

Solar Masterplanning

Can 'Town Planning'
help to deliver
Passivhaus development?

Introductions

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Environmental Design Consultants

PH designers

Sustainability Masterplanning

Daylight/Sunlight Impact Analysis

BREEAM/CSH/SAP/
Thermal Bridge Modelling

SpaceStrategy

Architecture

Urban Design

Masterplanning

The phone call...



Beginnings

BIG QUESTION:

Can 'masterplanning' help
deliver PH development?

Remember: UK approach is
driven by our legislative
processes.

So, does Town Planning play a
measured part in reducing
CO2 emissions?

How does a masterplan assist
with PH compliance?

Solar gain is very important for
PH compliance, how is this
dealt with at the
masterplanning stage?

Strands

- Is it simply 'Development Control vs Building Control'?
Many see it this way...
- The PHPP approach – straddles the divide.
Is this actually possible?
- What drives best practice.

UK:1992:GIR27: Passive Solar Estate Layout.

UK:1997/2012: BR 209:
Daylight & sunlight impact assessments?

UK: SAP: Solar gain stranded near Sheffield

Next Steps

- ENVIRONMENTAL
SOLAR
GAIN
- Measure what Town Planning delivers!
- It 'drives' measurable benefits – it saves using artificial energy, reduces CO2 and reduces cost of PH compliance.
- ESG needs to be modelled and measured accurately, robustly and simply at all levels.
- Measuring ESG requires software...

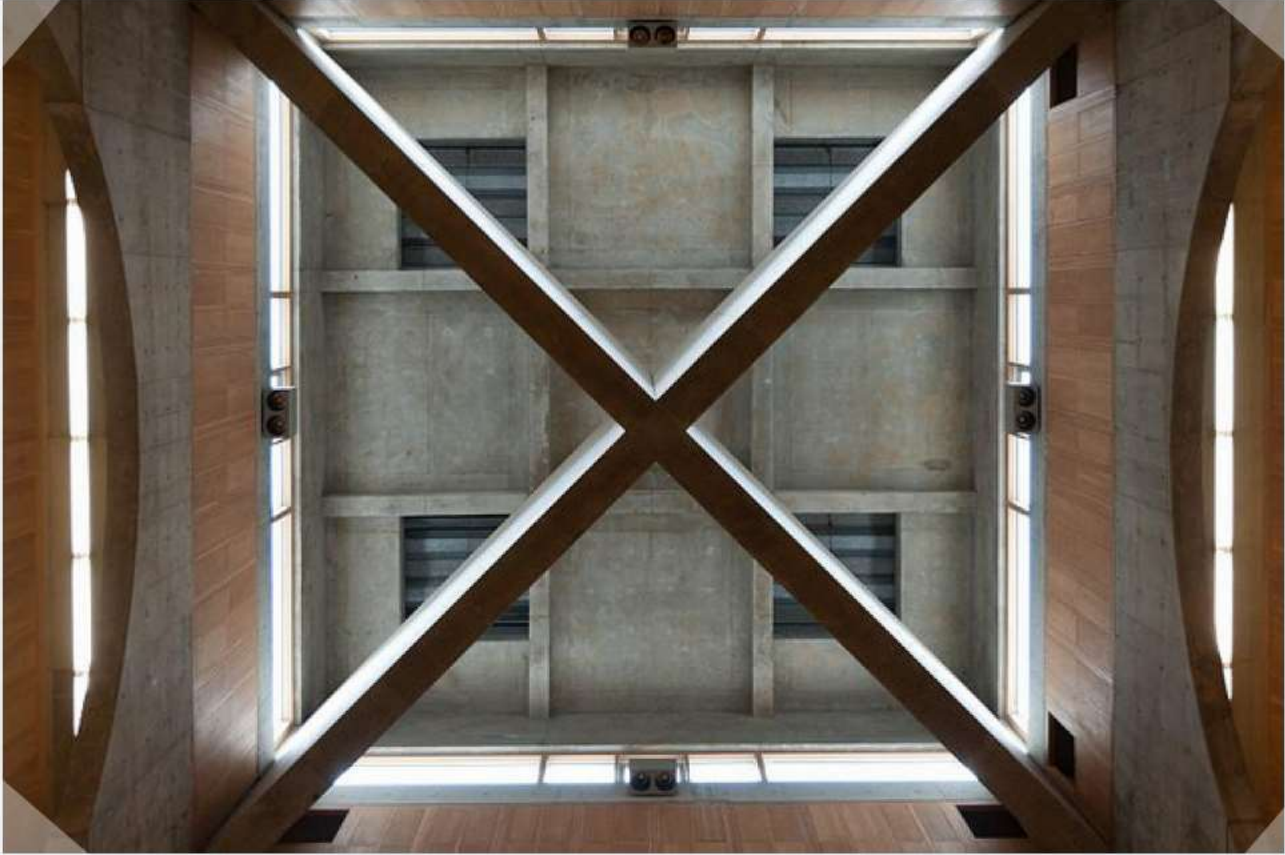
...that is *only just* 'practical' to use!

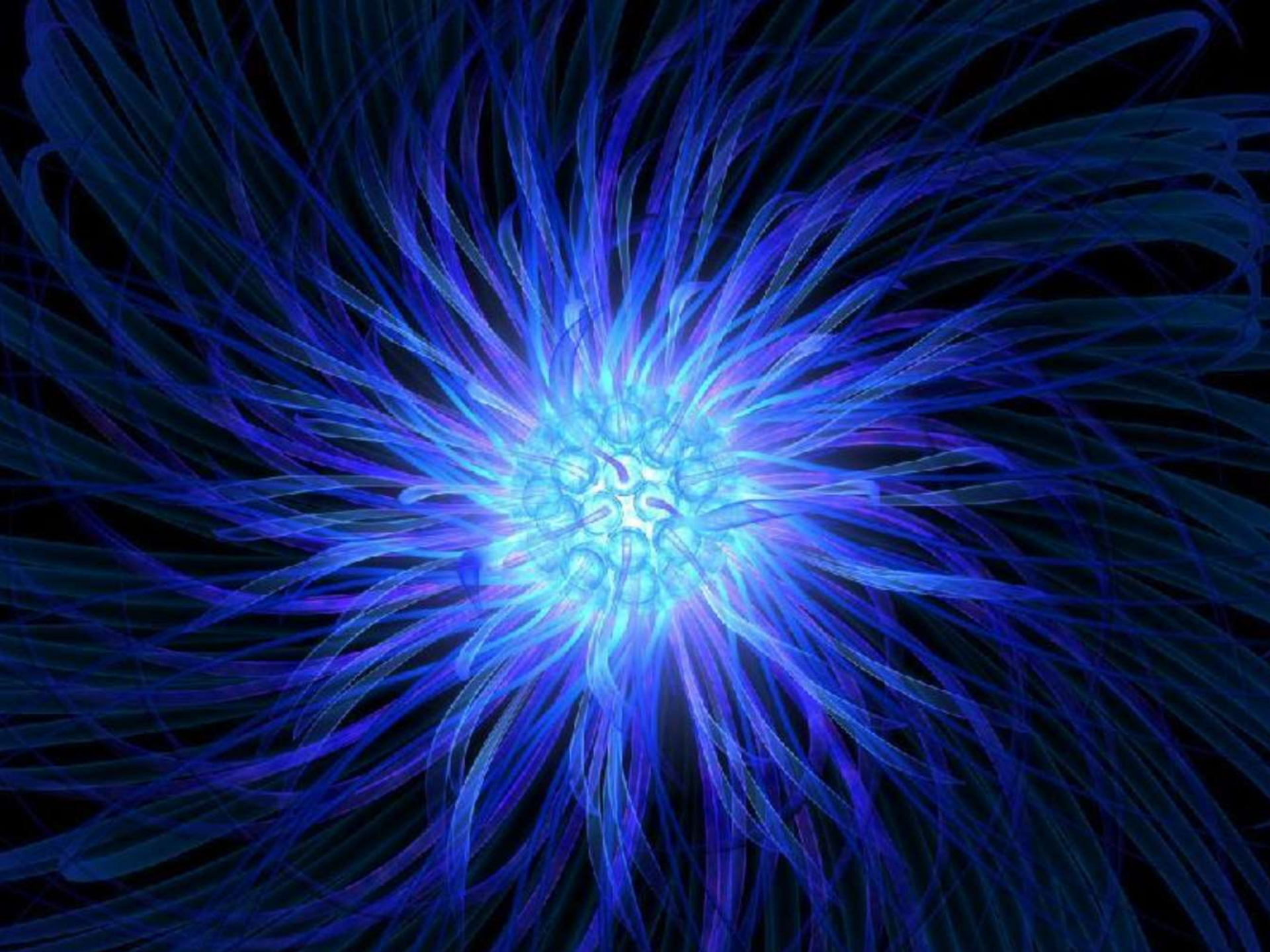
Climate Data

- It is, clearly, dependent on the weather model?
 - We can use PHPP Climate Data.
 - Challenges from others; Met Office? CIBSE? Prometheus? SAP?
 - Then there is probabilistic weather models taking into account future Climate Change(!)
- ...again, emerging data sets.
- ESG can be used to develop simple 'on site' comparisons; measured in kWh/m²

Solar Place-making?







Housing Standards Review

“There is reasonable evidence supporting the **physiological and emotional benefits** that adequate **daylighting** provides, and equally sound evidence that a **lack of daylighting can lead to negative health outcomes**. It is also accepted that while large windows providing good day light can **save energy** by reducing reliance on artificial lighting [sunlight and solar gain], they can also **reduce thermal performance** and increase heating demand, and/or result in excessive solar gain which can exacerbate **over-heating and increase demand for comfort cooling.**” (DCLG)



Consultation closes October 22, 2013

National Housing Standards

“...ensuring adequate sunlight is **primarily a strategic and site planning matter**, rather than a matter grounded in the internal layout of a property.” (DCLG, 2013)

“...government takes the view that requirements for sunlighting and daylighting calculations should be **on an exceptional case by case basis, where reasonable concerns exist** (such as in high density areas, or on sites with significant over-shadowing) and not as a blanket requirement for all new development.” (DCLG, 2013)



National Planning Policy Framework

In determining planning applications, local planning authorities should *expect new development* to ...take account of **landform, layout, building orientation, massing and landscaping to minimise energy consumption** (Para 96)

To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources... **They should have a positive strategy to promote energy from renewable and low carbon sources** (Para 97)





A room with a view...

- How do LPAs assess the masterplans put before them for solar gain? They can't and don't – too difficult pile!
- Should they...?
- Germany (1991) GOSOL: Masterplanning software for optimising solar gain to DIN Standards.
- Germany (1998) Hamburg Urban Design Planning Policy optimising layout, orientation, etc.

Germany

Didn't find North Sea Oil!

City of Hamburg identified that, via various solar masterplanning measures, the **difference between a poor and good scheme was upto a 40% saving in CO2 emissions** (AK 19: Urban planning tools for the implementation of Passive Houses, 1999)

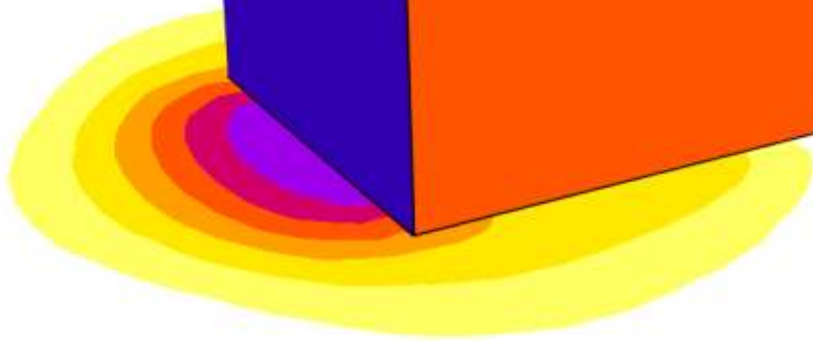
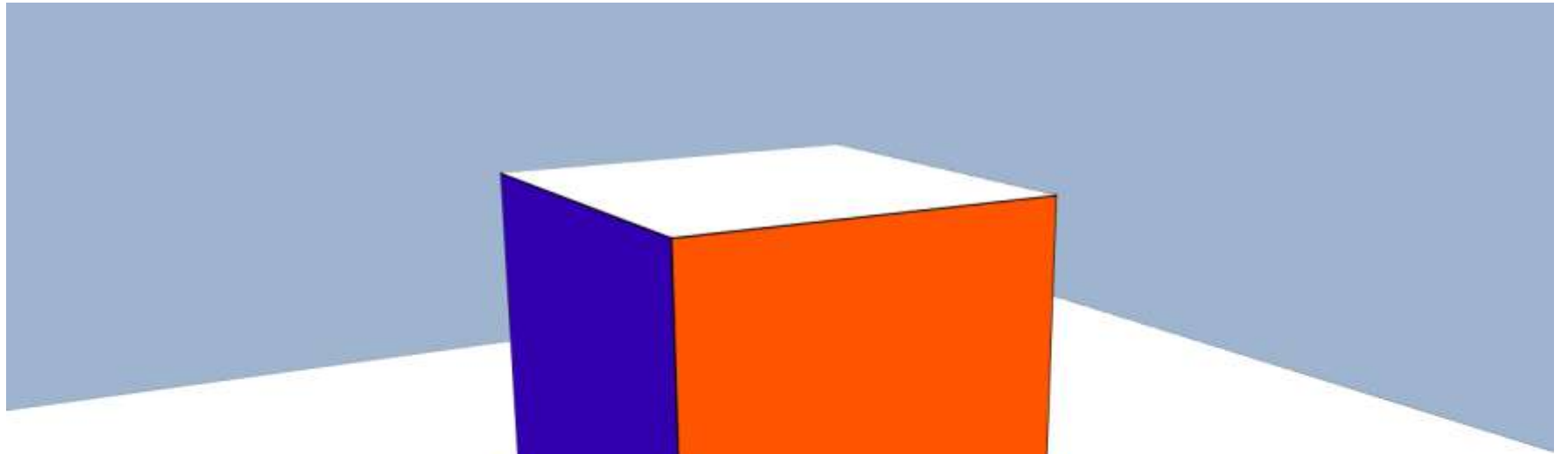
Savings that are not measured in the 'UK Carbon Plan' (DECC)
Controlled by the Planning Sector!

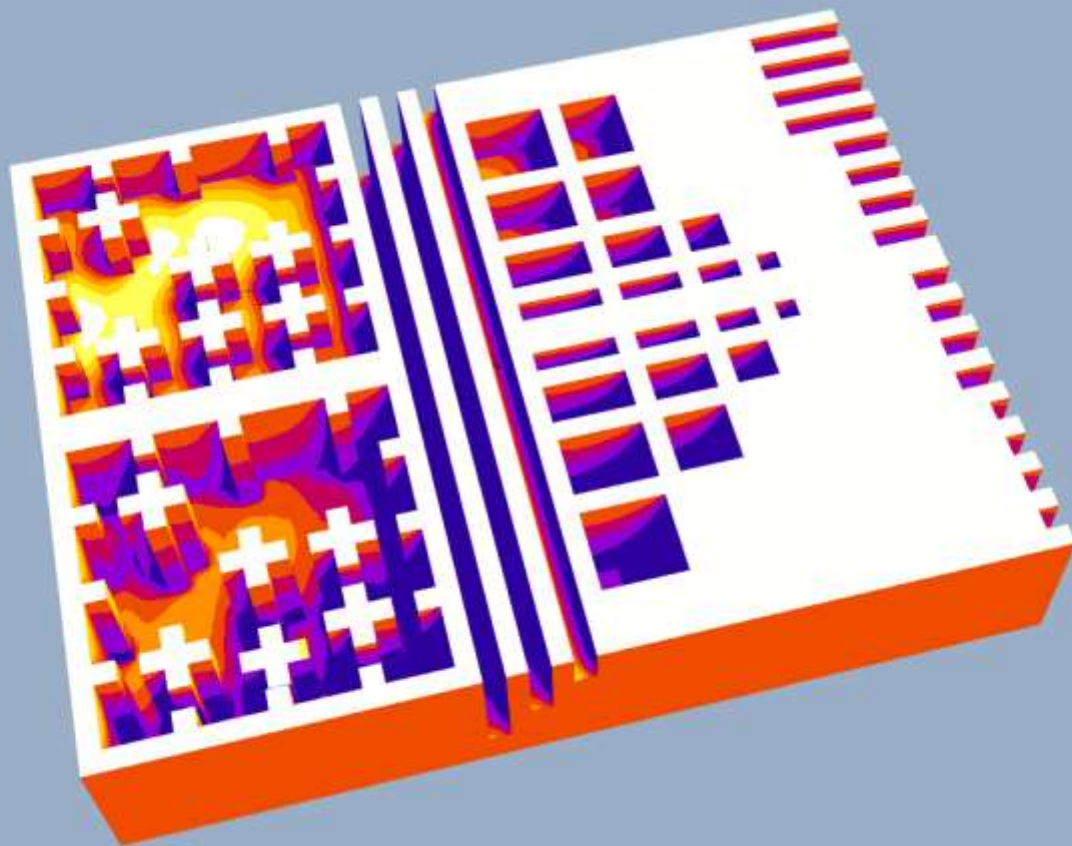


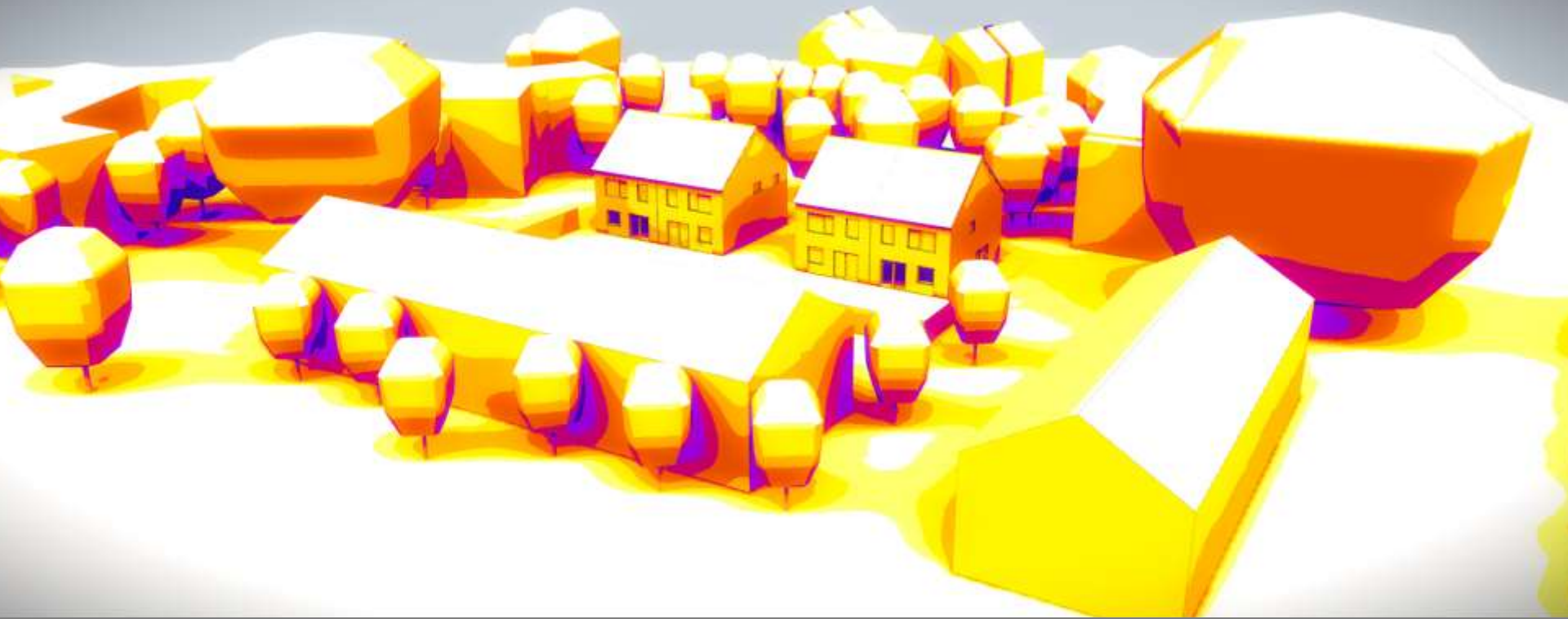


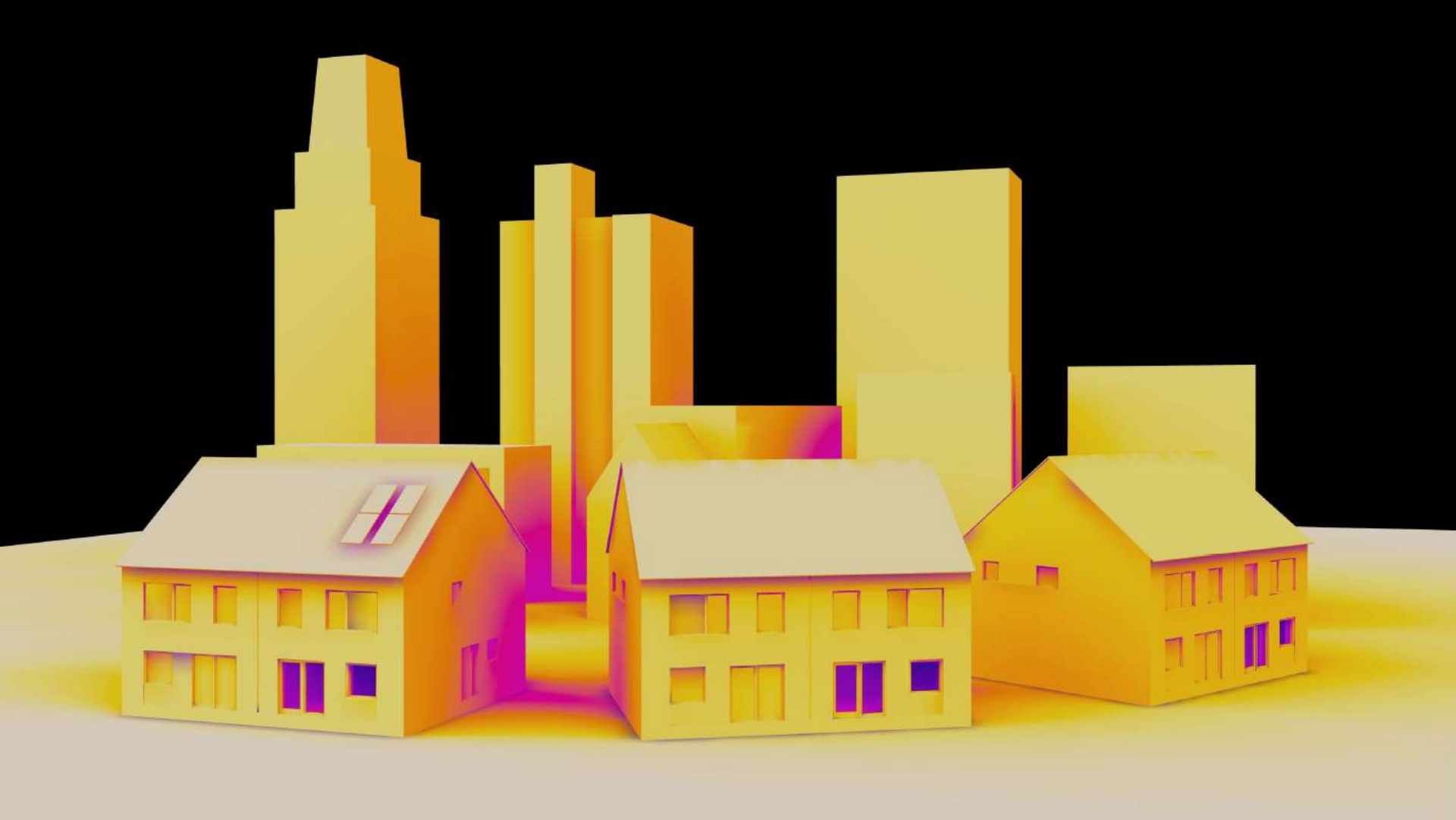
Energy reduction measure	Savings (against heating energy)
Use of solar radiation / distances between buildings	Upto 8%
Use of solar radiation / building orientation	Upto 7%
Avoiding wind chill/Wind breaks	Upto 1%
Building arrangement / compactness	Upto 15%
Building shape / compactness	Upto 50%
Building geometry / design	Upto 14%
Conservatories (glazed sunspaces)	Upto 2%
<u>Roofs/active solar systems</u>	<u>Upto 50%</u>
Green roofs and façades	Upto 0.5%
Zoning plan	Upto 1%

Hamburg (Munke & Zehner, 1998)









Postscript

- TSB/Rational funded software development – LightUp Analytics – BR209 daylight/sunlight modelling.
www.lightup-analytics.com
- Right to use PHI Solar modelling algorithms to match PHPP calculations
- Presentations at EcoBuild 2012, Urban Design Group, Room@RTPI, BRE, Plymouth University.
- Article published by the Good Homes Alliance

Postscript

- Technical Paper proposal to PHT
- Joint Policy paper on daylight/sunlight with UDG
- Applied Research Prospectus issued - awaiting funding
- Further software development (insolation modelling) funding prospectus issued - awaiting funding

Postscript

- Plymouth City Council – very keen to develop policy and guidance in the ESG area
- Plymouth University – new partnership with LUA working with Architecture

...an essential aspect of delivering low energy development in the UK & fully integrated with PH!

We think so!



THANK YOU