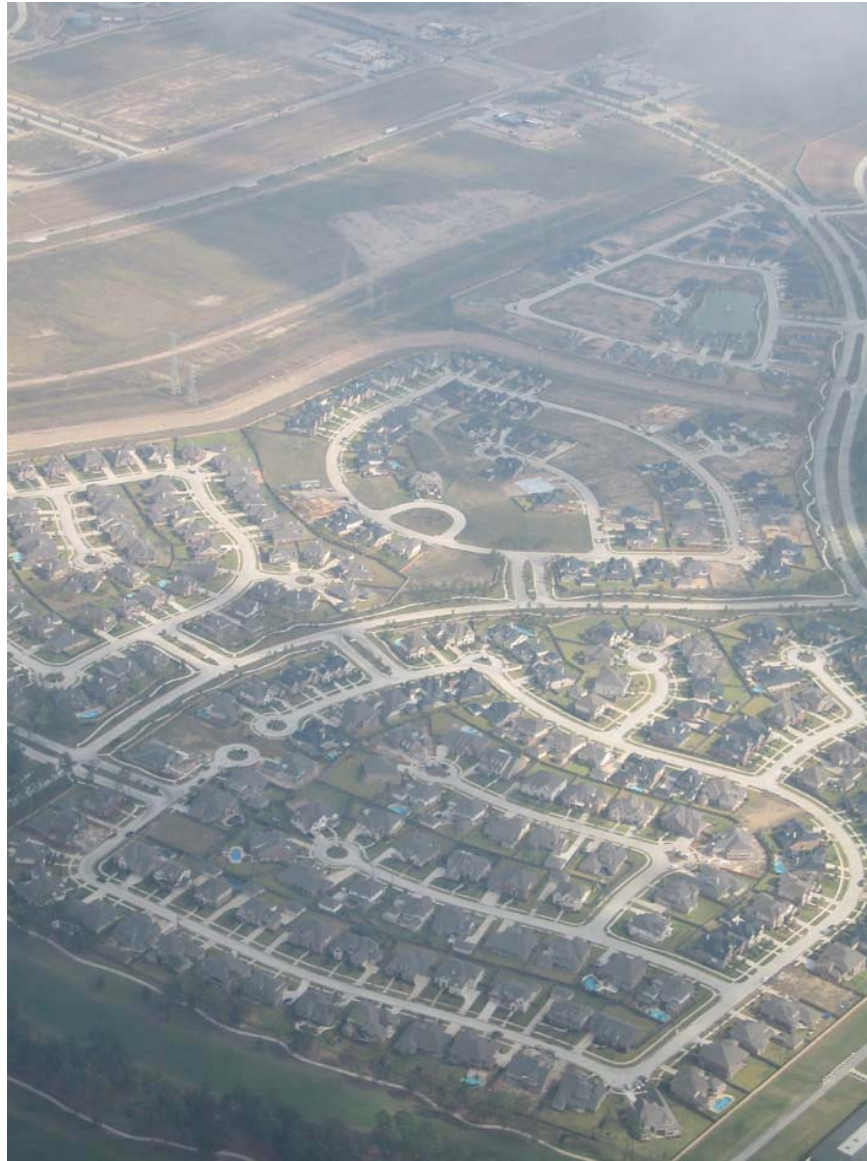


Traditional Green Architecture in 2007
A view from the UK

Ben Pentreath
Director, Working Group Design

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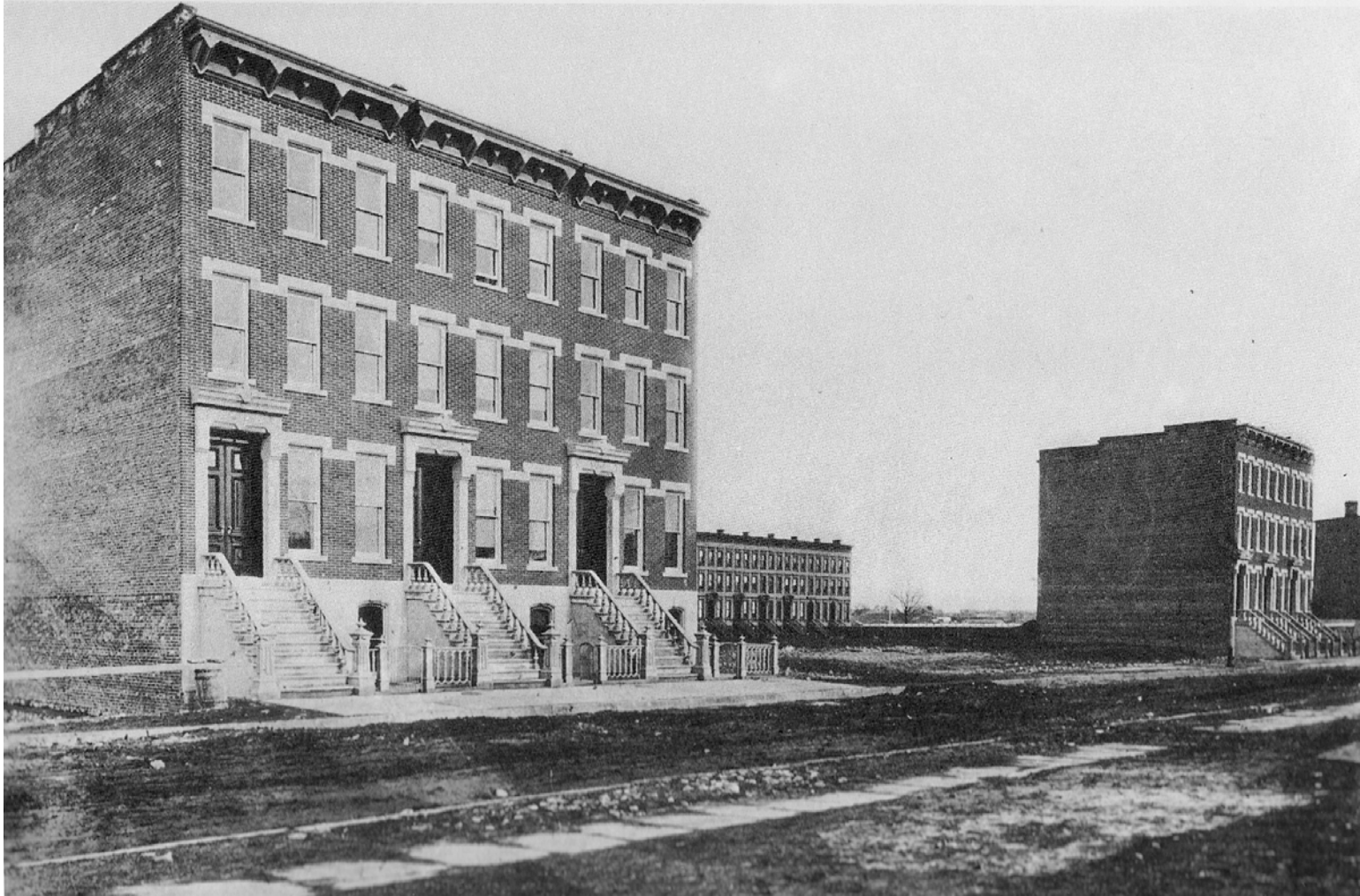
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Sustainable Development in the UK: 2007

- Rising fast up the political agenda, in response to:
- Climate Change issues
- Energy Supply issues
- A government priority especially with regard to new house construction: the 'Code for Sustainable Homes' was introduced in April 2007

www.communities.gov.uk

- 6 levels - CSH Level 1 through Level 6: Zero Carbon
- All new homes in the UK to be Level 6 by 2016



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Last Updated: Monday, 12 March 2007, 18:26 GMT

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Homes must be greener, says Brown

Chancellor Gordon Brown has called on households to do more to cut greenhouse gases by making homes better insulated and more fuel-efficient.



Mr Brown said families would have to 'count the carbon'

He told the BBC people had to "count the carbon as well as the pennies" and that tax breaks could be offered.

The draft Climate Change Bill, due out on Tuesday, will call for a 60% cut in carbon dioxide emissions by 2050.

But Conservative leader David Cameron urged ministers to set annual, not just long-term, targets.

'Balance'

The environment is seen as a key battleground ahead of the next general election.

VIDEO AND AUDIO NEWS

Gordon Brown explains some of his ideas on climate change

WATCH

CLIMATE CHANGE



Animated guide

Find out how the greenhouse effect works and more...

GLOBAL POLITICS

IPCC and Gore win Nobel prize
Critics angry at Bush climate plan

EU/UK POLITICS

PM outlines climate action plan
Climate bill's 60% emission cut
Tories pledge energy 'revolution'

LATEST SCIENCE

'Unexpected growth' in CO2 found
Amazonian forest 'more resilient'

IPCC ASSESSMENT

Cameron to make environment key issue

By George Jones, Political Editor

Last Updated: 6:01pm BST 18/05/2007

• Labour and Tory environment briefs

David Cameron will put the environment at the heart of a two million-word policy blitz to be launched next month to prevent Gordon Brown dominating the political agenda when he becomes Prime Minister.

The environment has emerged as the key battleground between the two leaders as they prepare to go head to head when Tony Blair finally steps down on June 27.

With six weeks in limbo to prepare for the handover, Mr Brown plans to "hit the ground running" when he finally becomes Prime Minister.

He is preparing for a wide-ranging cabinet reshuffle - in which he hopes to combine a new generation of rising politicians with the more experienced members of the Blair team - and a shake-up of Whitehall.



David Cameron doing his bit for the environment

EARTH MOST VIEWED

Mankind 'shortening the universe's life'

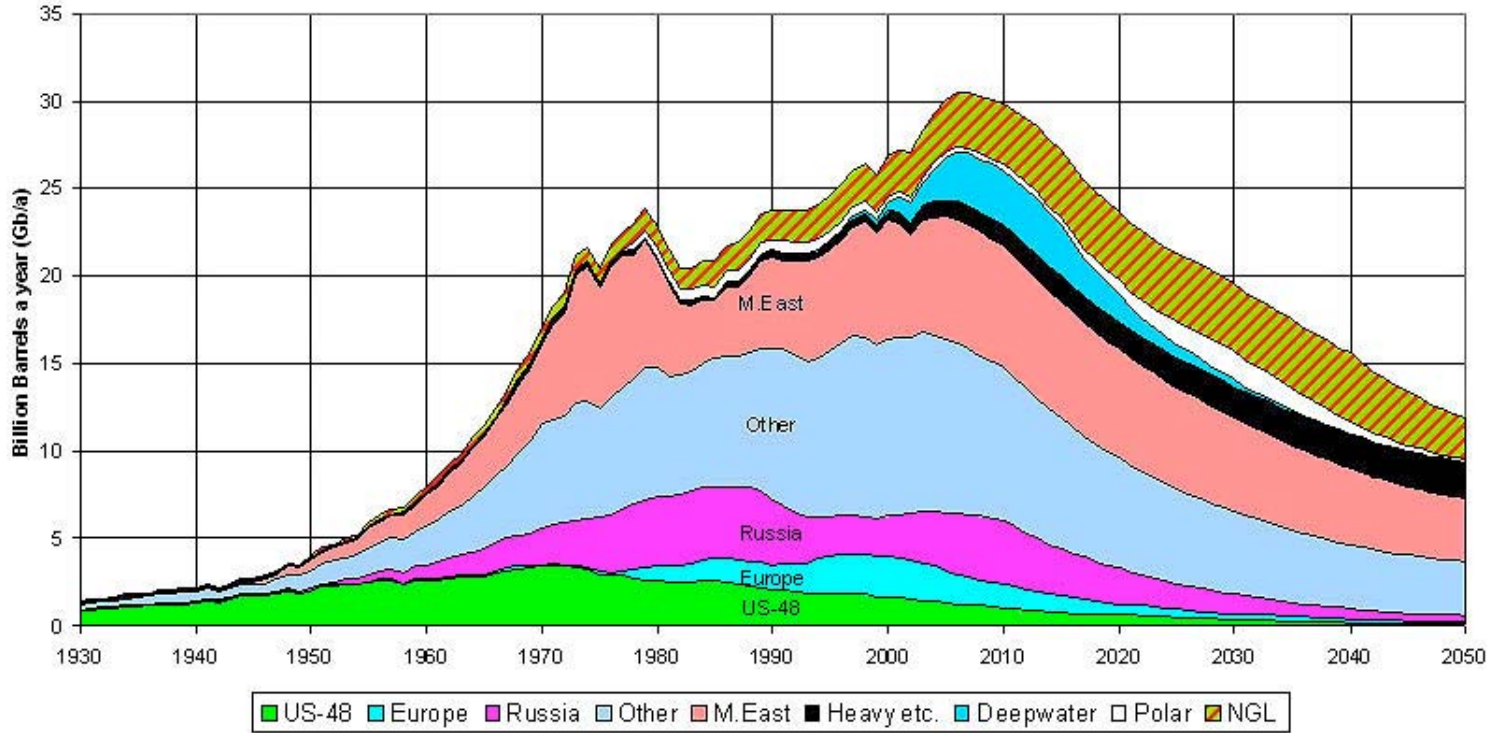
Shark pictures show amazing killing display

Surfer dude stuns physicists with theory of everything

Parallel universe suggests time travel

Mobula Ray pictures reveal spectacular leaps

OIL AND GAS LIQUIDS 2004 Scenario



What happens?

If you type 'GREEN ARCHITECTURE UK' into Google?

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“London’s first tall ecological building and an instantly recognisable addition to the city’s skyline, 30 St Mary Axe is rooted in a radical approach - technically, architecturally, socially and spatially...

Foster & Partners

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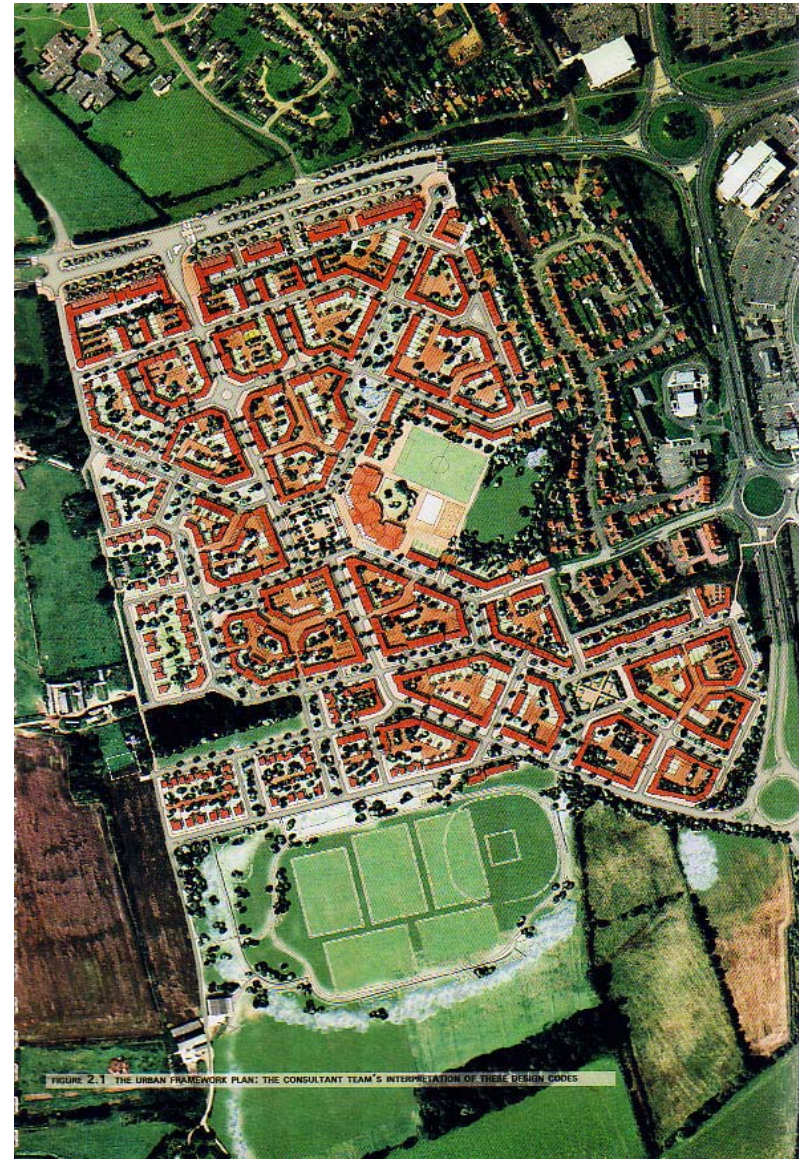
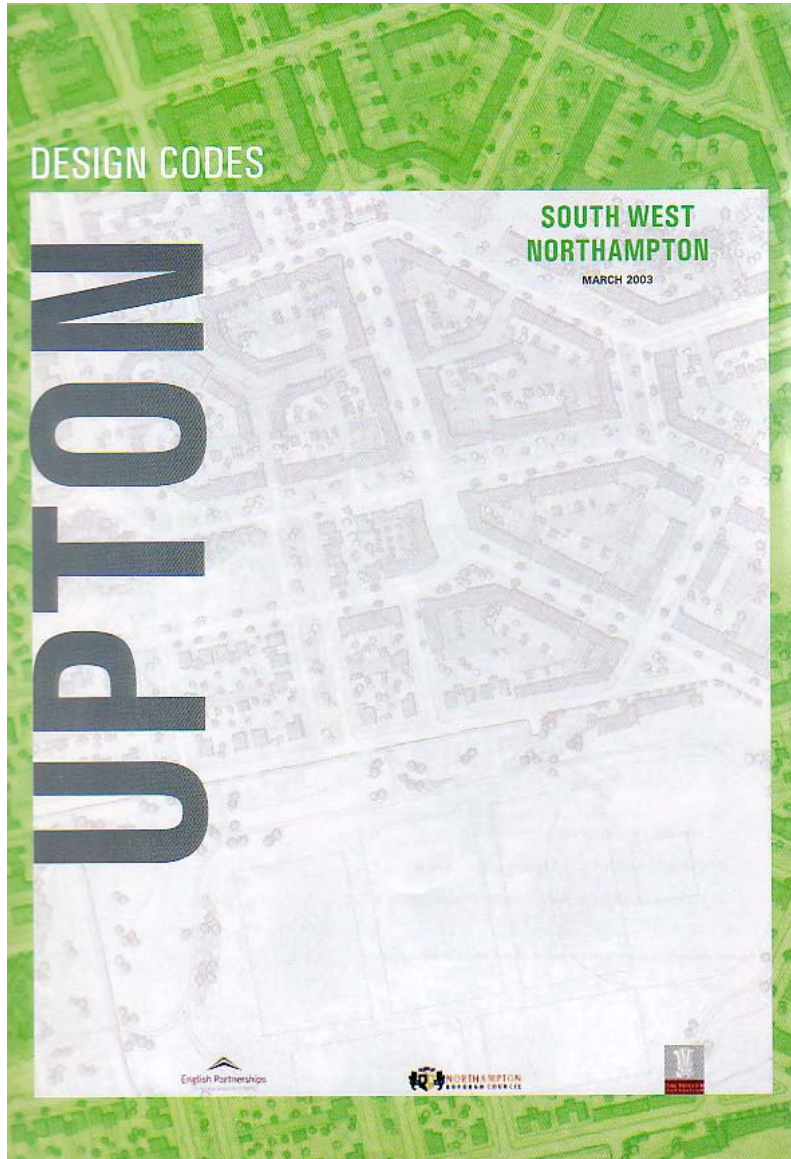
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Four dangers: 2007

- An ever widening gap between aspiration and reality: easy to set targets, much harder to meet them
- The danger that the modernists (or the hippies) will 'own the clothing' of sustainability
- And that as a result, the urgent need to address climate change and energy supply will radically fail to meet public satisfaction
- Conversely, that sustainability will become a 'sacred cow' - the excuse to build another generation of rubbish...

Our response:

- Traditional architecture has to perform as well as or better than Modernist architecture
- We cannot merely rest on our laurels:
 - traditional walkable infrastructure
 - Public transport
 - natural materials
 - low embodied energy and proven lifespan
 - Longevity
 - Beauty
- We must radically improve the energy use and water consumption of our buildings



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Upton Site B Masterplan
October 2004



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Neighbourhood square concept

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Upton Site B - Sustainable Buildings

- The 'Greenest Housing Development in Britain' 2007
- High levels of insulation in walls, roof, floors
- High levels of airtightness
- Solar water heating
- Photo voltaic electricity generation
- A-rated condensing boilers
- Heat Recovery Ventilation
- Rainwater Harvesting
- Sustainable materials specification (eg sheepswool insulation, lime-based mortar)

U-Values for those afraid to ask

Understanding the U-value

- The U-value (or Unit of Thermal Radiation) measures how well a building component, e.g. a wall, roof or a window, keeps heat inside a building. For those living in a warm climate the U-value is also relevant as it is an indicator of how long the interior can be kept cool.

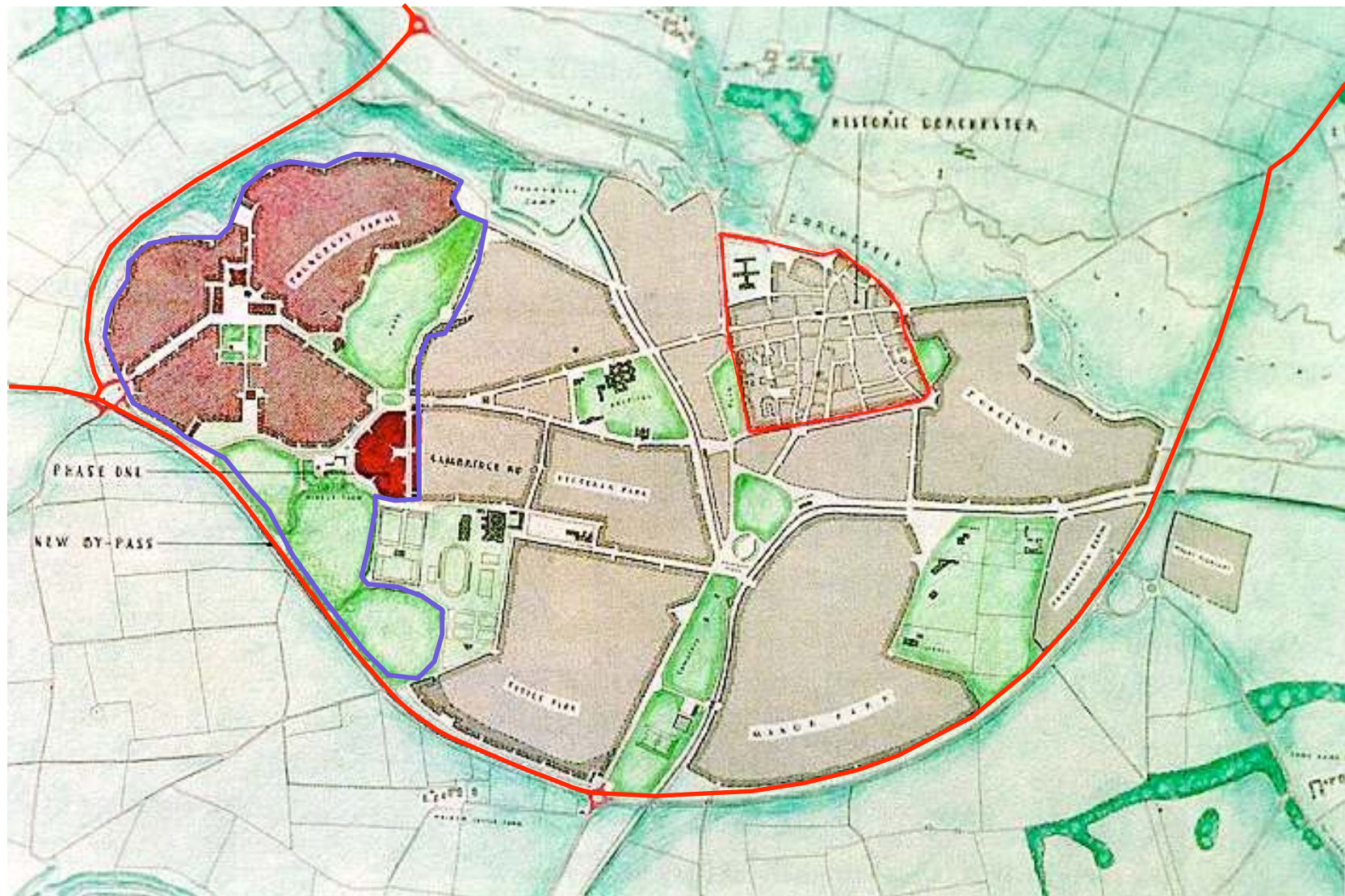
What is the U-value?

- The U-value is a measure of the heat flow through a building element such as a wall or window. The higher the U-value the more heat flows through so a good U-value is a low one as you want to keep heat inside the building or outside depending on the climate you live in.

U-Values 101

The technical explanation of the U-value

- Getting a little technical the U-value physically describes how much thermal energy in Watts [W] is transported through a building component with the size of 1 square meter [m^2] at a temperature difference of 1 Kelvin [K] ($=1^{\circ}C$). Thus the unit for U-values is W/m^2K .
- So what is a good U-value?
- Looking at walls:
- Today's building regs: $3.5 W/m^2K$
- Code Level 4 2013: $0.14 W/m^2K$
- Code Level 6 2016: $0.11 W/m^2K$



The Poundbury Masterplan - Leon Krier

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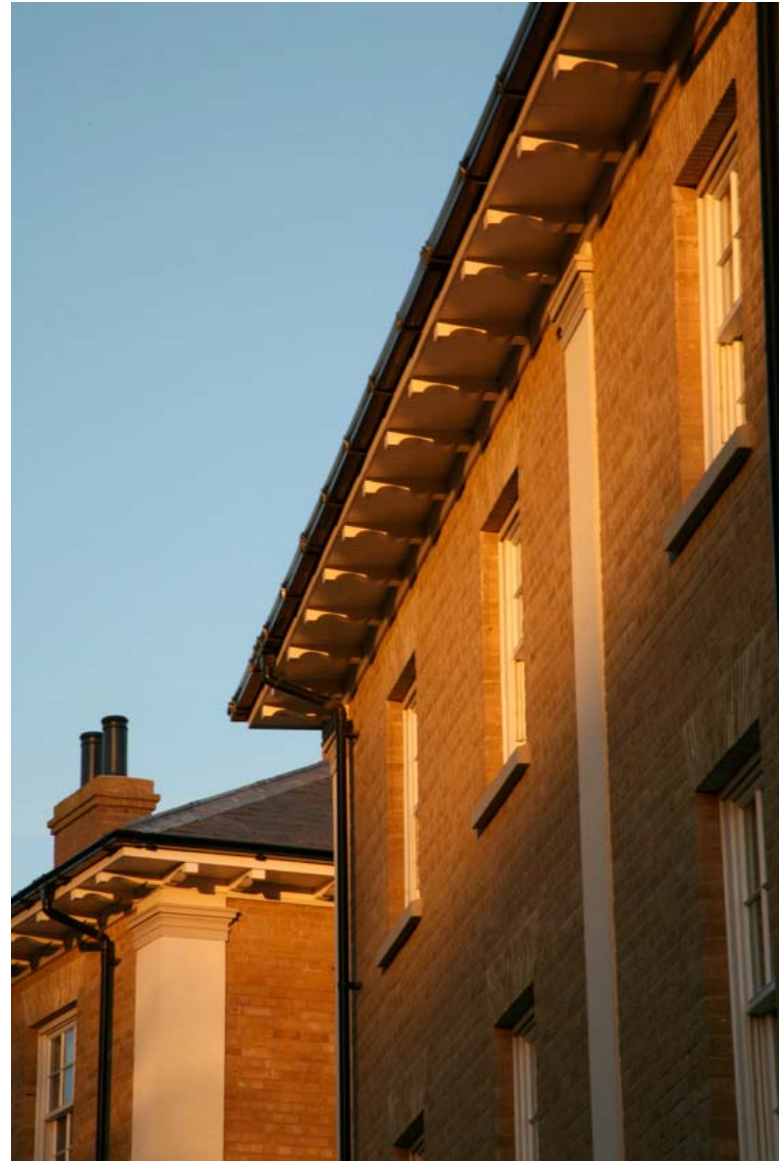
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Poundbury Eco Homes 2006

- A joint venture in 2005-06 between Cornhill Estates & the Duchy of Cornwall
- 11 homes; 7 private houses, 4 shared equity
- All houses are BRE EcoHomes Excellent
- On the site of a former factory car park
- To demonstrate that highly energy efficient sustainable homes can be commercially viable for the volume house-builder and can compete in the open market
- To build commercially viable sustainable homes within the constraints of traditional British architecture
- To build commercially viable homes with running costs that are at least 50% lower than equivalent homes built to the 2006 Building Regulations standards



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Poundbury South West Quadrant



229 dwellings - mix of flats and houses, commercial office space, restaurant, cafes
Submitted for planning October 2007 Due to commence on site Spring 2008

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South West Quadrant - Sustainability

- Code for Sustainable Homes Level 4 (but could be higher without architectural - merely financial - impact)
- The same architectural improvements as we see in EcoHomes (both Upton and Poundbury) - but with:
- On-Site, Carbon Neutral Generation of Electricity (linked to the National Grid) using a Local Biogas Generator: 60% reduction in carbon footprint. Heat is a by-product, and will be piped direct to houses for HW and CH (a hot water mains supply alongside a cold water main)

The following slides show a selection of some of the greenest houses in Britain 2008-09!



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Carbon-Neutral
on-site energy
production

Wood burning stoves
to all houses

Natural slate roofs
(but n.b. transported)

Sheep's wool
insulation

Potential (invisible)
location for PV cells
when cost-efficient

Robust wall
construction
with high
thermal mass,
super-insulation
and excellent
airtightness

Solar shading
& outdoor 'rooms'
on South facing
Elevations

Lime-based stucco

Highly efficient
double glazing
with excellent
daylight to heat-
Gain/loss ratios

Natural timber doors
& windows from FSC
sustainable sources

Rainwater harvesting to all houses

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Towards Zero Carbon

- Getting the envelope right - a robust shell & windows
- Achieving airtightness - but versus Thermal Mass...
- Reducing water consumption - harvesting and appliances
- Reducing energy consumption

Energy Production

- Carbon Neutral Heat & HW
 - Wood pellet stoves with back boilers
 - Solar thermal vacuum tubes
- The Big Challenge: Zero Carbon (on-site?) Electricity Production
 - Combined Heat & Power from Biogas (but the problems of excess heat)
 - photovoltaic - relies on support from ESCo (Energy Services Co.)
 - Wind - unreliable and requires ESCo support
 - Nuclear? Is a non-renewable resource
- Energy efficiency can often be counter-productive (the irony being that since 1970s legislation, the more efficient we become, the more net energy we use)
- But rising energy costs will take care of that...

Other problems

- Economic issues at a time of affordable housing crisis - zero carbon carries cost
- The need for testing - most houses in 2007 are so badly built they don't even meet current regulations
- The downside of Airtightness: an asthma epidemic and a generation of respiratory problems?
- The dash to 'zero carbon' could lead us to forget wider issues of health and happiness...

THE GOOD HOMES ALLIANCE

www.goodhomes.org.uk

The biggest challenge of all - scale

- In 2007, 168 homes in the UK achieved 'EcoHomes Excellent'
- In 2007, approx 160,000 new houses were built
- The government wants up to 250,000 houses a year
- We have 8 years left to make all these new homes Zero Carbon
- The problem of achieving quality *and* quantity...



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We overestimate what we can achieve in a year
And underestimate what we can achieve in a decade

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