

Crop derived bio-renewable materials – opportunities
in the construction sector and beyond.

Andrew Williams, Director of Innovation, BRE
Ventures

InCrops 29th June 2009

Building a Better World...

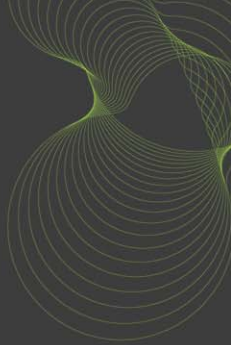
Research, innovation, consultancy, testing, certification, training



Working in the built environment, but also
transport, manufacturing, electronics, agriculture...

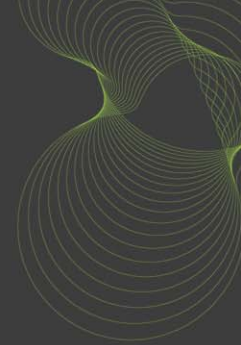
Sustainability...

Masterplans to corporate plans



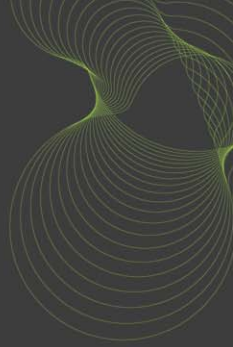
Low impact buildings and technologies...

Carbon reduction to resource utilisation



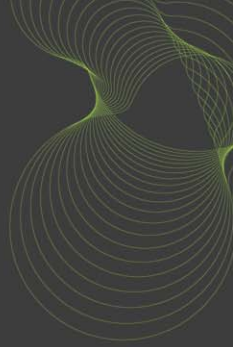
Social sustainability...

Stakeholder engagement to assisted living



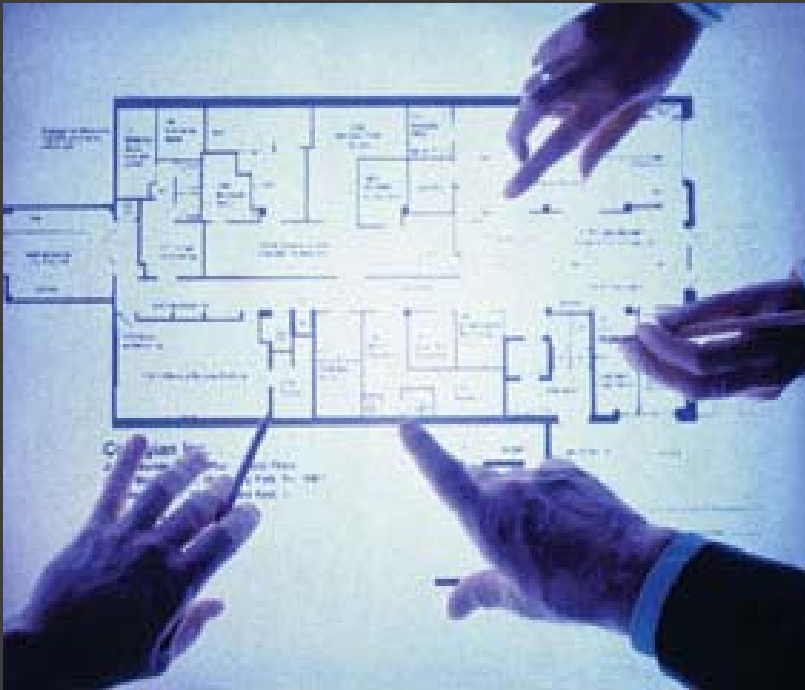
Innovation...

Product development to market transformation



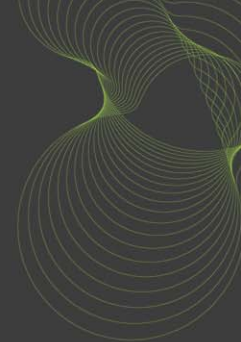
Risk management...

Design review to mock up testing



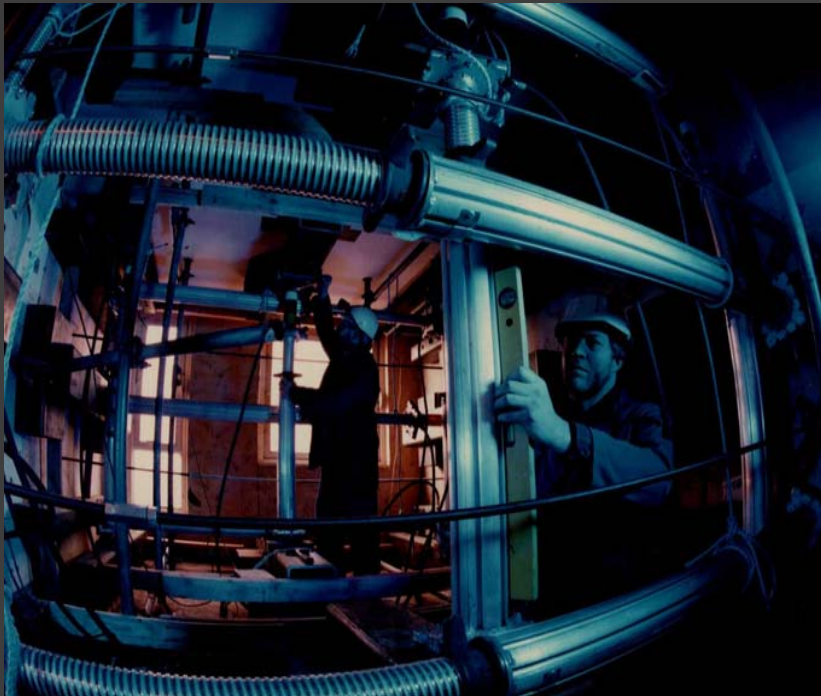
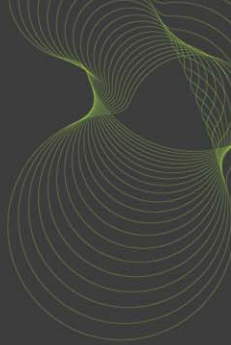
Protecting life and property...

Fire safety to security



Protecting life and property...

Structural safety to air quality



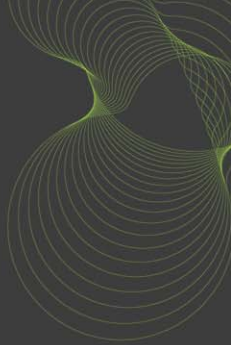
BRE Global - Certification

Fire and security to construction and environment



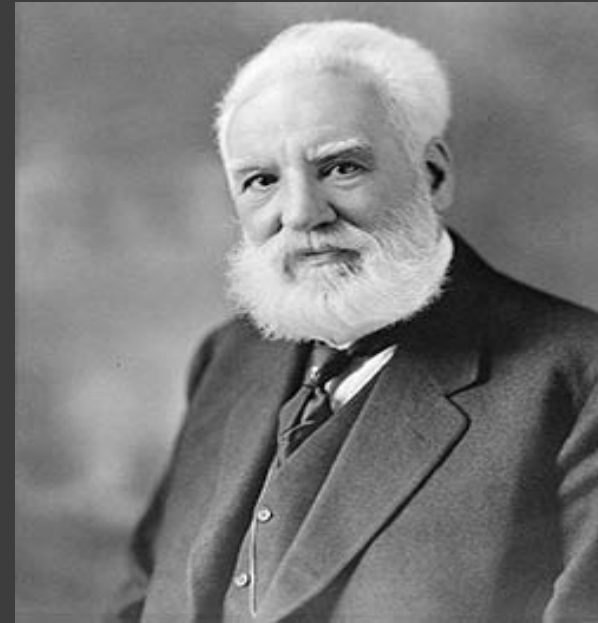
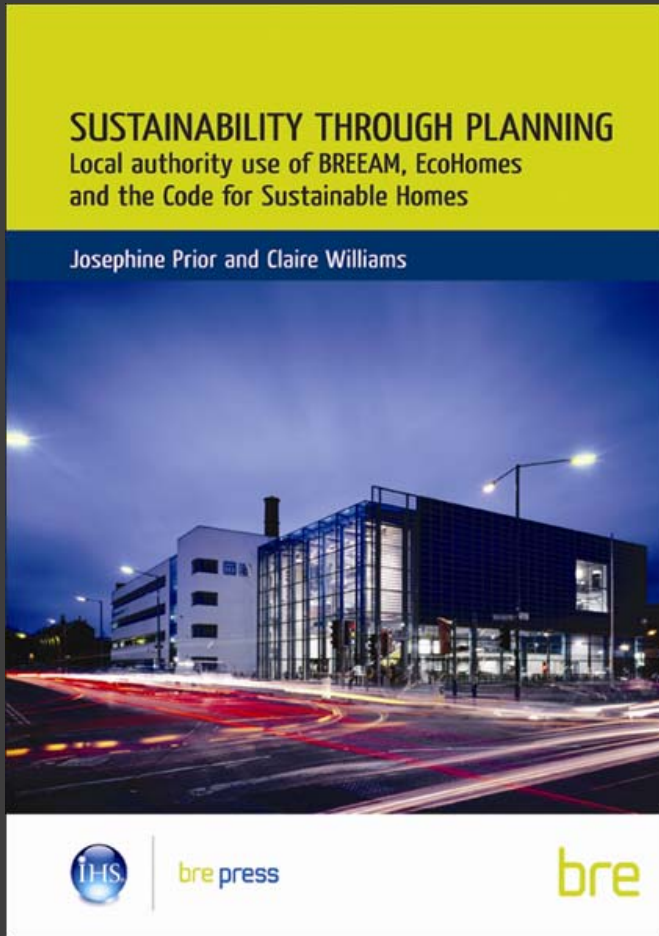
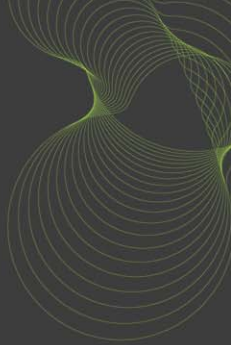
BRE Training...

Positively changing peoples lives



Knowledge and information...

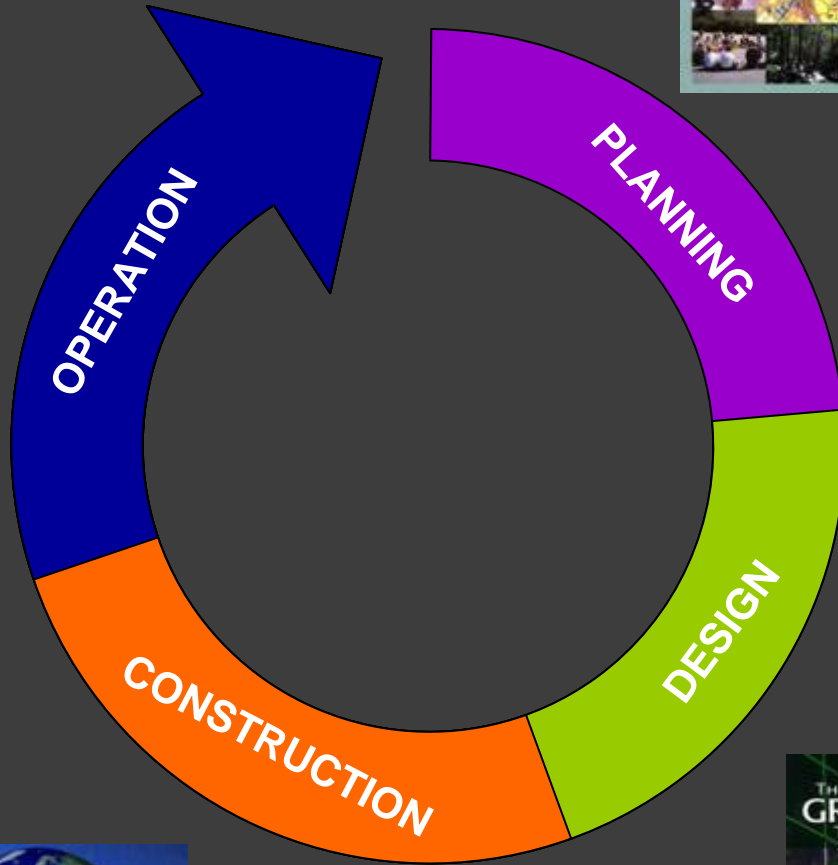
Publications to knowledge transfer

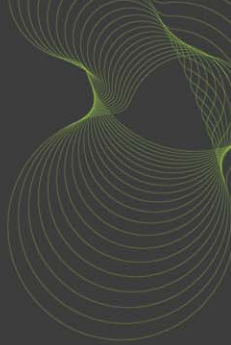


‘Great discoveries and improvements invariably involve the co-operation of many minds’

Alexander Graham Bell

An integrated suite of tools...



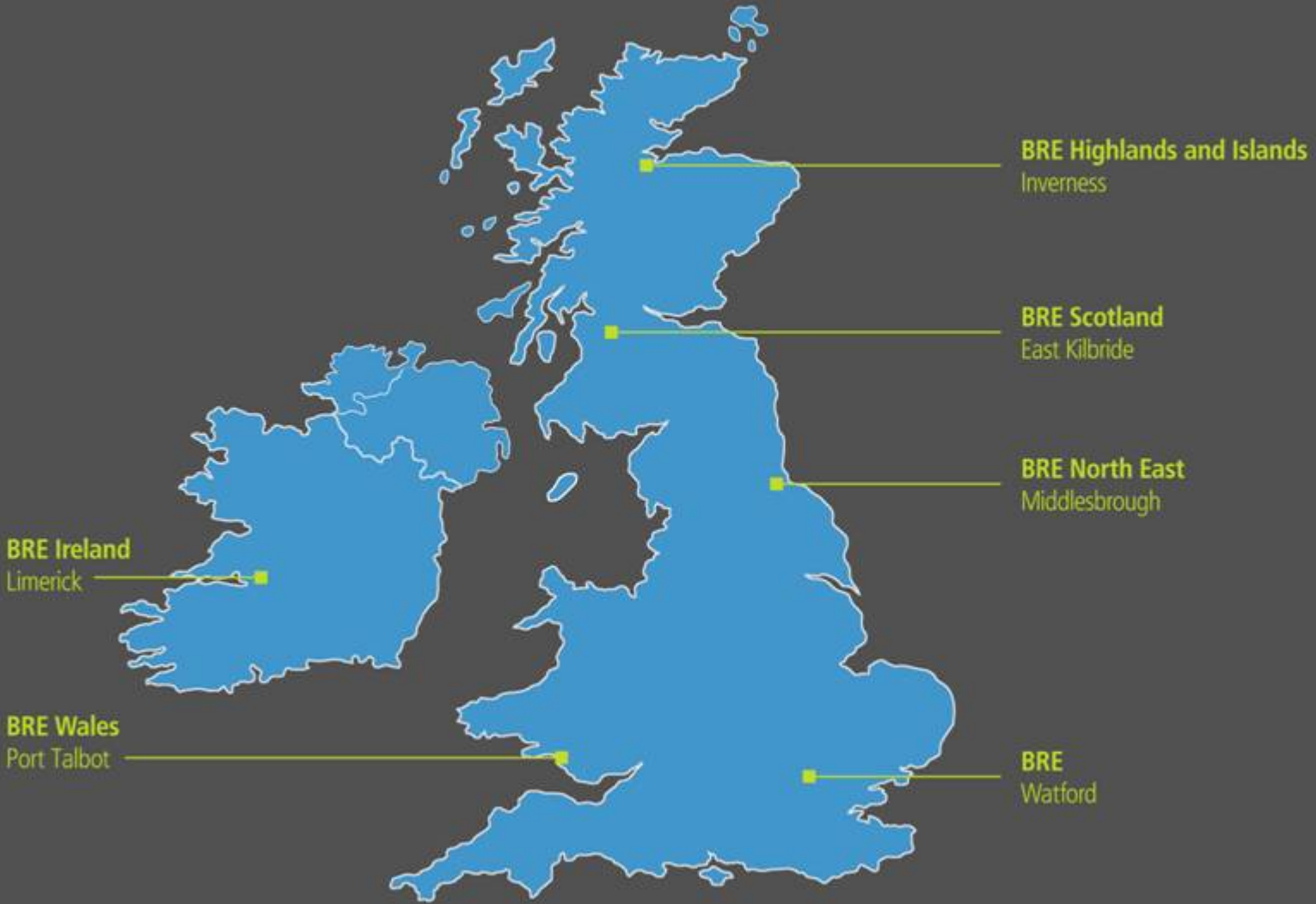


Our Staff...

- Over 600 staff
- Over 400 professionally qualified
- Many national and international experts
- An integrated team of professionals

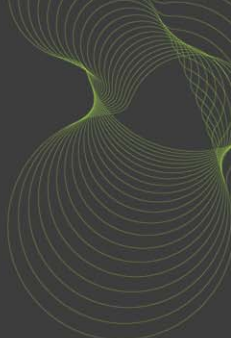
...people at the heart of our business

Our locations

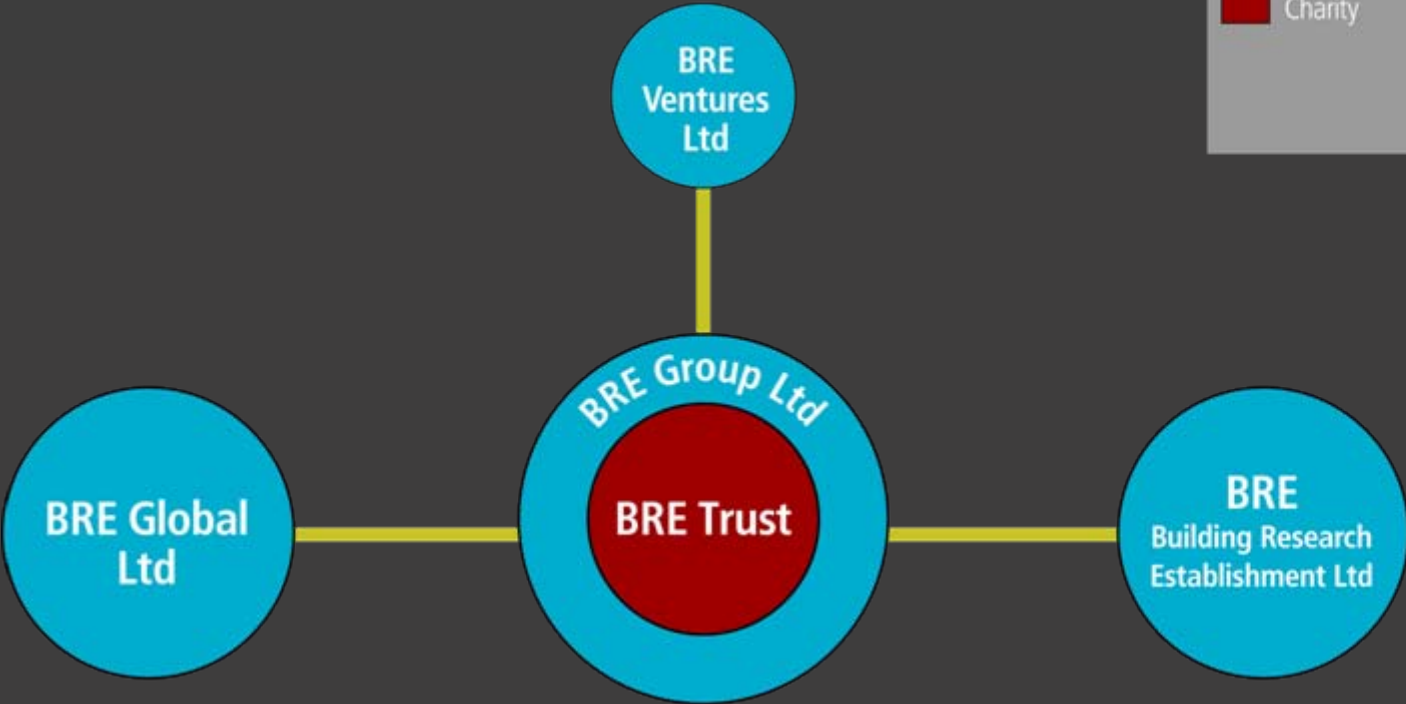


Active world wide with offices in Beijing, Abu Dhabi and The Hague

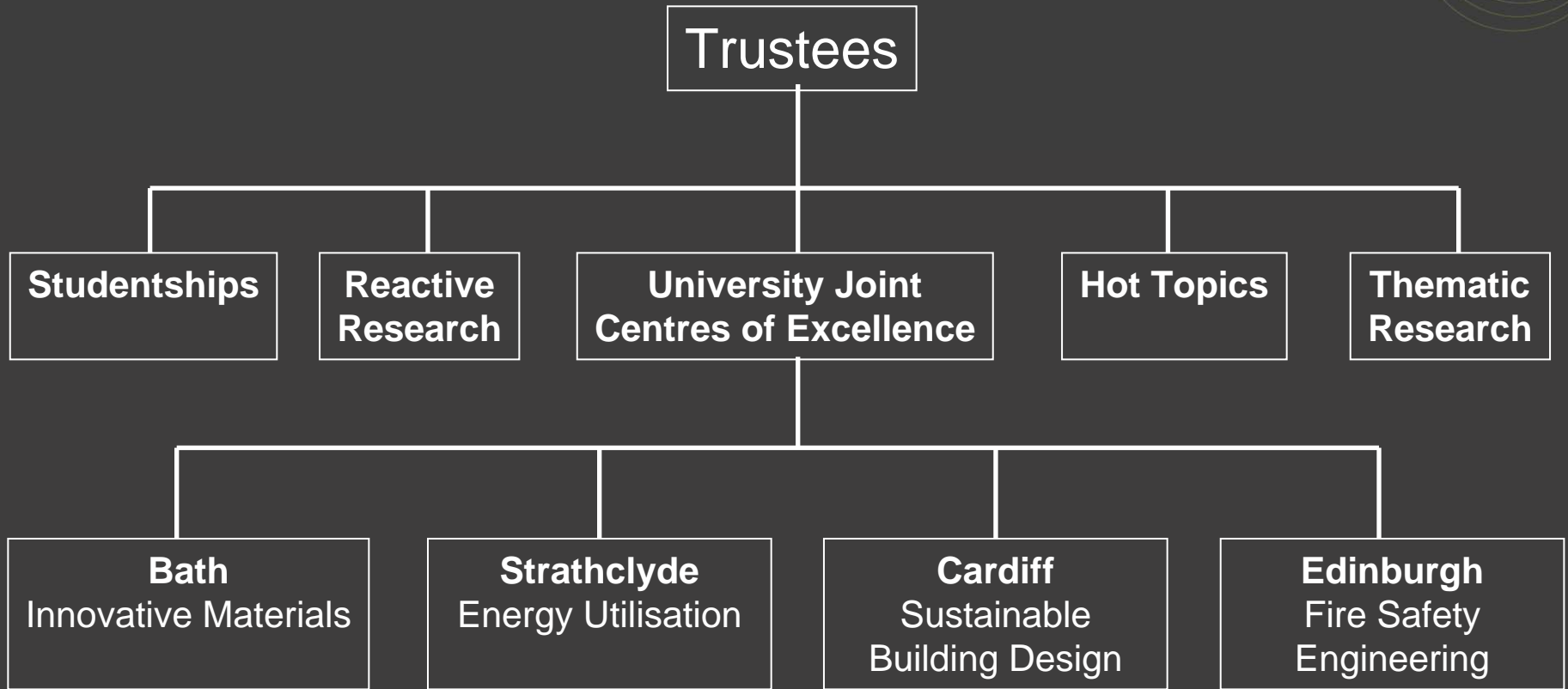
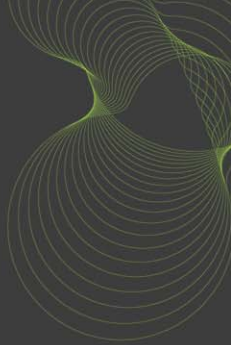
Corporate and Management Structure



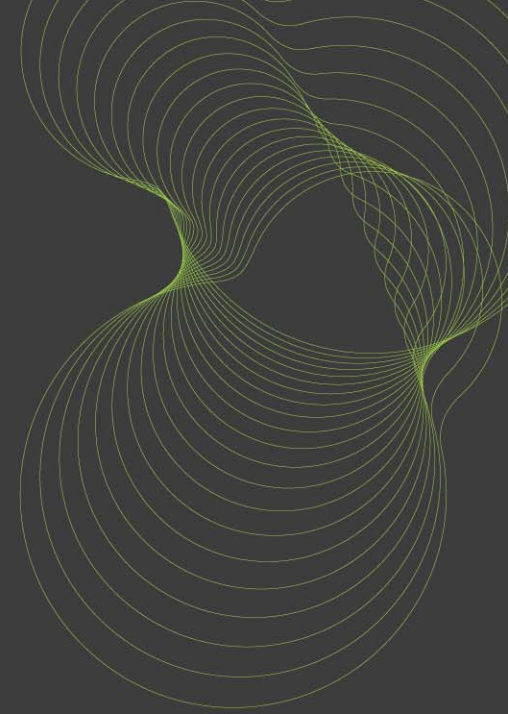
■ Charity ■ Companies



BRE Trust

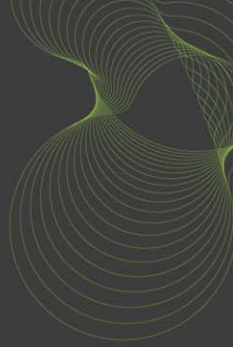


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New raw material streams - Crop derived bio-renewable materials

Why construction?



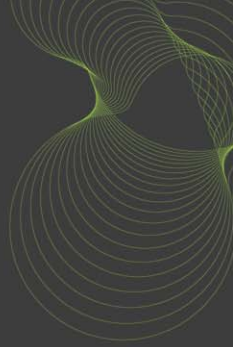
- Positives

- Construction sector requires bulk commodity materials
- Has significant sustainability drivers – cradle to cradle
- Significant volumes (MDF 1.5m sqm traded pa in UK)
- GRP – 240,000 tonnes to landfill pa in UK (MDF plant 700,000 tonnes)

- Negatives

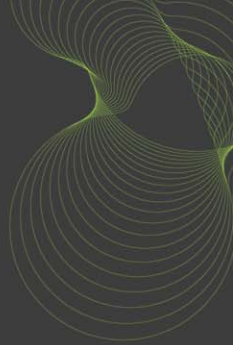
- Cost is key (green wood pulp £30/tonne)
- Recycled paper traded (£30 to £120/tonne)
- Quality and consistency
- Regulations, product performance (also a positive)

Making composites is easy but! - Feed material and end product performance - board products



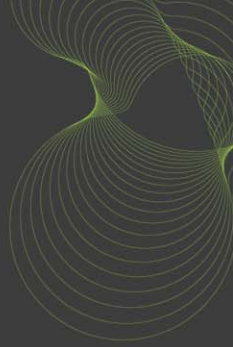
- *Characterisation of fibre for board production is being achieved by means of the following TAPPI Standards:*
 - *Water soluble wood and pulp - T207.*
 - *Ash in wood, pulp, paper and paper board : at 525 °C & 900 °C - T211*
 - *Acid insoluble Lignin in wood and Pulp – T222*
 - *Fibre length by classification – T233*
 - *Alkali solubility of pulp at 25 °C – T235*
 - *Acid insoluble in pulp – T244*
 - *Basic density and moisture content of pulpwood - T258.*
 - *Acetone Extractives – T280*

Making composites is easy but! - Feed material and end product performance - insulation products



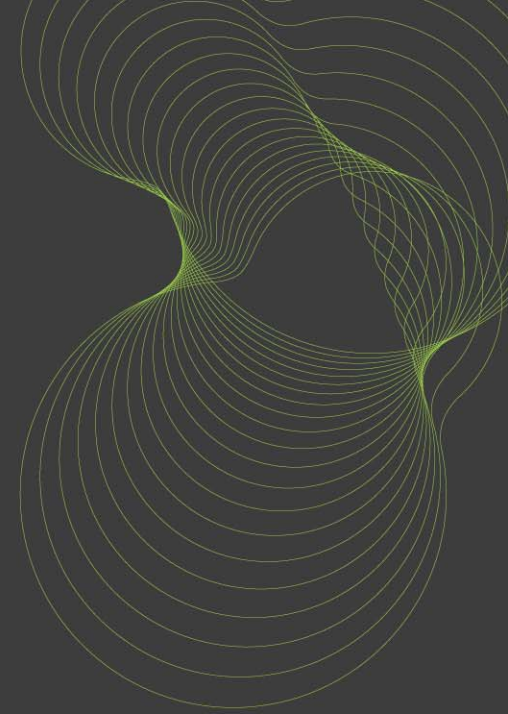
- *prEN15101-1:2008 - Thermal insulation products for buildings - In-situ formed loose fill cellulose (LFCI) products - Part 1: Specification for the products before installation:*
 - *Thermal Conductivity.*
 - *Short-term water absorption*
 - *Corrosive effects of the insulation material on certain metals.*
 - *Resistance to biological agents.*
 - *Settlement under static humidity.*
 - *Moisture pick up under humidity.*
 - *Single flaming item test.*
 - *Blow torch.*
 - *Open blown density.*

End product testing/certification - board



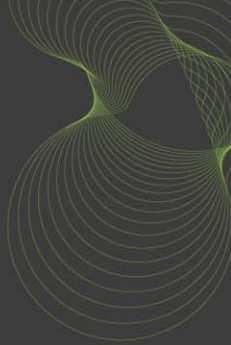
- Specifications and requirements
 - 9 requirements/categories
- Physical characteristics
 - 17 standards
- Biological degrade and resistance to mould
 - 3 standards
- Coating and film performance
 - 2 standards
- Acoustics
 - 4 standards
- Thermal insulation
 - 1 regulation
- Fire performance testing (appropriate end use)
 - 2 standards
- Chemical resistance (appropriate end use)
 - 1 standard

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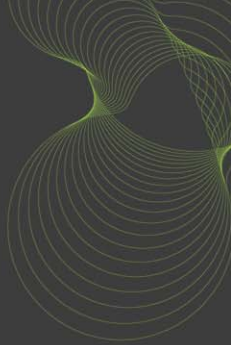


One project - Autoclaved domestic waste

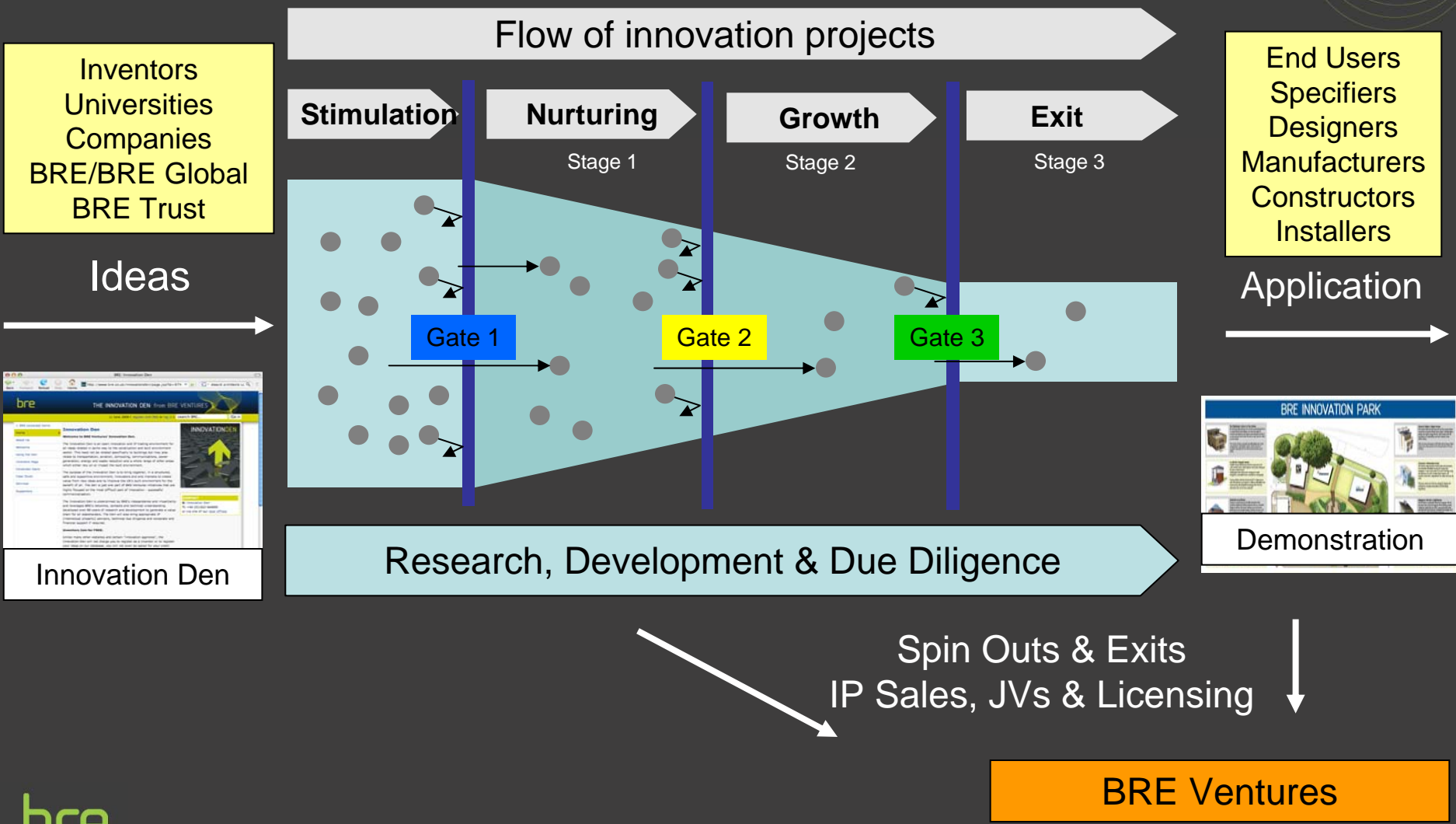
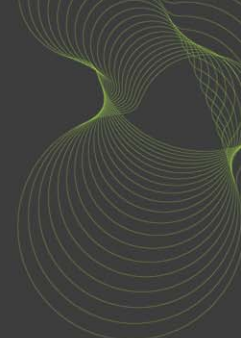
Examples of Dried Fibre Output.



Examples of BRE Generated Fibreboard.

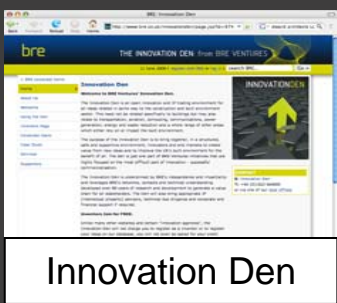


Making the most of new ideas – BRE's innovation pipeline



Inventors
Universities
Companies
BRE/BRE Global
BRE Trust

End Users
Specifiers
Designers
Manufacturers
Constructors
Installers





Summary

- There is massive potential to use non food crops in the construction sector (easily transferred to other sectors)
- BRE is promoting a wide range of material ‘sources’ as new raw material streams (waste is a bad word) for construction
- BRE is changing perceptions in relation to;
 - The use of crops in association with new construction methods
 - The standardisation of crops as a raw material stream for use in bulk in existing construction processes and products
- BRE is keen to be part of InCrops and looks forward to strong engagement in the future.