Creating a Green Business Cluster

Prof John French
CEO Adapt Low Carbon Group, UEA
Project Director

Dr Rosemary Willatt
Sustainability Coordinator
London College of Fashion

Case Study: The Enterprise Centre (TEC) at UEA and the green business cluster

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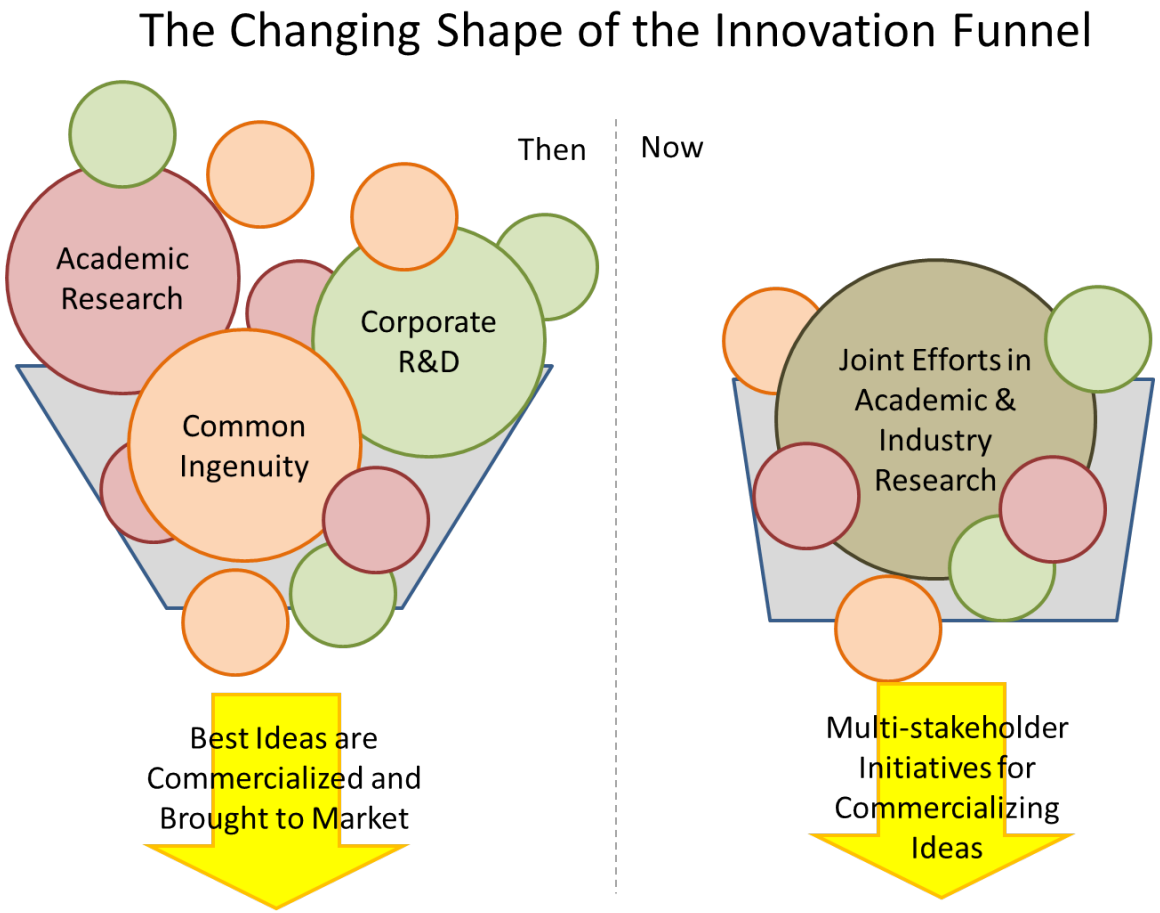
New modes of collaboration in the ‘funnel’

New modes – reduce risk, speed up processes but are more demanding of both sides



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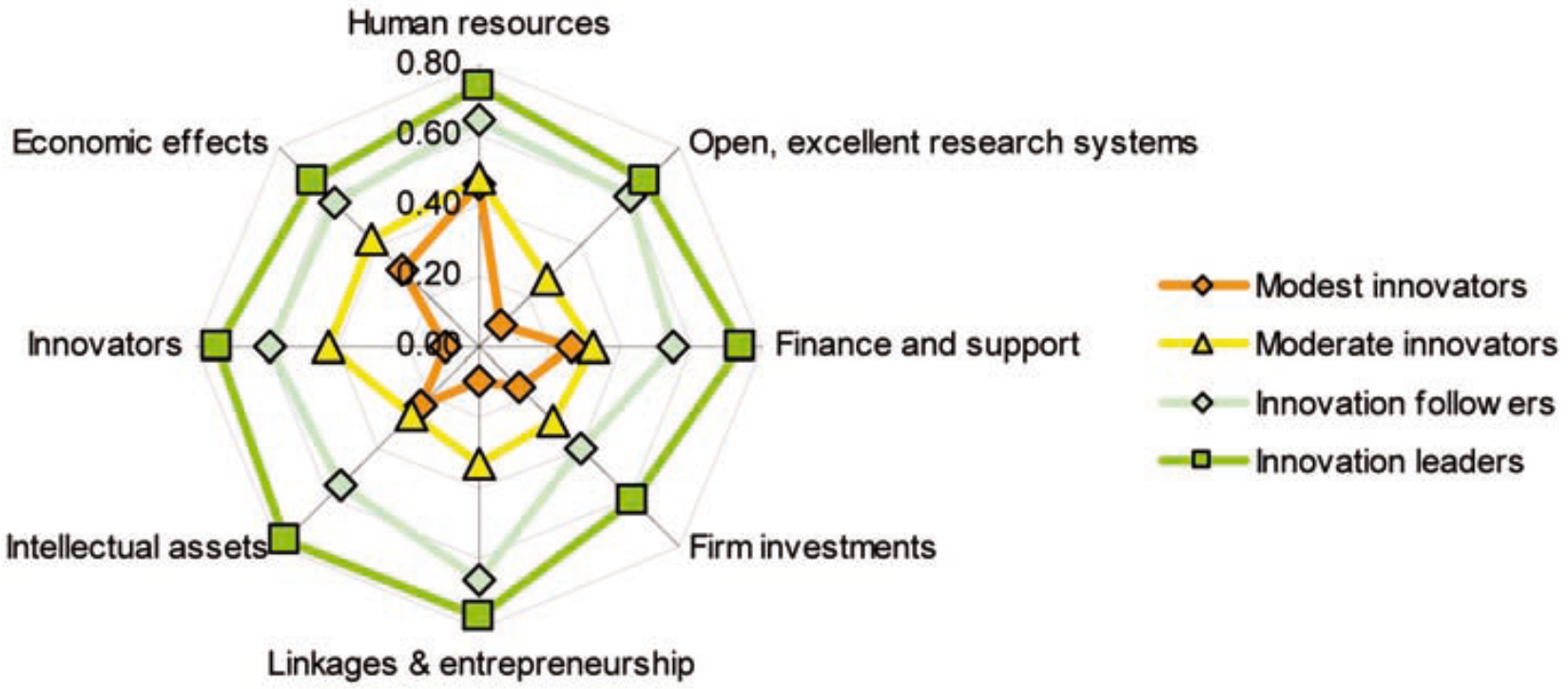
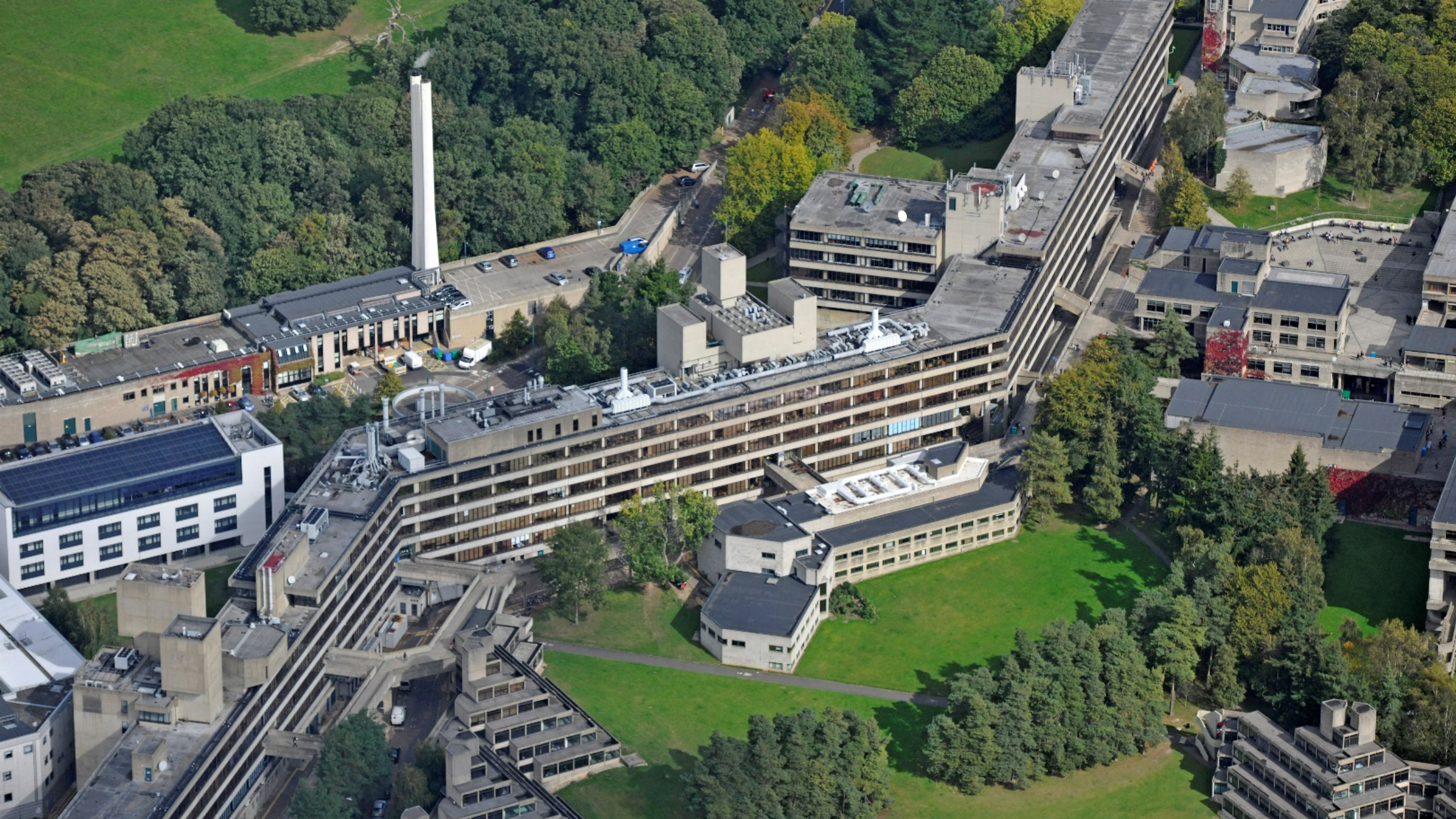
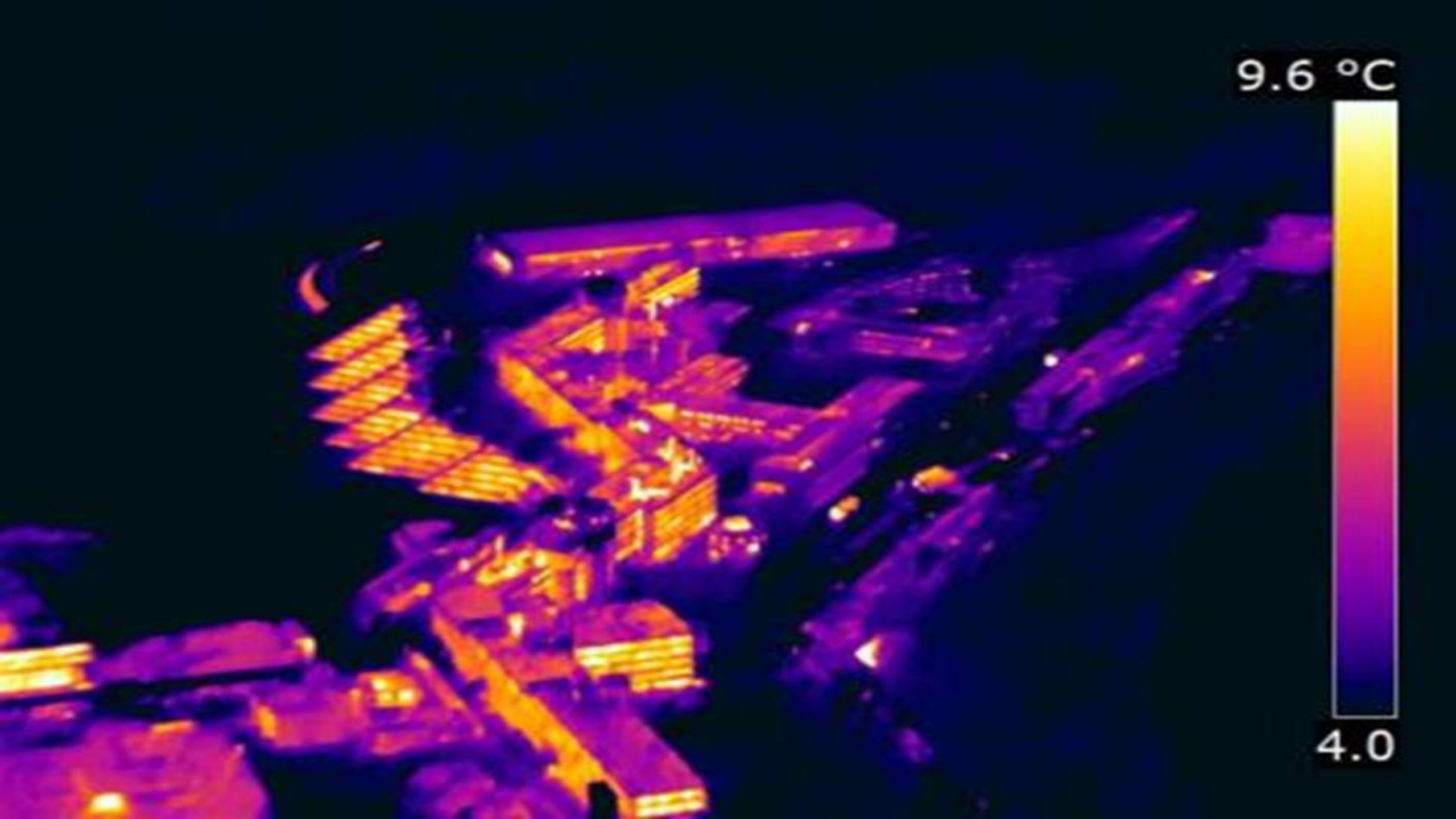
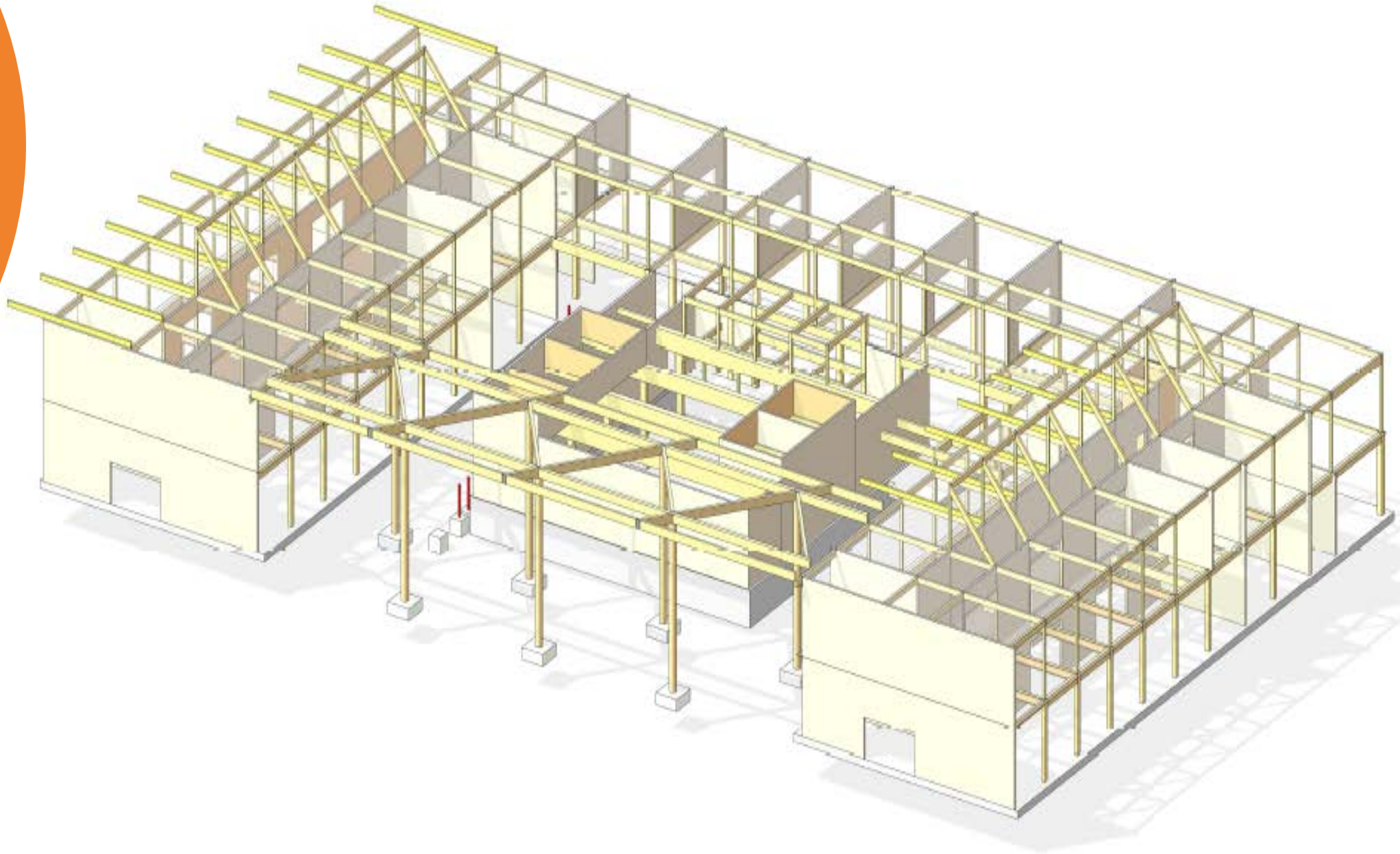
Innovation ecosystem factors






9.6 °C
4.0

Design concept in Jan 2013

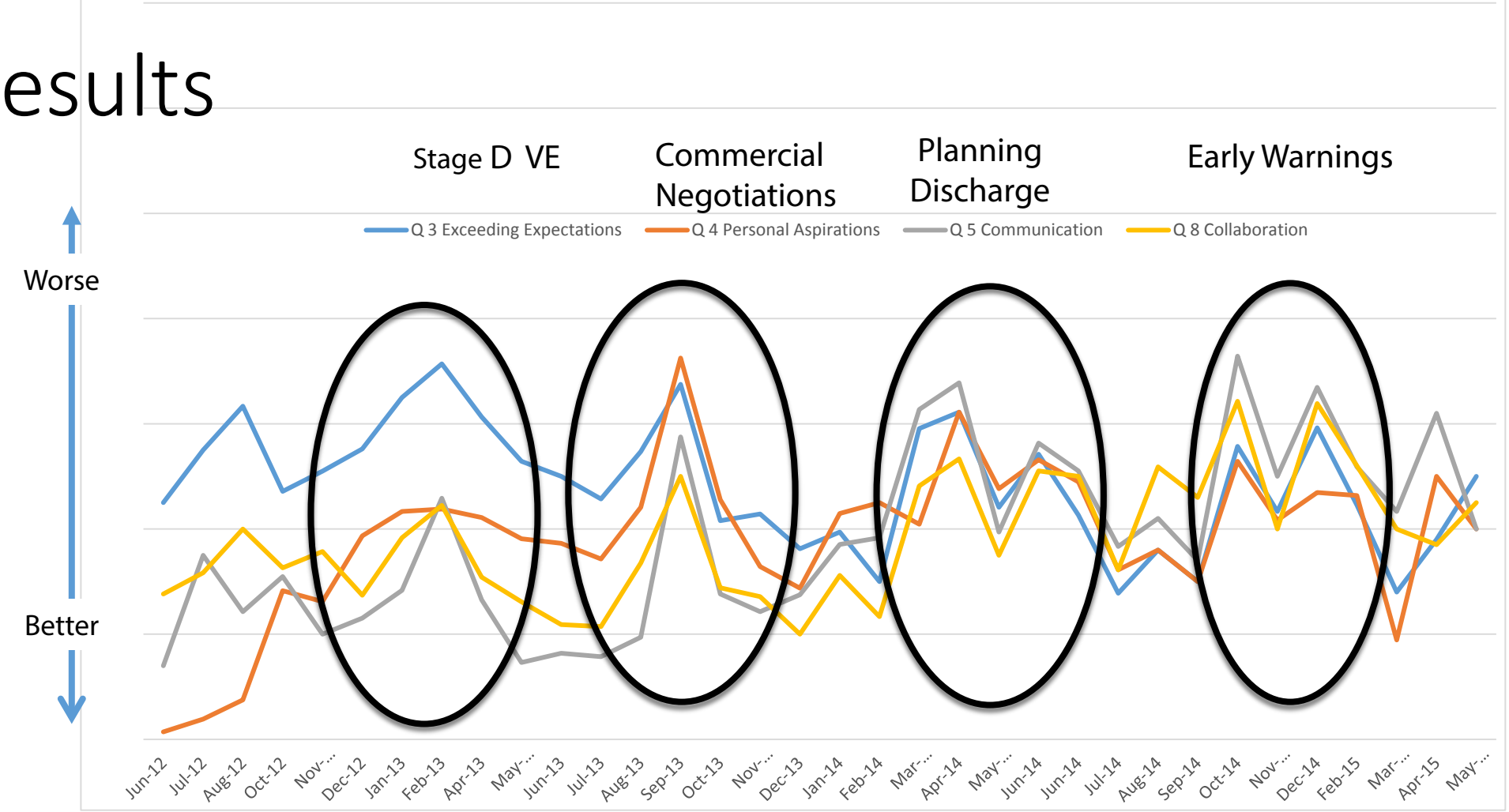


UEA-NRP Enterprise Centre

10th December 2014


UEA NRP Enterprise Centre
17th April 2015

RADAR Results



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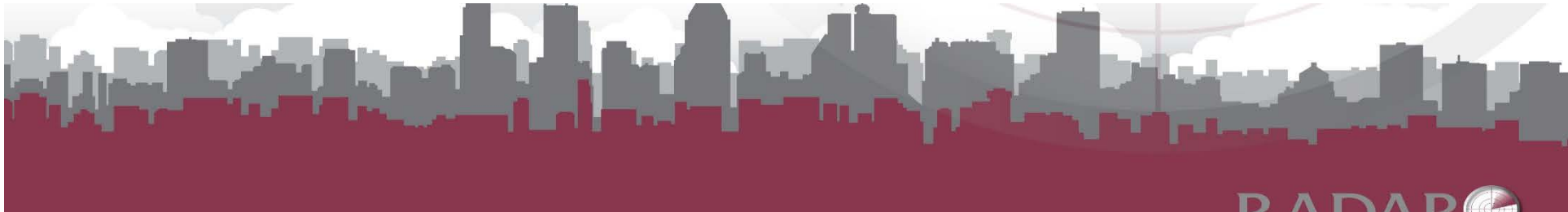
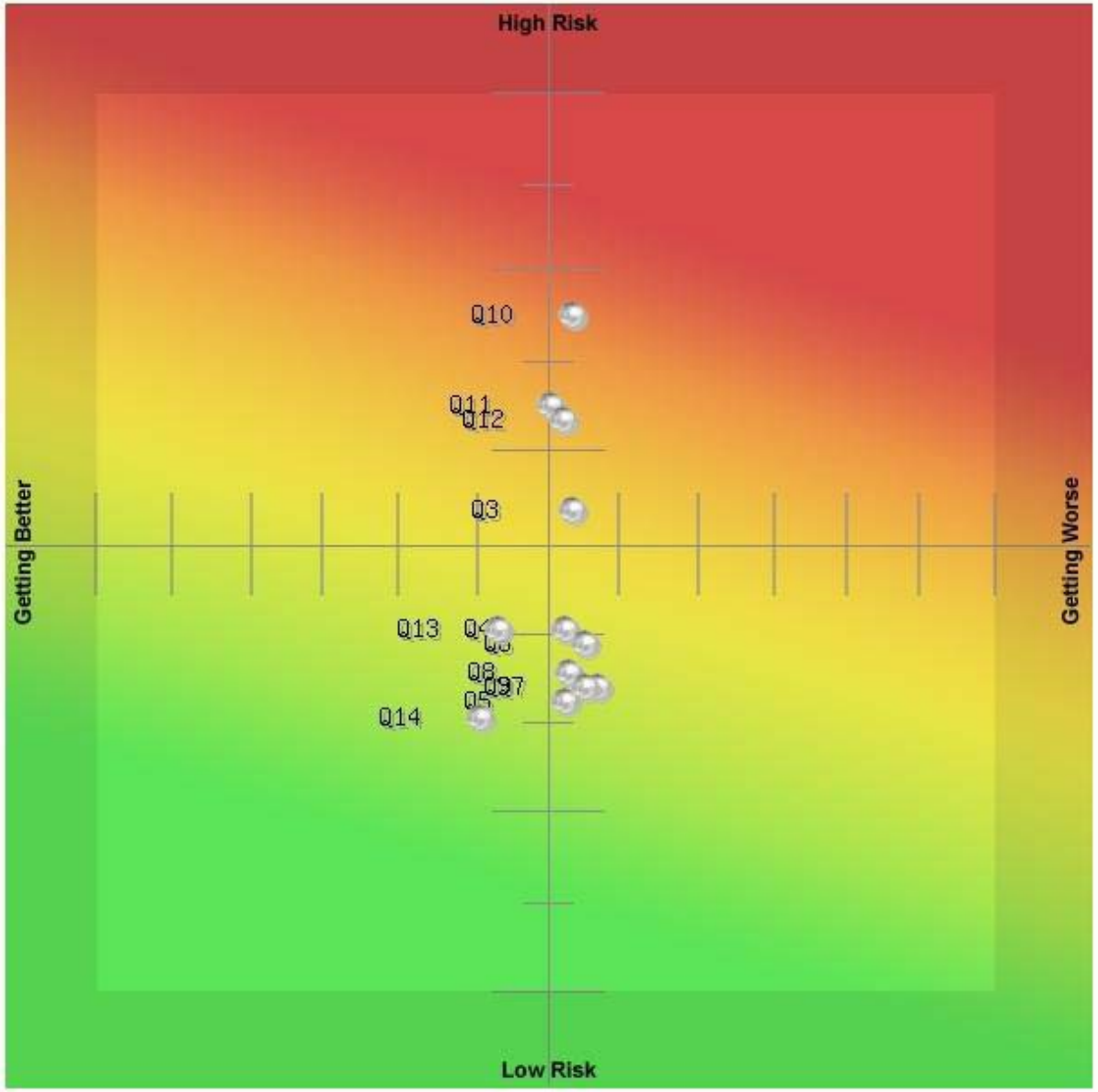


Exemplary Low Carbon Project – X-Tracker Report 29th January 2013



Q10, There may be a lack of resource (Funds, time or people) to maintain the Accepted programme.
Q3, The overall stated objective of the project charter is to "exceed expectations"; from progress to date, do you feel the current delivery plan will allow us to exceed expectations?
Q4, How do you rate the team's progress towards its stated goal of "perfect delivery" which is described as safe, on time, snag free, with a delighted customer? Would you recommend the team?
Q5, Is the project team achieving open and honest communication sufficient to prevent surprises across the whole project team
Q6, Do you feel that the innovations in both design and methods of working are capable of being adopted commercially on other projects?
Q7, One of the goals of the project is to deliver long-term benefits to all team members, how do you rate your future benefits?
Q8, The project charter commitment to "Developing, maintaining and channelling enthusiasm for, and celebrating successful collaboration". Please rate your experience of the collaborative working practices of the team?
Q9, Do you feel the team is effectively mitigating unnecessary risks, within the context of a pioneering project?
Q11, Inadequate time for costing stage D design
Q12, New & unproven combinations of materials requiring specialist testing at early stage in design process
Q13, Requirement to provide supplies to Earlham Hall causes conflict with proposed Project Works.
Q14, Please rate the following risk: Failure to document SME engagement causes mismatch in achieving ERDF targets.

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Project Successes

Collaboration

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A world class HE building

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A gateway to the university

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A major new conference venue

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An exemplary workplace

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An exemplary teaching and learning environment

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A truly exciting piece of architecture

Exemplify environmental innovation

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The ‘Magnificent 7’

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Passivhaus

Passive House Verification

Building:	NRP Enterprise Centre	
Location and Climate:	East Anglia	East Anglia
Street:	University Drive	
Postcode/City:	Norwich	
Country:	UK	
Building Type:	University teaching, small businesses and exhibition/conference	
Home Owner(s) / Client(s):	UEA	
Street:		
Postcode/City:	Norwich	
Architect:	Architype	
Street:	1B Leathermarket St	
Postcode/City:	London SE1 3JA	
Mechanical System:	BDP	
Street:	16 Brewhouse Yard	
Postcode/City:	London	
Year of Construction:	2013	
Number of Dwelling Units:	n/a	
Enclosed Volume V_e:		m^3
Number of Occupants:	570.0	
Interior Temperature:	20.0	°C
Internal Heat Gains:	3.5	W/m²

Specific Demands with Reference to the Treated Floor Area

Treated Floor Area: 3222.8 m^2

	Applied:	Monthly method	PH Certificate:	Fulfilled?
Specific Space Heating Demand:	7	kWh/(m²a)	15 kWh/(m²a)	Yes
Heating Load:	9	W/m²	10 W/m²	
Pressurization Test Result:	0.6	h^{-1}	0.6 h^{-1}	Yes
Specific Primary Energy Demand (DHW, Heating, Cooling, Auxiliary and Household Electricity):		kWh/(m²a)	120 kWh/(m²a)	
Specific Primary Energy Demand (DHW, Heating and Auxiliary Electricity):		kWh/(m²a)		
Specific Primary Energy Reduction through Solar Electricity:		kWh/(m²a)		
Frequency of Overheating:	4	%	over 25 °C	
Specific Useful Cooling Energy Demand:		kWh/(m²a)	15 kWh/(m²a)	
Cooling Load:	4	W/m²		

We confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The calculations with PHPP are attached to this application.

Issued on:

signed:

VERIFICATION PAGE EXTRACT FROM PHPP, SHOWING CURRENT RESULTS

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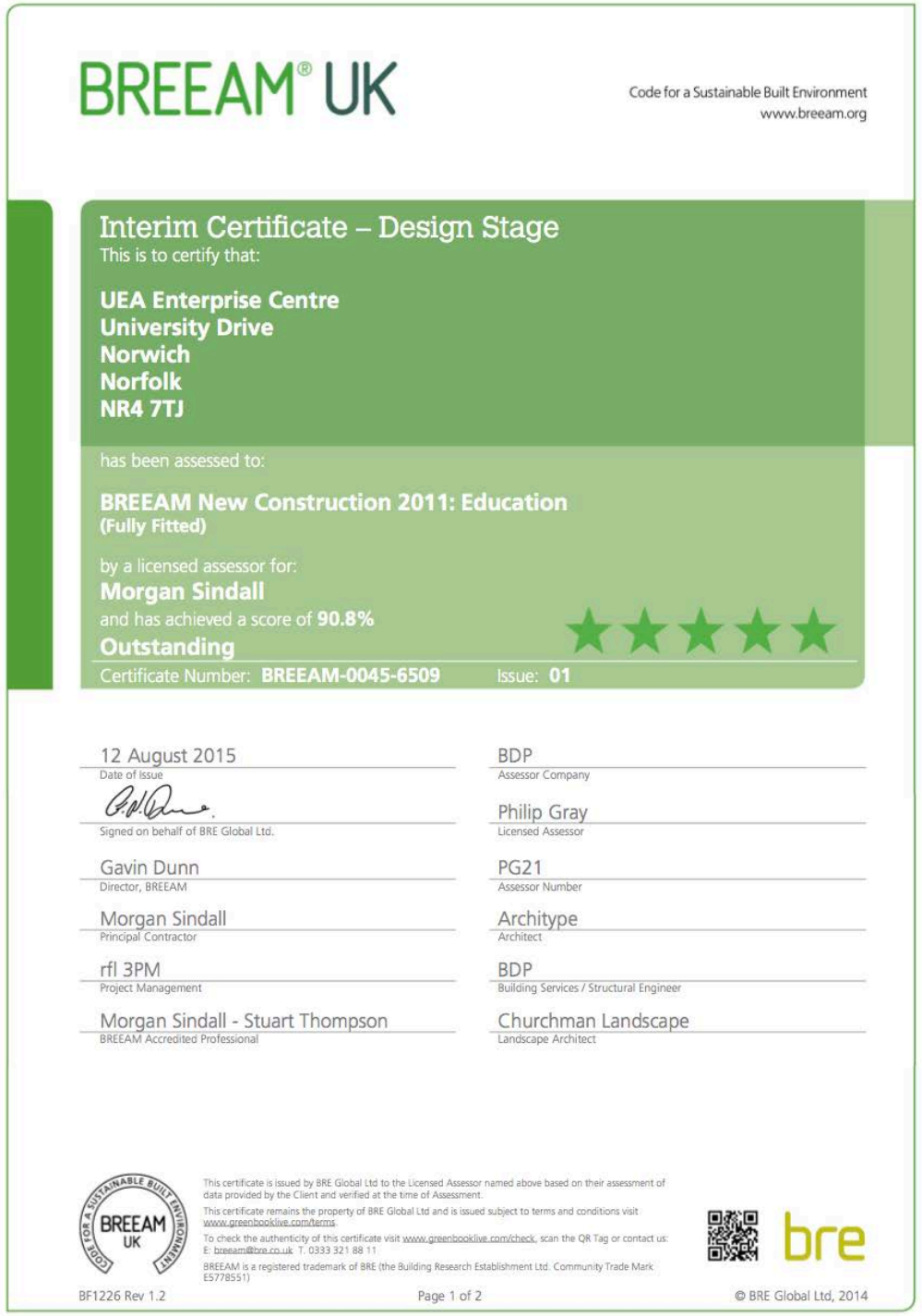
BREEAM Outstanding



BREEAM® UK

Code for a Sustainable Built Environment
www.breeam.org

Interim Certificate – Design Stage

This is to certify that:

UEA Enterprise Centre
University Drive
Norwich
Norfolk
NR4 7TJ

has been assessed to:

BREEAM New Construction 2011: Education
(Fully Fitted)

by a licensed assessor for:
Morgan Sindall
and has achieved a score of **90.8%**
Outstanding

Certificate Number: **BREEAM-0045-6509** Issue: **01**

12 August 2015 Date of Issue	BDP Assessor Company
Signed on behalf of BRE Global Ltd.	Philip Gray Licensed Assessor
Gavin Dunn Director, BREEAM	PG21 Assessor Number
Morgan Sindall Principal Contractor	Architype Architect
rfl 3PM Project Management	BDP Building Services / Structural Engineer
Morgan Sindall - Stuart Thompson BREEAM Accredited Professional	Churchman Landscape Landscape Architect

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100 Year Design Life

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Soft Landings and 3 Year POE

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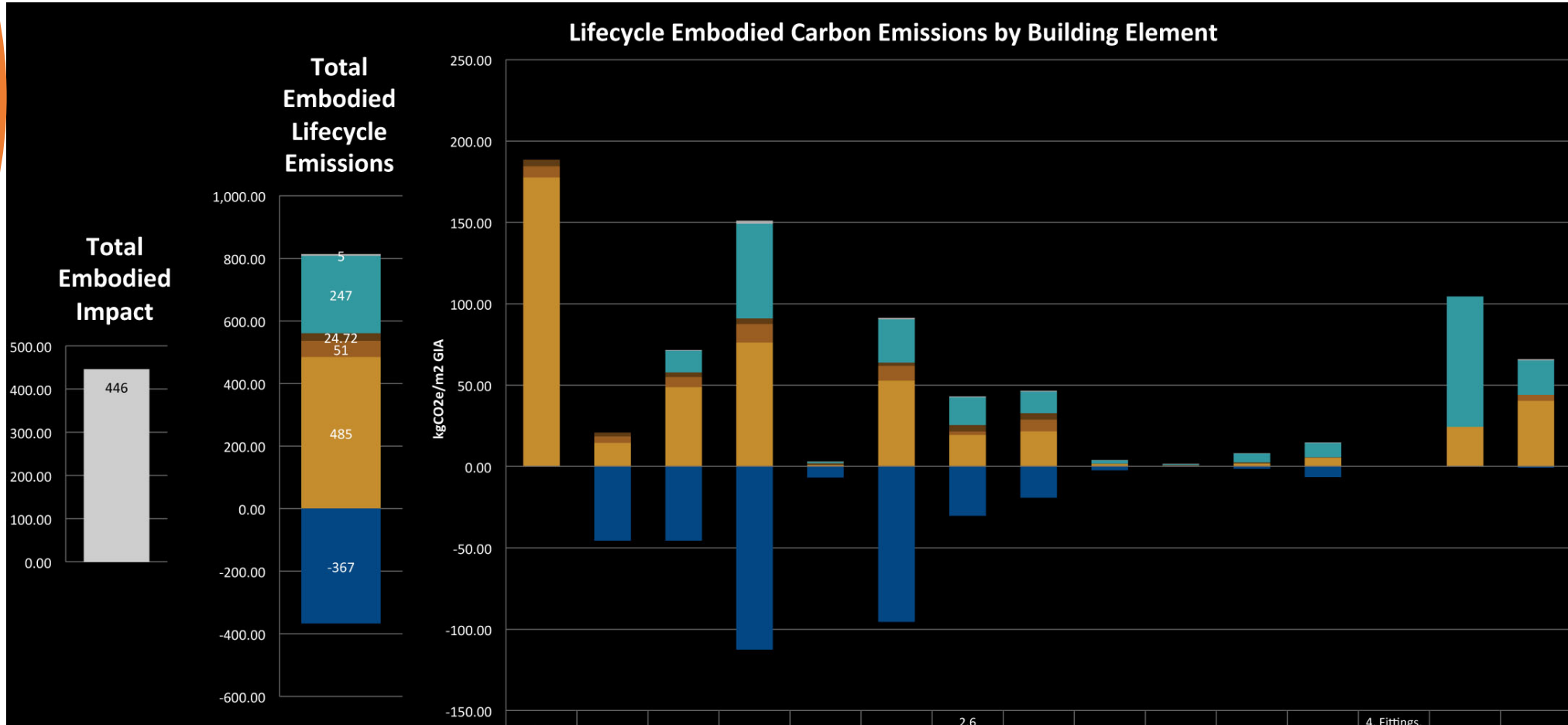
Embodied Carbon – 446kg/co2/sqm



	1.1 Substructure	2.1 Frame	2.2 Upper Floors	2.3 Roofs	2.4 Stairs and ramps	2.5 External walls	2.6 Windows & External Doors	2.7 Internal Walls	2.8 Internal Doors	3.1 Wall Finishes	3.2 Floor Finishes	3.3 Ceiling Finishes	4. Fittings, Furnishings & Equipment	5. Services	8. External Works
Biogenic carbon stored yr 0, kgCO2e/FU	0.00	-45.61	-45.62	-112.57	-6.84	-95.53	-30.34	-19.28	-2.33	-0.05	-1.42	-6.64	0.00	0.00	-0.73
C1-C4, disposal, kgCO2e/FU	0.00	0.00	0.40	1.75	0.03	0.80	0.51	0.39	0.06	0.02	0.16	0.26	0.00	0.00	0.64
B1-B5, maintenance, repair and replacements, kgCO2e/FU	0.00	0.00	13.25	58.20	0.93	26.57	17.03	13.15	2.04	0.59	5.43	8.69	0.00	80.00	21.23
A5, Site works, kgCO2e/FU	3.93	2.31	2.89	3.44	0.92	1.96	4.01	4.04	0.00	0.39	0.66	0.15	0.00	0.00	0.00
A4, transport, kgCO2e/FU	6.94	3.99	6.22	11.39	0.04	9.14	2.08	7.25	0.33	0.05	0.14	0.20	0.00	0.00	3.68
A1-A3, design and manufacturing, kgCO2e/FU	177.52	14.42	48.73	76.12	0.93	52.72	19.35	21.52	1.35	0.39	1.69	5.28	0.00	24.39	40.28

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High use of Renewable Materials

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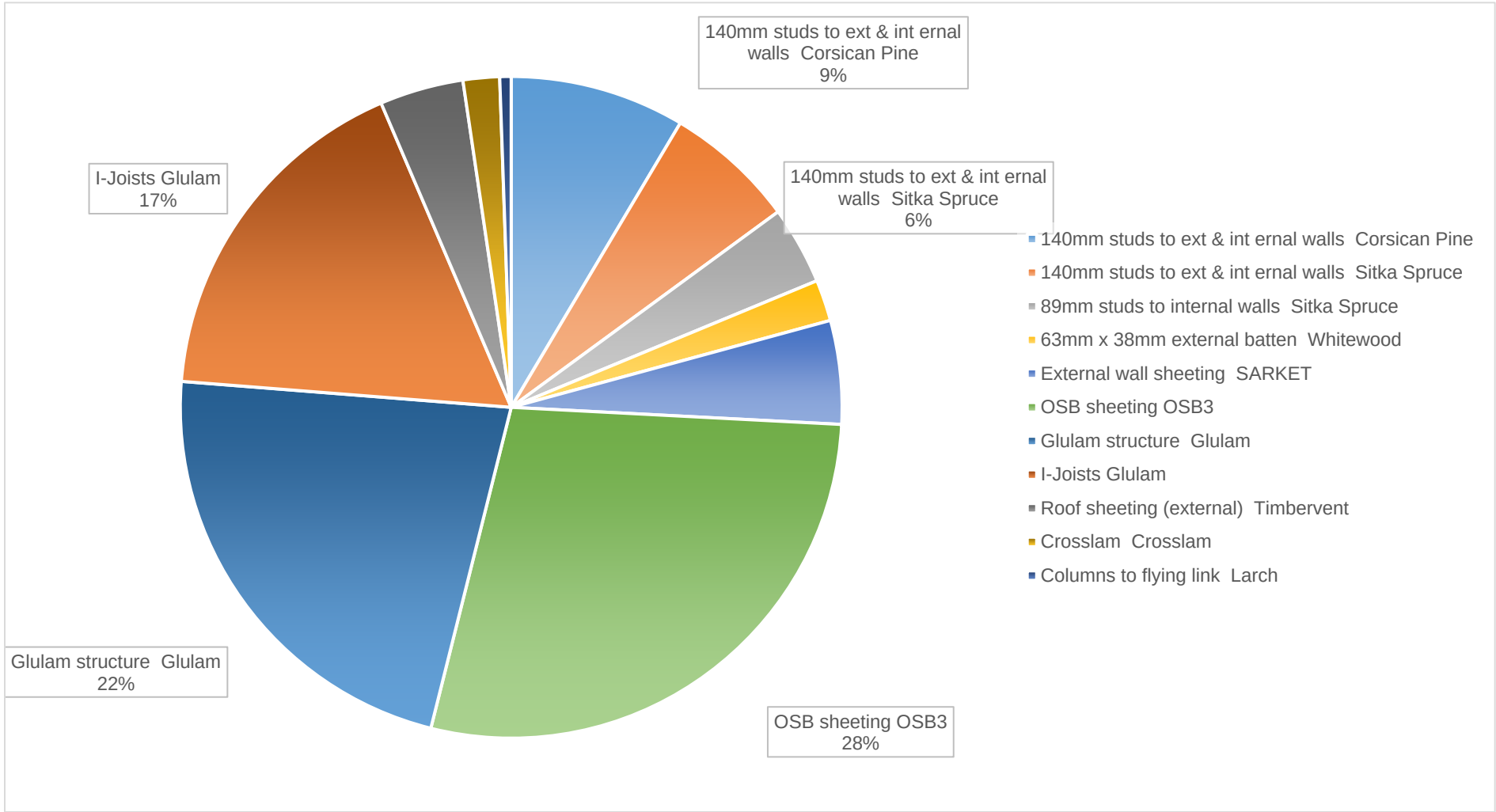
Traceability: Timber frame of superstructure

The breakdown of material percentage



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Focus on Local Supply Chains

Chalk
Norwich, Norfolk

Hemp
Lime Technology, Suffolk
or
Black Mountain, Suffolk

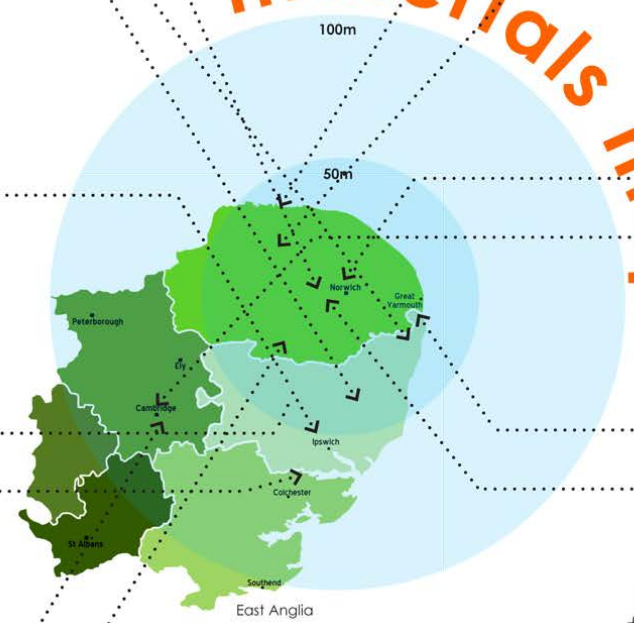
Earth and Reed
Needham Market, Suffolk

Lime Mortar
Ashfield Traditional
Needham Market, Suffolk

Anglia Lime
Sudbury, Suffolk

New World Timber Frame
Saffron Waldon, Essex

Timber
Thetford Forest, Norfolk



North Norfolk Reed Cutters Association
Cley-next-the-Sea, Norfolk

Flint Cobbles
Norfolk

Gerald Barnes
Norwich, Norfolk

H. Gingell Ltd
Hornsea, Cambridge

Paul Bellinger
Beccles, Suffolk

Norfolk Straw Products Ltd.
Dereham, Norfolk

A large proportion of materials will be sourced from East Anglia. Where this is not possible, the majority of materials will be sourced elsewhere within the UK.

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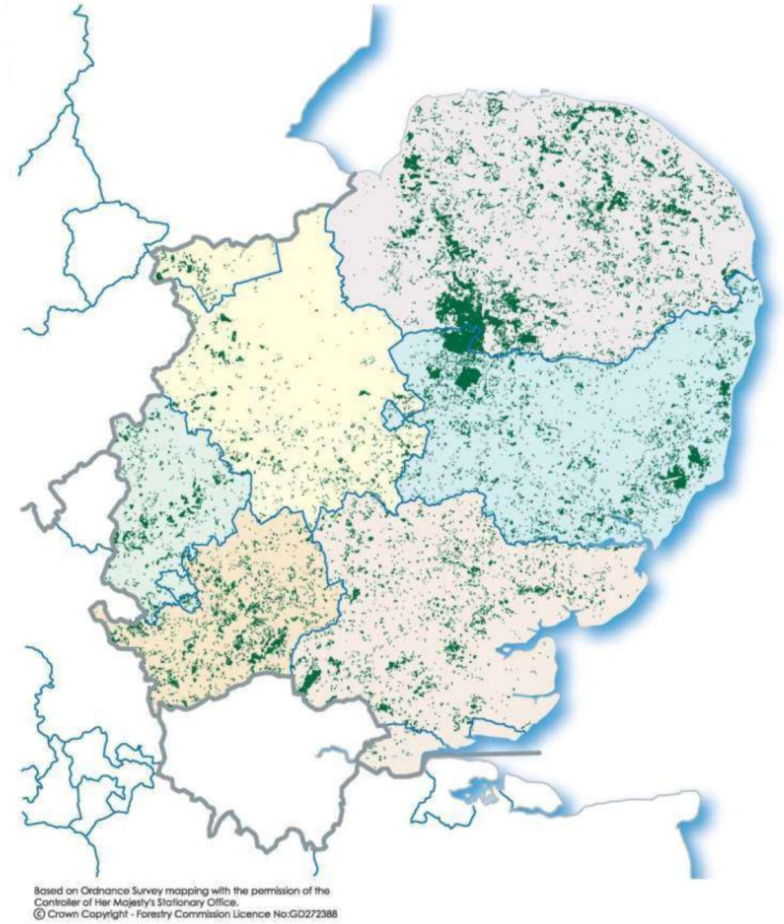

InCrops Project

Low carbon supply chains for forest products in the East of England

John French, Benedict Binns, Mark Coleman InCrops Ltd, UEA
Ed Suttie, Chris Holland and Martin Glynn BRE
Steve Scott, Mark Broadmeadow, Forestry Commission
Barry Haines, Norwich Business School, UEA

A report commissioned by the East of England Development Agency and produced by InCrops Ltd with BRE, Forestry Commission and Norwich Business School

ERDF EEDA University of East Anglia

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Press Coverage

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AJ
AJ Specification
On Office
Architecture Today
FM World
RIBA J
Green Building Council
Passivhaus Trust
CIBSE Journal
Architects Data File
Buildings and Energy Efficiency
Building Magazine

BD Online
Construction News
New Anglia
EDP
BBC Look East
ASBP
AECB
Construction Manager
Building Construction Design
Universities UK Blog
Green Building Press
DETAIL Green (Germany)
Green Source (US)

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Press Coverage

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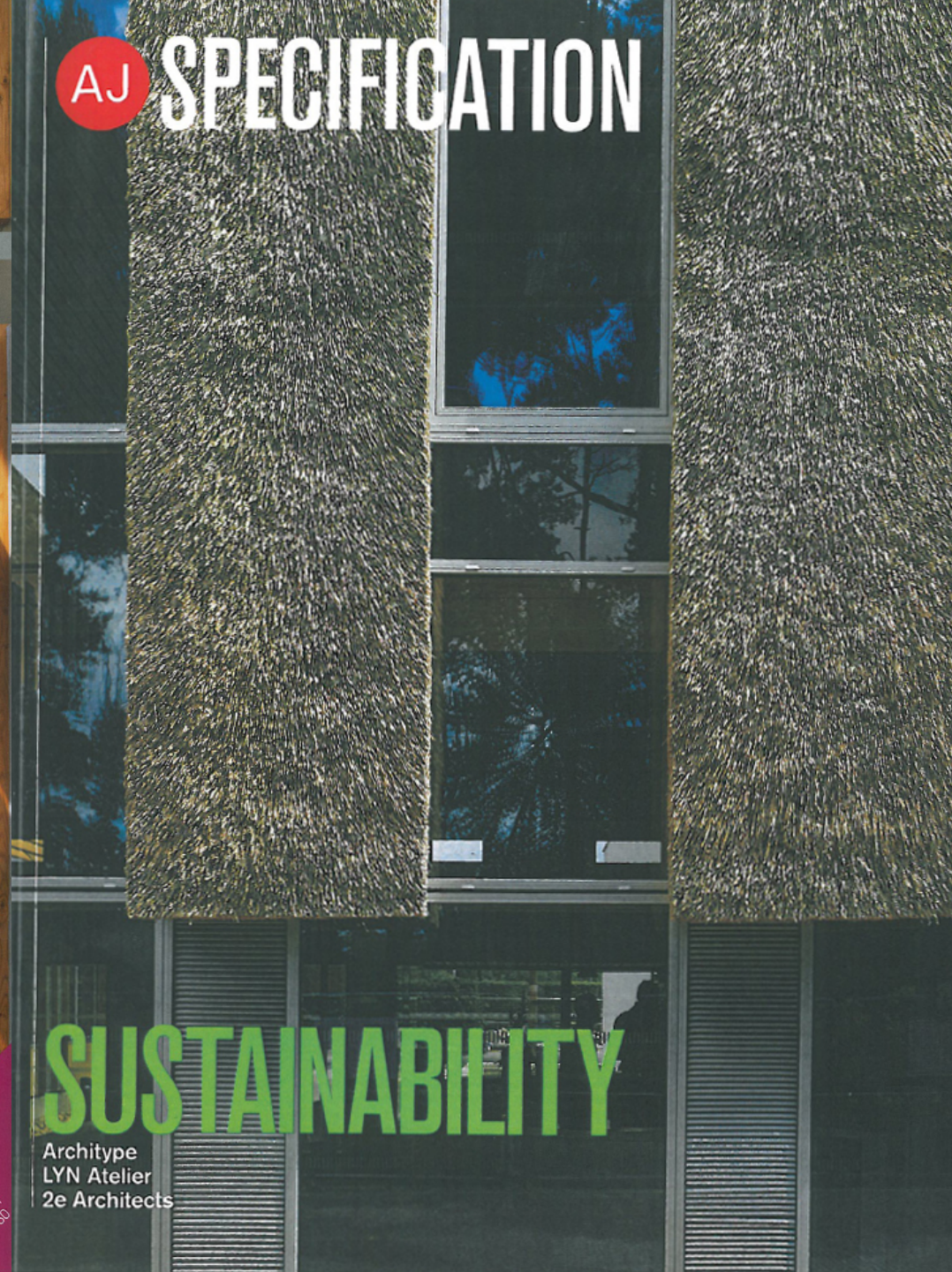

Press Coverage

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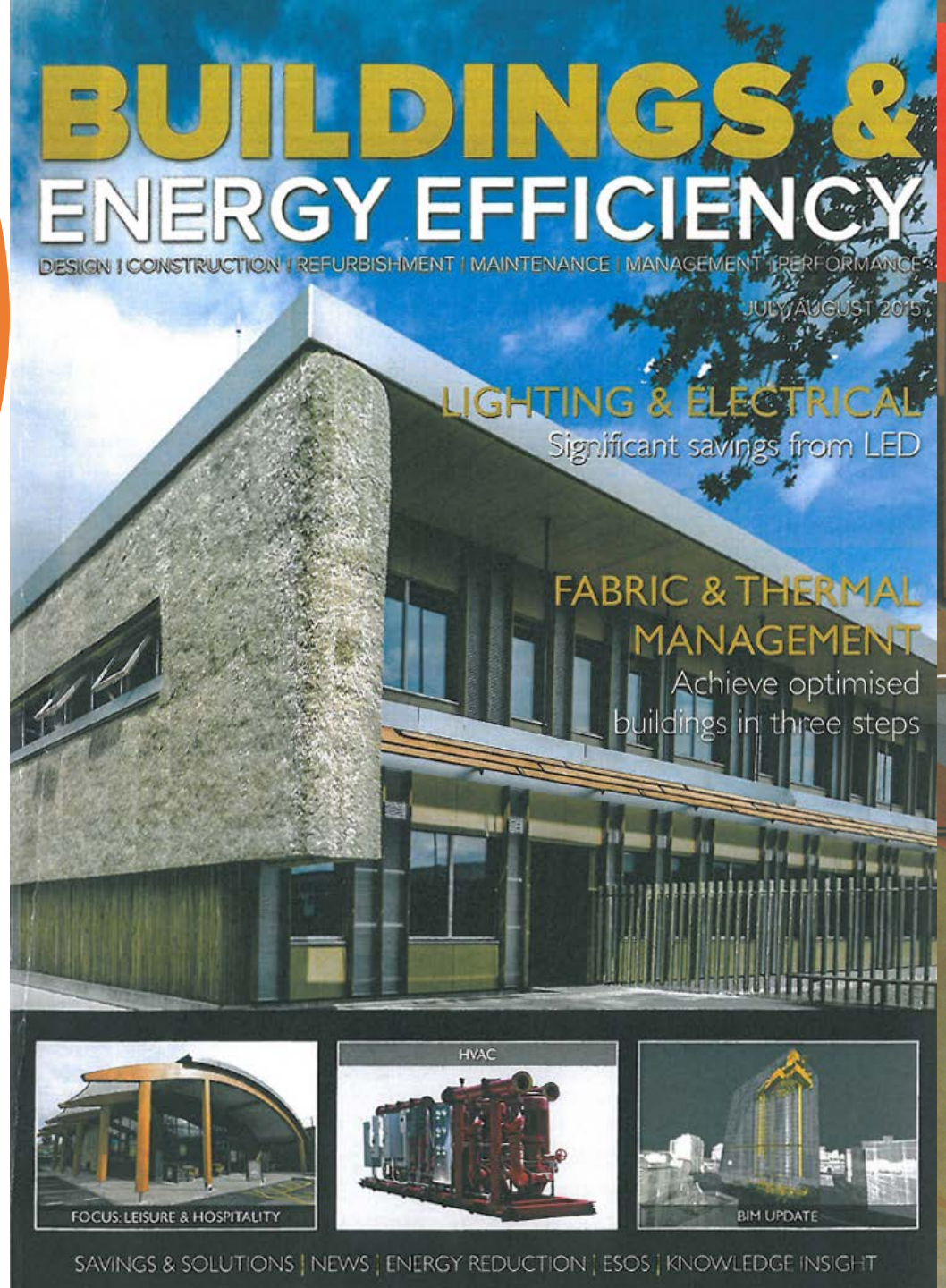

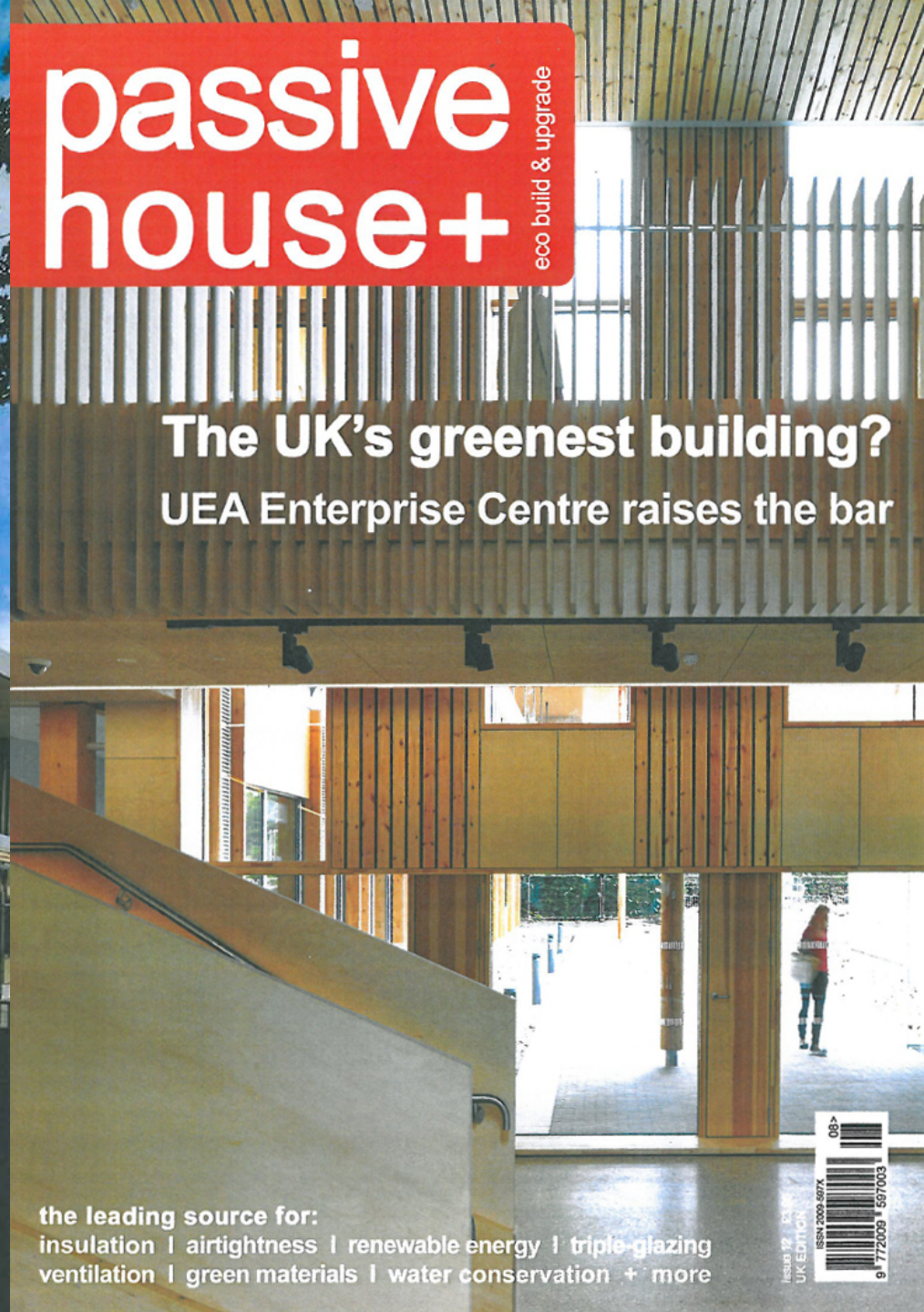

Press Coverage

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Building

Local Hero

Architype's low-energy Enterprise Centre at Norwich Research Park pairs vernacular materials with Passivhaus principles

Words
Alex Goodhart

Photos
Dennis Gilbert

Left
The Enterprise Centre forms a new gateway to UEA's Norwich Research Park and features an innovation lab, a 300-seat theatre, flexible workspaces, teaching and learning facilities, as well as business hatcheries and incubator units for SMEs and start-ups in the low carbon sector. By placing academic and business users side by side, the centre aims to foster innovation, stimulate smarter ways of working, promote industry standards and create new supply chains. It was delivered using a Single Point Delivery form of contract that promotes collaborative working practice, with main contractor Morgan Sindall as the Single Point Deliverer.

Below
The reception desk, designed by Foster Associates, was recycled from the university's Sainsbury Centre for Visual Arts (1978).

The Enterprise Centre at the University of East Anglia's Norwich Research Park, built by a team including architect Architype and intended to encourage the cooperation of academia and new business, is described as the UK's greenest commercial building.

In terms of sustainability, its distinguishing feature is that it has been constructed in such a way that its embodied energy is virtually negative. Photosynthesis combines water and carbon dioxide using solar energy and releasing oxygen. The process produces plant material, most of which decomposes as fast as it is made and returns the carbon dioxide to the atmosphere. The carbon cycle in nature is in equilibrium until we start to burn carbon fuels. When we fix plant material into a building for 100 years or so, that is an offset for whatever carbon fuel we have burnt elsewhere.

Architype's embodied energy calculations give a figure of 440kg/CO_2/sqm across the 100-year life cycle. This equates to a quarter of the lifetime emissions of a conventionally constructed university building of equal size, but I am surprised that it isn't a negative number.

Almost every part of the building is based on timber or cellulose, though there are exceptions; the ground floor was going to be suspended timber until it was replaced by a low-carbon concrete raft for economic reasons. The timber sheathing that replaces plasterboard raises the thermal capacity of the building, and is a favourite material for art gallery walls. Wood wool acoustic boards also offer low embodied energy. The attention to the possibilities inherent in the material shows in every part of the construction detail.

Press Coverage

28 Buildings
University

It's only natural

When Adapt Low Carbon asked Architype to design its Enterprise Centre, a bio-building was the obvious choice

Words: Eleanor Young Photographs: Dennis Gilbert

Right With thatch as a rainscreen cladding, the highly insulated walls appear even deeper. Left The closer you get the hairier the thatch appears.

The RIBA Journal September 2015

"Here is a building that breathes rational humanism. It has a freshness that belies the gimmicky sounding nettle fabric finishes and the double accreditation of Breeam Outstanding and Passivhaus. Within a linear building, on a very plain grid and without spatial gymnastics, it creates an airy, open and generous university route and some straightforward and very likeable offices and learning spaces as well as a building with industry pedagogy artlessly written into its every surface"

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In Occupation

- All office suites and co-working desks are either contracted or under firm commitment -25 businesses
- Tenants range from the built environment sector to finance and business to business development companies
- Co-working desks sold to a number of companies who have come into the building to meet with our earliest arrival tenants
- Currently there are 8 virtual tenants with the likelihood of more
- 15 different reservations for conferences, including up to next summer
- 25 room bookings taken, including some which have already been occupied
- Students started in the building on 21st September

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In Occupation - Users

“We have moved to the fantastic Enterprise Centre, UEA! ***Thanks @morgansindall for fab building” (Twitter)***

“It’s a really great building to work in”
Jackie Richards, Whole House Energy

“We’ve just totally landed on our feet – this is the most amazing office in the amazing building”
Student Enterprise Officer

“We’re loving the new building. The joy of opening a window on a sunny day like today is something we truly appreciate”
Julia O’Rourke, Adapt Low Carbon Group

In Occupation - Visitors

“Popped into the Enterprise Centre today. What a fantastic building, best on campus”
UEA Human Resources (on Twitter)

“Check out the Enterprise Centre. A really inspiring, amazing building”
David Woodward (on Twitter)

“Loving the Enterprise Centre”
Deborah Harrison (on Twitter)

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In Occupation - Visitors

‘This building represents a paradigm shift in sustainable architecture’

Ed Suttie
Building Research Establishment

24th June 2015

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Annual UEA Energy Consumption Comparisons

Building and Completion Date	Technology/Materials/Certification	Energy Consumption kWh/m²/yr			PV Elec Generation kWh/m²/yr	Energy Balance kWh/m²/yr
		Elec	Heat/Gas	Total		
The Enterprise Centre (2015)	Passivhaus certified BREEAM 'Outstanding' Low embodied carbon (local, natural & recycled materials)	30	15	**45**	**6**	**39**
The Zicer Building (2003)	TermoDeck (concrete) Integrated PV	69	28	**97**	**4**	**93**
The Julian Study Centre (2013)	Passivhaus principles (not certified) BREEAM 'Excellent Cross laminated timber and TermoDeck (concrete)	77	35	**112**	**8**	**104**
The Elizabeth Fry Building (1995)	TermoDeck (concrete)	69	80	**149**	**0**	**149**
The Sainsbury Centre (1978)	Norman Foster designed Modular steel structure with aluminium & glass panels	128	143	**271**	**0**	**271**

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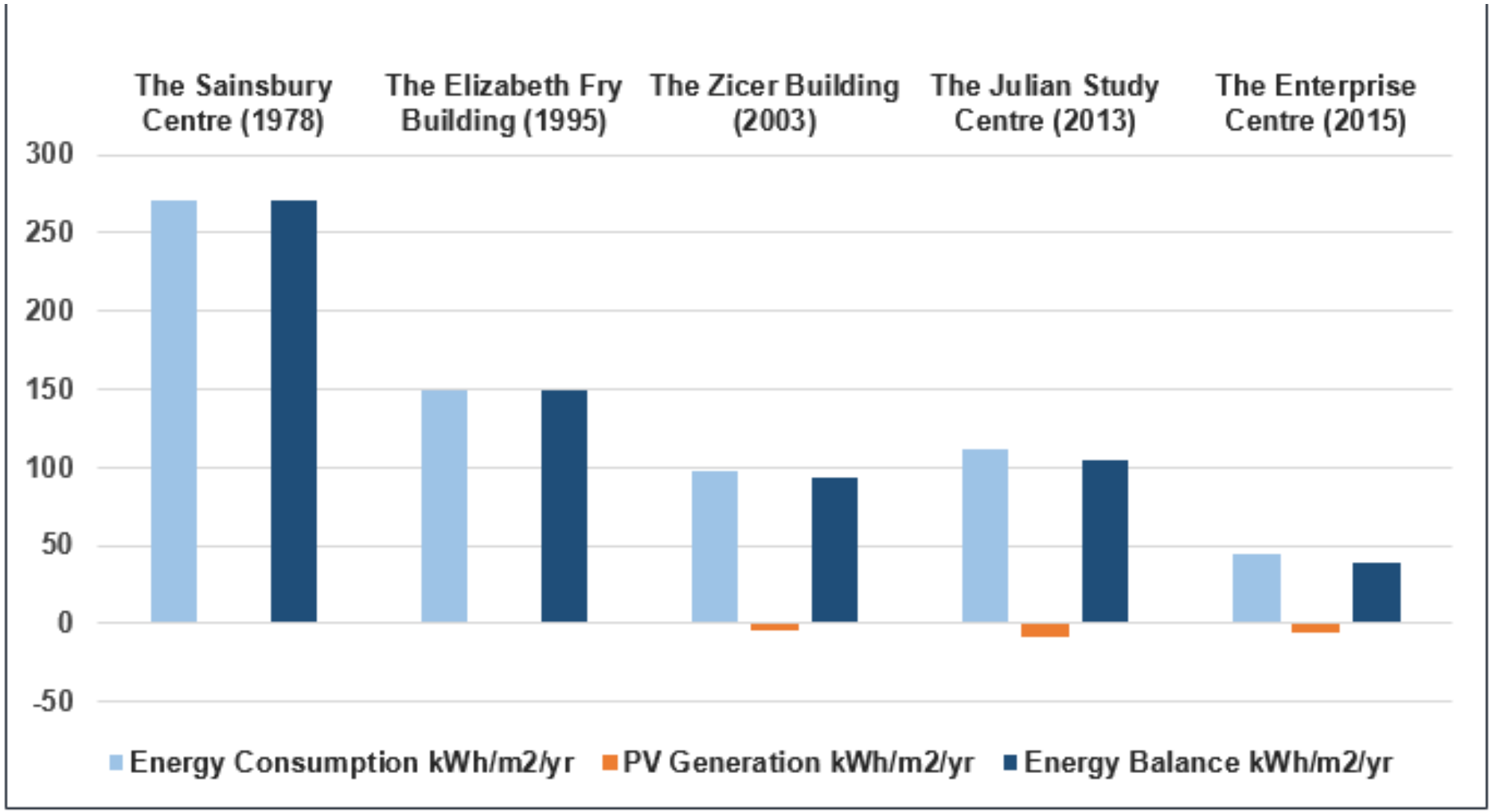
Annual UEA Energy Consumption Comparisons



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TEC Workspace

The Enterprise Centre
part of norwich research park

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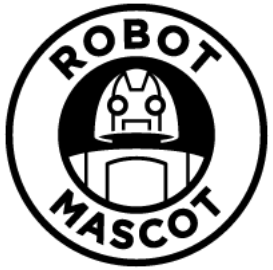
TEC Tenants

The Enterprise Centre
part of norwich research park



The Enterprise Centre
part of norwich research park

TEC Awards

Award	Category
Civic Trust Awards 2017	National
Architects Journal 100 Building of the Year 2016	Readers' Choice
British Council for Offices (BCO) Awards 2016 Regional	Corporate Workplace
	Innovation
British Council for Offices (BCO) Awards 2016 National	Best of the Best
	Corporate Workplace
BREEAM awards 2016	Education and Healthcare
Construction News 2016	Sustainable Project of the Year
Constructing Excellence 2016 National awards	Innovation
Constructing Excellence 2016 Regional awards	Innovation
Guardian Sustainable Business Awards 2016	Built Environment
Gyproc trophy - British Gypsum 2016	Innovation and Sustainability (UK)
Local Authority Building Control 2016	Best Commercial Building
Lux Awards 2016	Office, Education and Healthcare
	Lighting Project of the Year
Norfolk Architects 2016	Craftsmanship
	President's Award for Design
Offsite Awards 2016	Best use of timber
Structural Timber Awards 2016	Best low energy project
	Best timber frame project
Education Estates 2015	Sustainable Achievement

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Case Study – Demonstrating sustainable business practices to students

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ual: university of the arts london
london college of fashion

“I can think of few other industries as creative, innovative and agile as fashion. At LCF I have heavily invested in making sure sustainability is seen less as an adjunct and more an integral part of the process of business and design.

We need our graduates to be aware of how influential designers can be in working out ‘cradle to cradle’ solutions before the garment leaves the design board.”

Professor Frances Corner OBE, Head of LCF

http://www.wearesalt.org/london-fashion-school-boss-its-time-we-stopped-destroying-the-earth/

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ual: university of the arts london
london college of fashion

Image credits: Still from a video by Kristina Pulejkova

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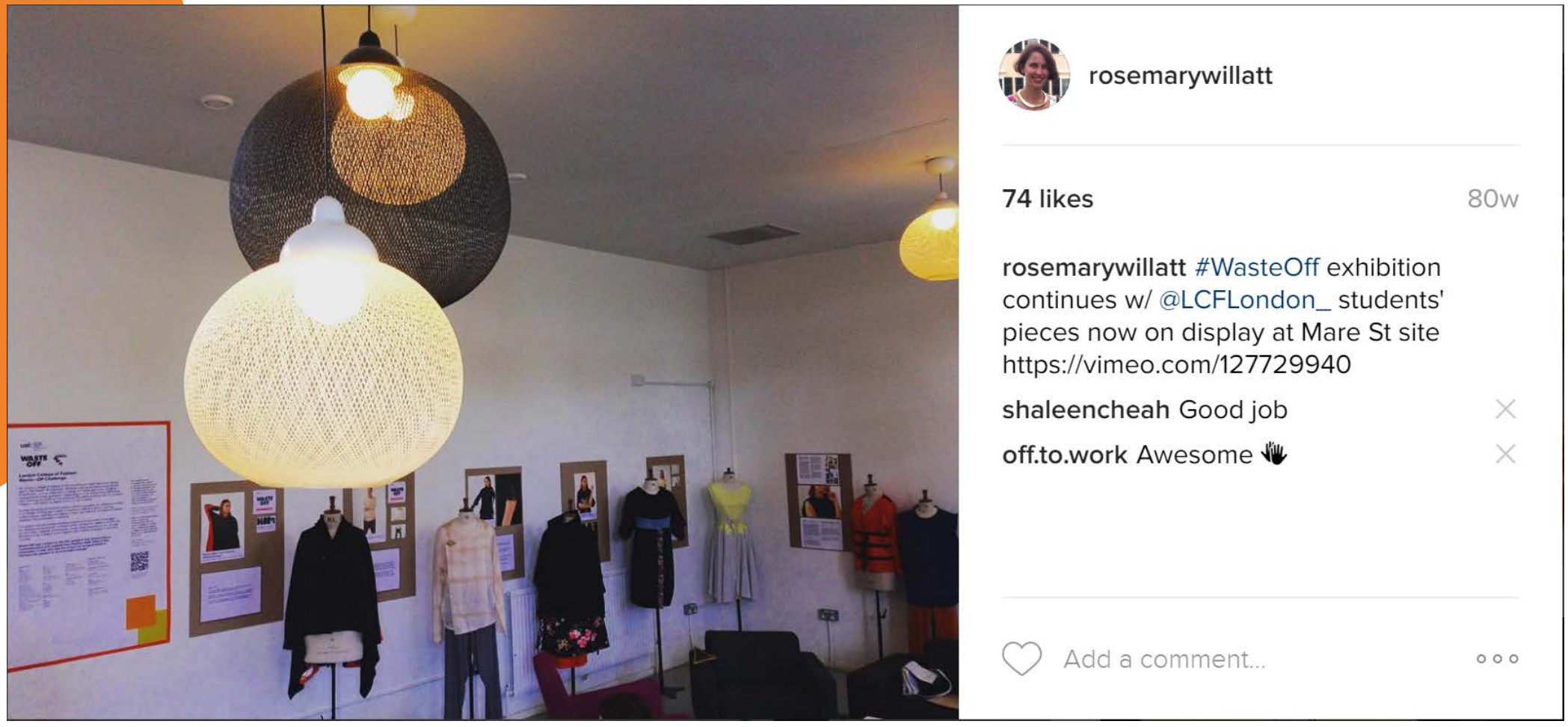
ual: university of the arts london
london college of fashion



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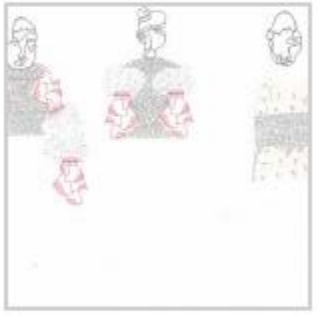
ual: university of the arts london
london college of fashion



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ual: university of the arts london
london college of fashion

Image credits: Ryan Saradjola – BA Fashion Photography, Quentin Hubert – MA Fashion Media Production, Ka Hei Law – Hair and Make up for Fashion,

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ual: university of the arts london
london college of fashion

FASHION

Education | Enterprise | Research | Better Lives

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london college of fashion

VALUES

INVESTMENT

MENTORING

CONDUCIVE ENVIRONMENT

DISRUPTIVE PROCESS

APETITE FOR RISK

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london college of fashion

Case Study – The Low Carbon Innovation Fund and new fund developments at UAL

Low Carbon Innovation Fund

Adapt at the UEA and Norwich Research Park

- UEA and the Norwich Research Park have a world renowned reputation for environmental, climate change and bio-tech research.

- We are committed to utilizing this expertise and knowledge to achieve positive impacts on the wider world.

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Investment Activities

- We align our activities with the UEA and NRP by supporting innovation and the low carbon economy through a number of financial instruments
- Adapt Low Carbon Group - Low Carbon Innovation Fund
- Adapt Cocoon Equity LLP – Mulberry Green Fund

Low Carbon Innovation Fund

- Venture Capital co-investment Fund
- Launched in 2010
- First investment cycle £20.5M from ERDF
- Co-invests alongside private sector investors
- Non-financial performance metrics
- Self-sustaining fund, exits already commenced
- New investment cycle to start spring 2017

Low Carbon Innovation Fund

Who is it for?

- SMEs in East of England
- Start-ups, early stage and established businesses
- Companies/technologies in development or already selling
- Innovative products and services (or operational methods) with a real carbon reduction impact

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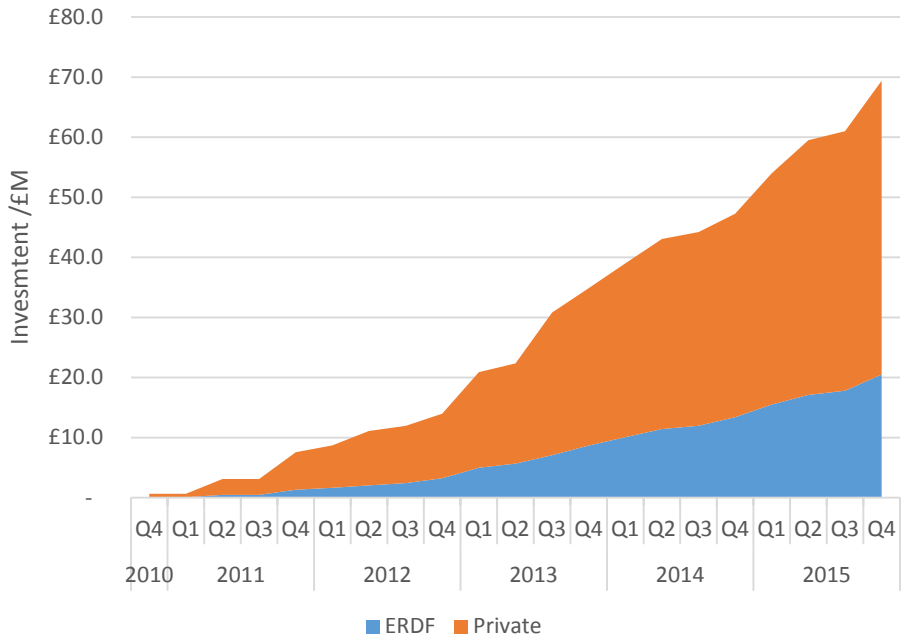
Low Carbon Innovation Fund

What has it achieved?

- 86 investments completed
- Over £69M invested :

  £20.5M LCIF and more than

  £48.9M private match
- 70 companies assisted



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What about those non-financial metrics?

- Over 270 new jobs created and over 190 jobs safeguarded so far
- Over 100 new and innovative products, processes, services or low carbon operational changes brought to market
- Over 250,000 tonnes of CO2 saved to date
- Over 10,000,000 tonnes CO2 forecast to be saved by end 2020 – that's a lot!

How does it work?

Two streams of investment:

- **LCIF Main Fund: £75K - £1M equity investments**
  - Operated by UEA through fund managers
- **LCIF Smaller Investments Scheme: £25K - £75K loans convertible to equity**
  - For earlier stage businesses
  - Streamlined application process, speedy approval, quick response
  - Seed funding, stimulating angel investment
- **Assisting companies to prepare for investment and ‘graduate’ from SIS to Main Fund**

Highlights from LCIF Project Evaluation

- **Substantial investment portfolio:**
  - 43 companies in a range of different sectors
  - A further 23 companies assisted to access risk capital
- **Leverage of £2.48 private co-investment to £1 of LCIF: target of £1.50**
- **LCIF involved in 20% of private equity deals between £25K and £2M in in the East of England**
- **Legacy Fund using recycled funds**
- **Great feedback from companies, co-investors and other stakeholders**
- **A ‘different style’ of VC investment**
- **Bringing otherwise unfunded products & services to market**

Low Carbon Innovation Fund

SIS Portfolio

99SQUARED

extremis technology

electronic sound

GENESIUS PICTURES

Midas

Knowledge TRANSMISSION

CCTech CUBE CLEAN TECH

RAPIERE

SOARK emission free taxis

FutureNova

SUNDRIED

MSF TECHNOLOGIES

LDS Liquid Digestate Solutions

Shackleton DESIGN & MANUFACTURING

enLight

Ablatus Therapeutics

gapogroup

ARRIBA COOLTECH engineering for a joined-up world

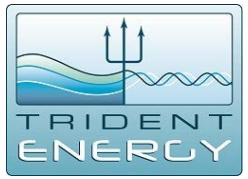
solar for schools

azoomee

adap+

Low Carbon Innovation Fund

Main Fund Portfolio



What do we provide?

- **Cash**
- **Investment Readiness Support**
  - Guidance on how to prepare the team and business for the fundraise
  - Knowledge and experience of the investment process & documentation
- **Carbon Reduction Support**
  - Guidance on how to implement real carbon savings through all aspects of the business – energy & resource efficiency
- **Access to our network & contacts**
  - Low Carbon business cluster based at The Enterprise Centre
  - Access to students, research and academic resources
  - Wider network of university experts and public sector
  - Like minded portfolio companies
  - Other investors
- **A committed Non Exec Board member or Observer**
- **Support to prepare the company for the next stage of growth**

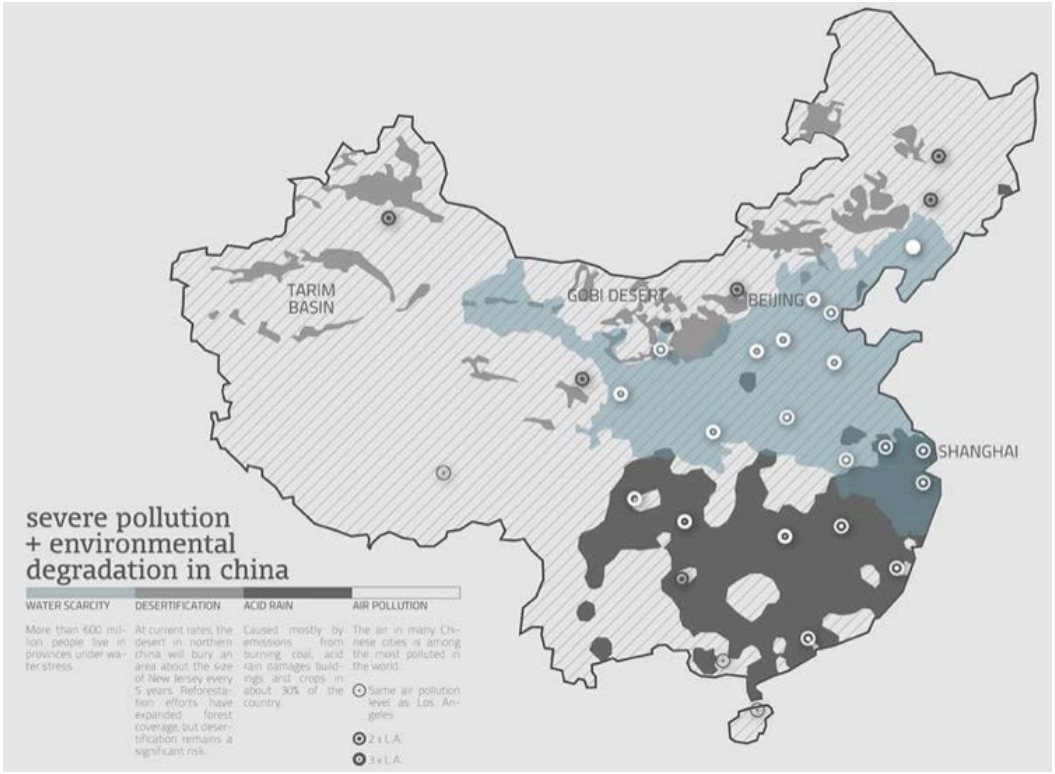
MULBERRY GREEN FUND

Joint venture between the Adapt Low Carbon Group at the University of East Anglia and Cocoon Networks, Europe's largest start-up ecosystem backed by Chinese capital

A £20m Venture Capital fund set up to address the need for more early stage investment into British Green-tech companies and China's growing appetite for efficient and sustainable technologies

Will focus its investments around some of China's most pressing environmental issues such as air quality, water quality, sustainable energy generation and food security

Through it's unique UK-China partnership the Fund will support British companies to expand into the Chinese market whilst simultaneously drive domestic innovation in the Green-tech sphere



Facilitated Discussion

adap+