Sustainable Design & Construction
What We Do

- Engineering Design
- Environmental Consulting
- Building Sustainability
- Integrated Environmental Design
- Economics and Development
- Transportation Planning, Design, Project Management and Maintenance
- Strategic Facilities Management
- Mergers & Acquisition Consulting
- Corporate Responsibility Consulting
“Triple bottom line”

- **Environmental**
  - Climate change
  - Local impacts
  - Health & wellbeing

- **Economic**
  - Employment - local, national, global
  - Empowerment

- **Social**
  - Cultural
  - Health
  - Education
  - Security
Drivers

• **Securing the Future** – The UK Government Sustainable Development Strategy (March 2005)

• ‘**Building a Better Quality of Life**’ DETR Sustainable Development Initiative ([www.dti.gov.uk](http://www.dti.gov.uk))

• Kyoto Protocol – 10% reduction in CO2 by 2010

• Building Regulations Part L ‘**Conservation of Fuel and Power**’ April 2006

• Climate Change Levy
London Planning context

- The London Plan
- The Mayor’s Energy Strategy
- The Mayor’s Transport Strategy
- Renewables Toolkit
- Tower Hamlets Sustainability Checklist
- Westminster Environmental Performance Statement
- etc...
London Planning requirements

• Energy Hierarchy – Be Lean, Be Green, Be Clean

• BREEAM / EcoHomes (Excellent for LDA projects)

• Draft SPG Essential and Mayor’s preferred standards

• Bio-diversity Action Plan
London Planning requirements

- FSC certified timber
- A rated construction materials
- Community heating
- Combined heat & power
- Rainwater harvesting
EcoHomes

- Considerate Constructors
- Commissioning
- Carbon emissions
- Transport
- Materials
- Health & Wellbeing
- Pollution
- Water use
- Land use
- Ecological impact
Ecohomes

- Assume compliance with Part L1
- Assume brownfield site
- Assume sensible measures taken where cost neutral
Dwellings to Part L1 compliance achieves GOOD

Ecohomes Score 'GOOD' by Achieving Building Regs

- Energy
- Transport
- Pollution
- Materials
- Water
- Land Use & Ecology
- Health & Wellbeing
- Unscored Points
Path to EcoHomes Excellent

Ecohomes Score 'EXCELLENT' by extra low cost measures

£50/m2 or 8% of construction cost
Measures Required for EcoHomes Excellent

- Reduced carbon emissions
- Reduced pollution impact
- Reduced materials & embodied energy impact
- Basic water conservation
- Consult Ecologist
- Health & Wellbeing
Case Study 1

- Ecohomes ‘Very Good’

- Energy Strategy
  - CHP
  - Wind
  - Ground Coupled Heating & Cooling
Case Study 2

- Ecohomes ‘Very Good’
Low Carbon Design

Energy Hierarchy

- Façade performance
- Insulation
- Low energy services design
- Natural/Mixed mode ventilation
- Displacement ventilation
- Community heating
- CHP and trigeneration
- On-site renewables
London Renewables Targets

By 2010:
- Power 100,000 homes by renewables
- Heat 40,000 homes
- Every Borough to have a ZED
- 7000 domestic PV installations
- 250 commercial PV installations
- 6 large wind turbines
- 500 small wind turbines
- Double the CHP installations in 2000
Combined Heat and Power
Building integrated wind turbines
GCHC – Aquifer Thermal Energy Storage
GCHC – Aquifer Thermal Energy Storage
Building Integrated Photovoltaics
# The Cost of Renewables

<table>
<thead>
<tr>
<th>Renewable</th>
<th>£/m² gross fa</th>
<th>kgC/m² gross fa</th>
<th>£/kgC saved</th>
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<tbody>
<tr>
<td>Ground source heat pump</td>
<td>32.81</td>
<td>1.32</td>
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<td>Biomass heating</td>
<td>28.95</td>
<td>4.49</td>
<td>6.45</td>
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<td>Solar water heating</td>
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<td>1.08</td>
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<td>PV rooftop</td>
<td>£850/m² panel</td>
<td>11.3/m² panel</td>
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<td>Wind turbine</td>
<td>£2000/kW</td>
<td>290/kW</td>
<td>6.90</td>
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The London ESCo

- Energy Islands
- JV between LCCP and EDF Energy
- Design, Build, Finance, Operate
- Risks as yet unknown
- Biogas available in London within 5 years
Grid price vs Private Wire price
Fuel Cells
Questions