Community scheme with CHP, mains gas and oil	Very good	Very good
Main heating controls	Flat rate charging, programmer and TRVs	Average	Average
Secondary heating	None	-	-
Hot water	Community scheme with CHP	Very good	Very good
Lighting	Low energy lighting in all fixed outlets	Very good	Very good
Air tightness	Air permeability 2.9 m <sup>3</sup> /h.m <sup>2</sup> (as tested)	Very good	Very good

Current energy efficiency rating

A 101

Current environmental impact (CO<sub>2</sub>) rating

A 99

Thermal transmittance is a measure of the rate of heat loss through a building element; the lower the value the better the energy performance.

Air permeability is a measure of the air tightness of a building; the lower the value the better the air tightness.

### Low and zero carbon energy sources

The following low or zero carbon energy sources are provided for this home:

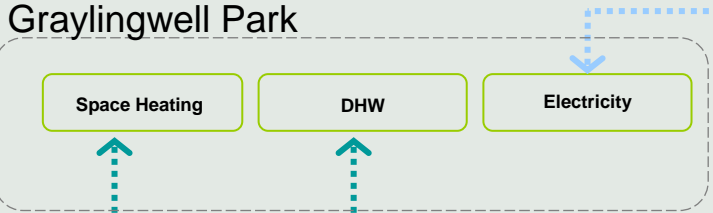
- Combined heat and power
- Solar photovoltaics

## 2. Energy Centre & District Heating System

# Graylingwell Park – Energy Centre

- High level diagram
- Interfaces & Risk Areas
- The Summary Components
- Some Pictures

# Low carbon and renewable energy technologies



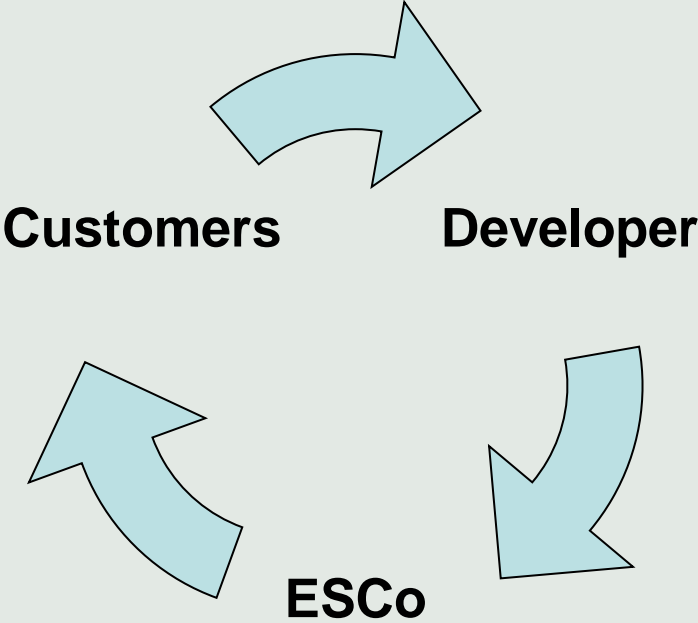
PV Tiles



Gas CHP

National Grid

# Graylingwell Park – ESCo



## Graylingwell Park – Energy Centre

The basic components of the energy centre and community heating comprises:

- **4 Gas Boilers - 1.1 MW each; with condensing economisers**
- **2 CHP engines 500 kW**
- **2 Thermal Stores 48,000 ltr**
- **8km approx of heating distribution pipe**
- **Hydraulic Interface Unit in each property**

# Graylingwell Park – Energy Centre



# Graylingwell Park – Energy Centre





## 3. Photovoltaic's

# Graylingwell Park



**PV's can look out of place  
“solar water evacuated tubes”**

**Or Raised Roof panels or even  
the black & red tile combination**



# Graylingwell Park

**We selected  
the  
Solarcentury  
in line C21  
Tile which  
matches the  
slate roofs of  
the  
conversion**



## 5% onsite from renewable energy

- Photovoltaics across Phase 1
- 220kWp in total (1,812m<sup>2</sup>)
- Solar Century C21E PV tile system
- Affordable homes PV financed by LCBP grant
- Phase 1 PV's generating savings / income  
£1,100 and £1,300 per annum

## 4. Allowable Solution



## **40% offsite renewable energy**

- **Allowable Solution - wind turbine option**
- **Generation to cover 40% Co2 reduction**
- **1MW wind turbine estimated to offset Co2**
- **Total covers 40% to 66% Graylingwell Co2**

# Graylingwell Park



# Graylingwell Park





# Graylingwell Park



# Zero Carbon Hub Conference



**Graylingwell  
Park**

