Innovate UK @ eViz:

Energy Visualisation for Carbon Reduction
Preparing for an uncertain future

Innovate UK

Mark Wray
Lead Technologist
Built environment

07825 112043
mark.wray@innovateuk.gov.uk
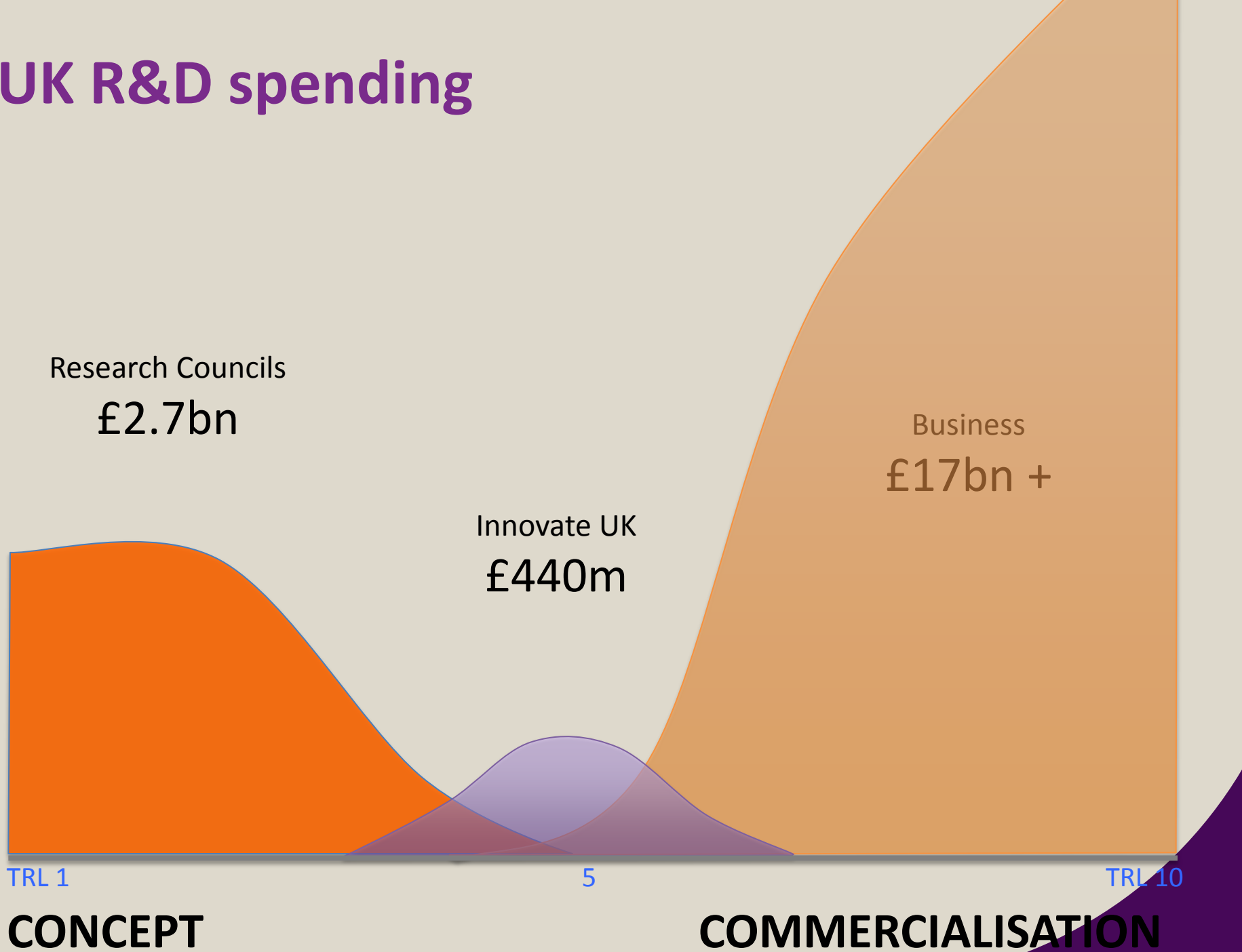@markinnovate

Interesting Times

Plan 2020

WHAT'S YOUR PLAN?

Thinking about the future

Ruth McKernan, Chief Executive

UK R&D spending

Research Councils
£2.7bn

Innovate UK
£440m

Business
£17bn +

TRL 1　　　　　5　　　　　TRL 10

CONCEPT　　　　　**COMMERCIALISATION**

5-point plan for future growth

1. **Accelerating UK economic growth,** nurturing small, high-growth companies, helping them to become high-growth mid-sized companies with strong productivity and export success.

2. **Building on innovation excellence throughout the UK,** investing locally in areas of strength.

3. **Developing Catapults within a national innovation network**, to provide access to cutting edge technologies, encourage inward investment and enable technical advances in existing businesses.

4. **Working with the research community and across government** to turn scientific excellence into economic impact, and improve efficiency.

5. **Evolving our funding models;** exploring ways to help public funding go further.

# 1. Accelerating innovation; growing businesses
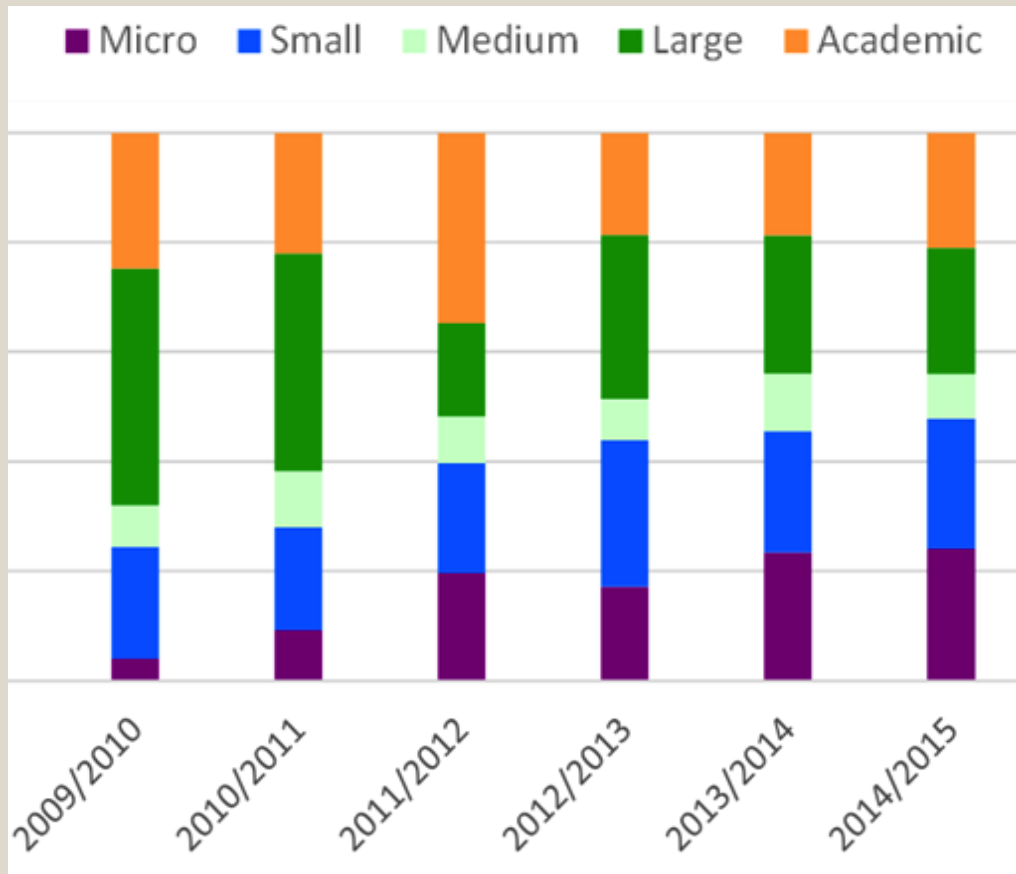
We have increased our focus on small, high-growth companies

2. Developing Catapults - within a network

Offshore Renewable Energy

High Value Manufacturing

Offshore Renewable Energy

High Value Manufacturing

High Value Manufacturing

Medicines Technologies

Energy Systems

High Value Manufacturing

Precision Medicine

Satellite Applications

Transport Systems

Digital

Future Cities

High Value Manufacturing
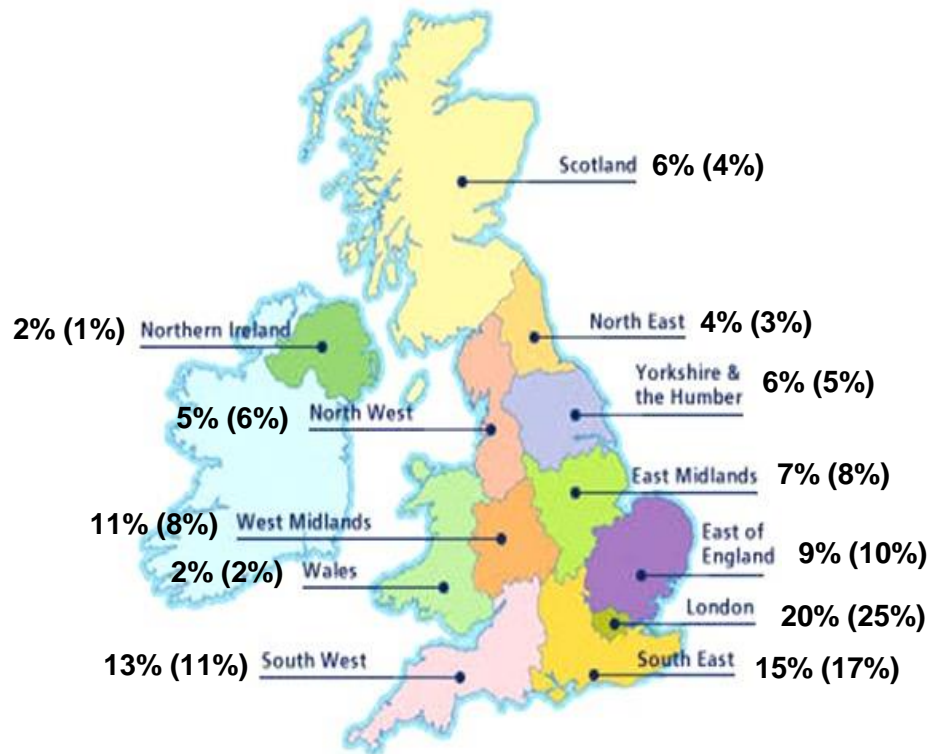
Cell Therapy

July 2015 V2.0

With headquarters in Cambridge, the Precision Medicine Catapult will have regional centres in the north of England, Northern Ireland, Scotland, Wales & southern England.
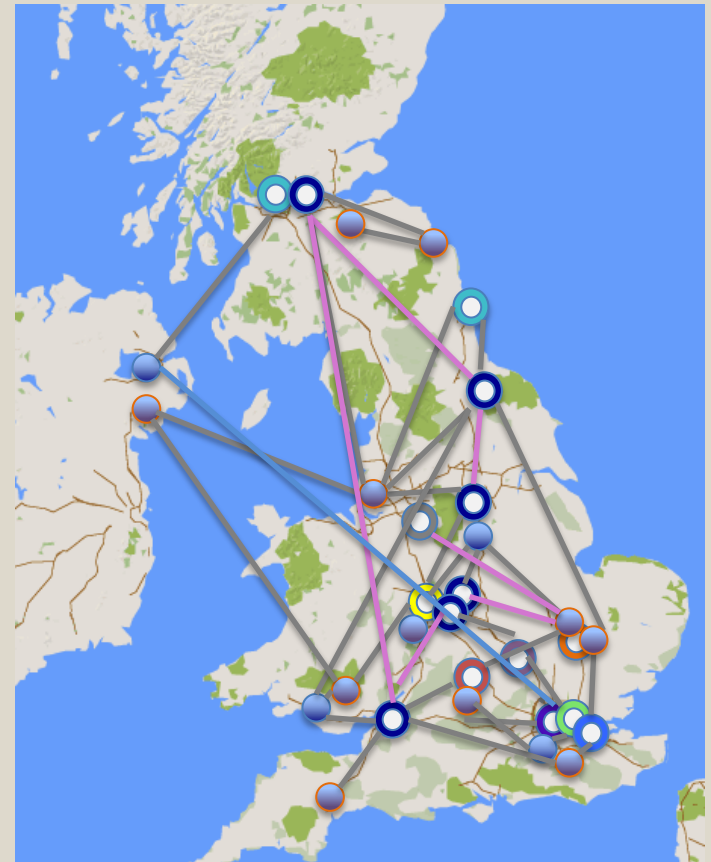
Future nodes and connections are illustrative only

3. Building on regional and local excellence

Map of the United Kingdom showing grant commitment by region:

- Scotland 6% (4%)
- Northern Ireland 2% (1%)
- North East 4% (3%)
- Yorkshire & the Humber 6% (5%)
- North West 5% (6%)
- East Midlands 7% (8%)
- West Midlands 11% (8%)
- East of England 9% (10%)
- Wales 2% (2%)
- London 20% (25%)
- South West 13% (11%)
- South East 15% (17%)

Grant commitment by region, 2014-15
(compared to previous year)

Launchpads:
**Driving SME innovation in clusters**

2011	Tech City, London
2013	Space, Harwell
2013	Digital & creative, Glasgow
2013	Materials & manufacturing, NW
2013	Cybersecurity, Severn Valley
2014	Medical technology, Wales
2014	Tech City, London
2014	Motorsport, Midlands
2014	Process industries, NE
2015	Digital media, Edinburgh

4. Working with the research community

Catalysts

■ Projects

■ Companies

Chart categories: Biomedical, Agri-Tech, Energy, Industrial Biotechnology

Y-axis: 0, 50, 100, 150, 200, 250, 300, 350
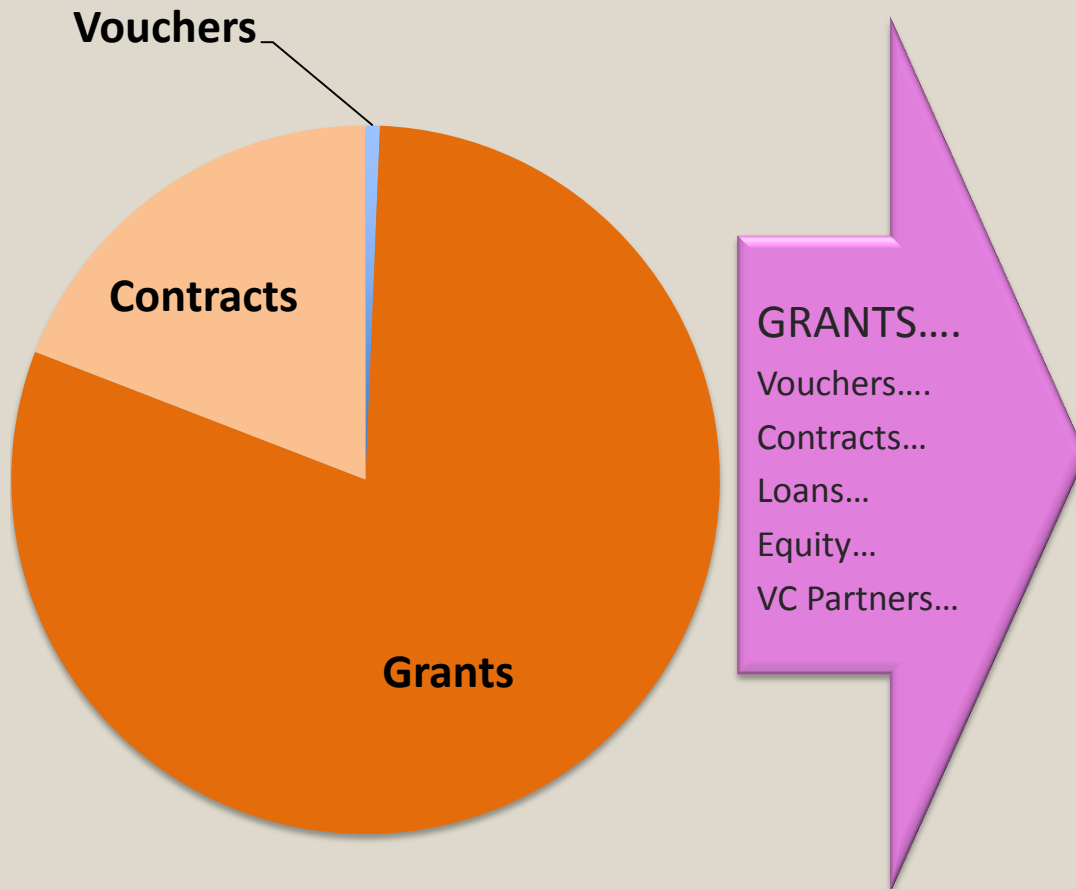

OxSonics

Targeting cancer with sound

- Spin-out from University of Oxford

- Commercialising research funded by EPSRC, NIHR and the Wellcome Trust

- Won Biomedical Catalyst funding to create a low-cost ultrasound device which targets drugs directly at tumours

5. Evolving our funding models

Vouchers

Contracts
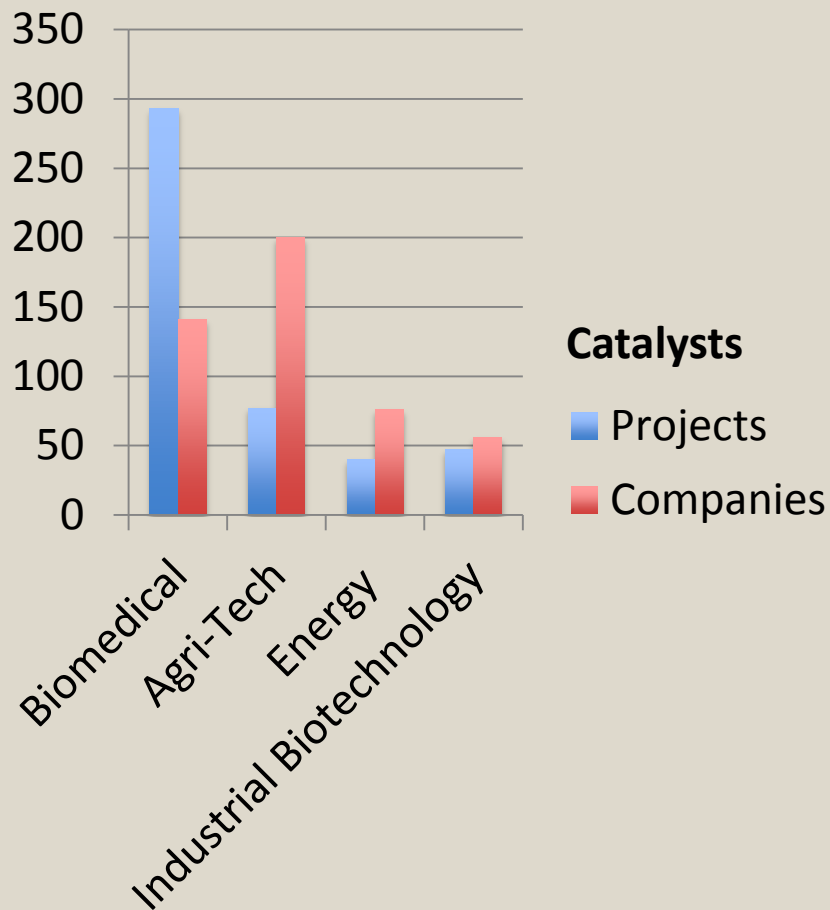
Grants

2014-15 - types of funding

GRANTS....
Vouchers....
Contracts...
Loans...
Equity...
VC Partners...

FIND
Research-led opportunities

Government-led opportunities

Business-led opportunities

GROW
Creating high growth potential SMEs

CATAPULT-centred scaling

SCALE
SME to mid-size, allowing new supply chains to form in UK

Delivery capability for industry

and digital scale-up

What will the next five years look like?

Consolidated Catapult networks, bridging innovation to business

More globally-competitive **medium sized science-based** companies in **strong clusters** across the United Kingdom

Excellence in science being translated enthusiastically and across disciplines
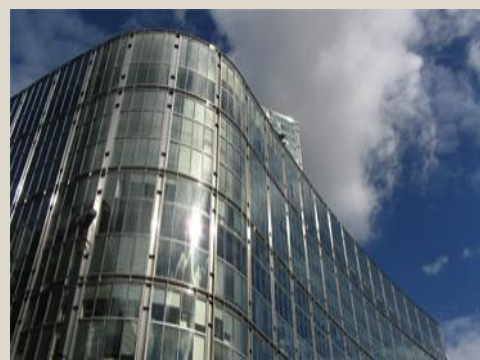
Energy Visualisation

Past programme – Building Performance Evaluation

Supported product – Demand Logic

Future gazing

Building Performance Evaluation

£8m Innovate UK funding - 2010 to 2014

Projects are case study investigations of individual buildings or developments to:

- identify design and in-use factors that encourage good performance

- expose activities that contribute to poor performance

- explore lessons learnt by the domestic and non-domestic projects

https://connect.innovateuk.org/web/building-performance-evaluation

Domestic:

53 projects
(350 dwellings)

**Non-domestic:**

48 projects

(55 study buildings)

We will be disseminating outcomes of the Building Performance Evaluation programme throughout 2015

4 principle emerging themes

1. Energy consumption is often much higher than design calculations suggest

2. Lack of client engagement

3. Challenges to occupants and building users

4. Low energy aspirations can influence system complexity

Tools and resources

busmethodology.org.uk

DomEARM

CIBSE TM22
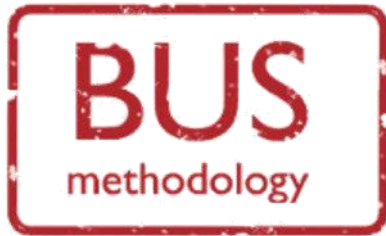
CarbonBuzz
an RIBA CIBSE platform

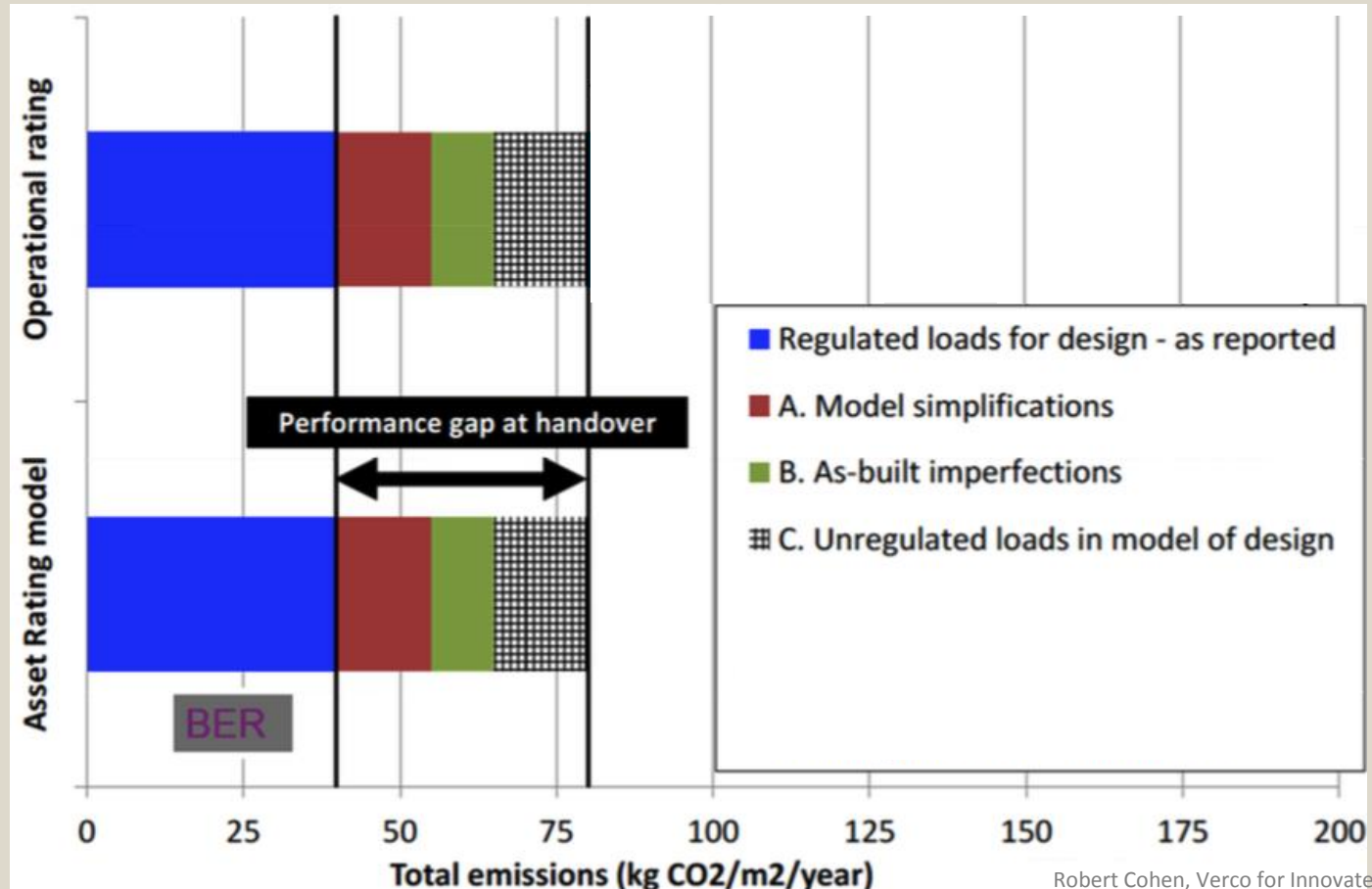carbonbuzz.org

KTN
the Knowledge Transfer Network

connect.innovateuk.org/web/modernbuiltktn
or search for Building Performance Evaluation

embed
building intelligence
for innovation

getembed.com

Energy perception and the performance gap

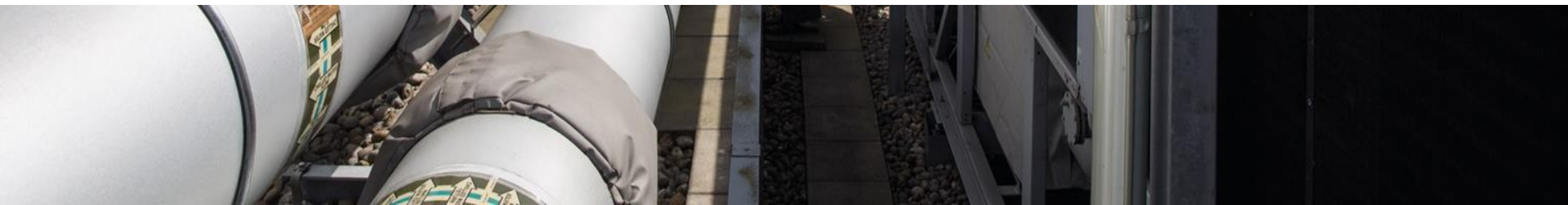Robert Cohen, Verco for Innovate UK and GCB

EPC's are only currently suitable for compliance checks and property valuations

- Building management collaboration
- Comfort & well-being
- Condition-based maintenance productivity
- Energy savings
- Smart commissioning and witnessing

Demand LOGIC

www.demandlogic.co.uk
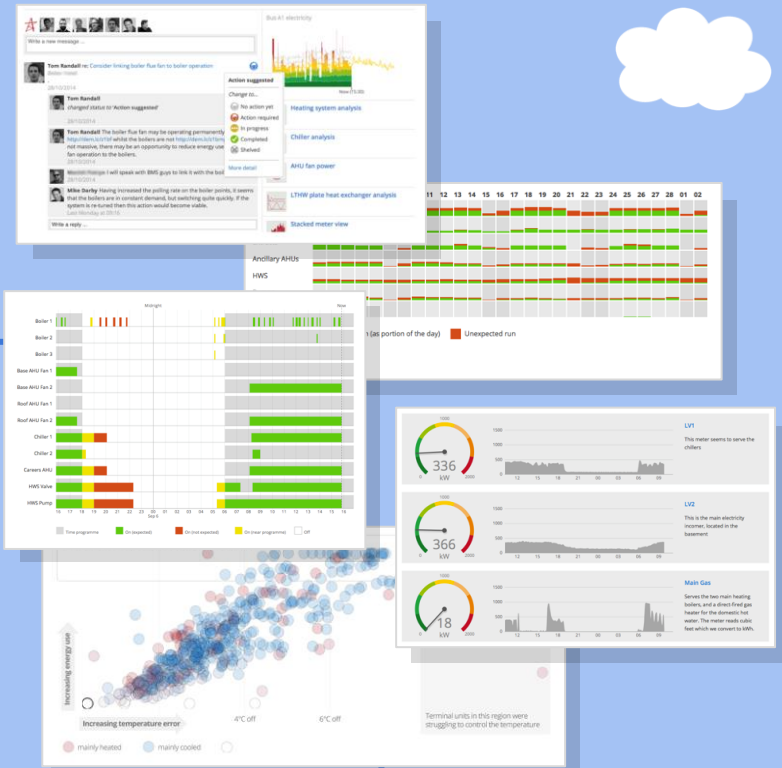
"Vision Mapping" project

- Develop a vision for the energy system experience of

  – What value add **functionality** might users value and be motivated by?

  – To stimulate the sector and inform funding strategy

- Blue sky….creative value add functionality - harness all personal motivators types….to REALLY engaging end users

- Workshops Dec/Jan - first theme

  – Energy functionality in commercial/public buildings

Energy Systems Definition

Social
Policy
Technology
Engineering
Regulation
Design
Business models
Etc...

End users
Energy suppliers
Network operators
Industry
System operator (s)
Building energy managers
Etc.....

1. Heat or cold
2. Light
3. Motive power
4. Power electronics
5. Data/ information
6. Control
7. £ ROI

Combinations of **ingredients and capabilities** that provide system **beneficiaries** with dynamic **functional energy value propositions**, that……

1. Maximize the adoption of energy and carbon efficiency of solutions and methods at point of use

2. Manage uncertainty and balancing of energy need with energy availability

3. **Engage users and other beneficiaries in more energy or carbon efficient participation in their use of energy**

Energy systems opportunity pot for visualization

Personal motivators

- Comfort
- Emotional
- Financial
- Risk minimization/peace of mind
- Care for others
- Carbon & resource efficiency
- Minimal hassle/simplicity
- Fun

End users actual needs

1. Heat or cold
2. Light
3. Motive power
4. Energize electronics
5. Data/information
6. Control
7. £ ROI

Visualization potential..

What's it doing?
What's it about to do?
What's the trend?
What's it cost me so far?
Is it on or off?
Is it working as it should?
etc

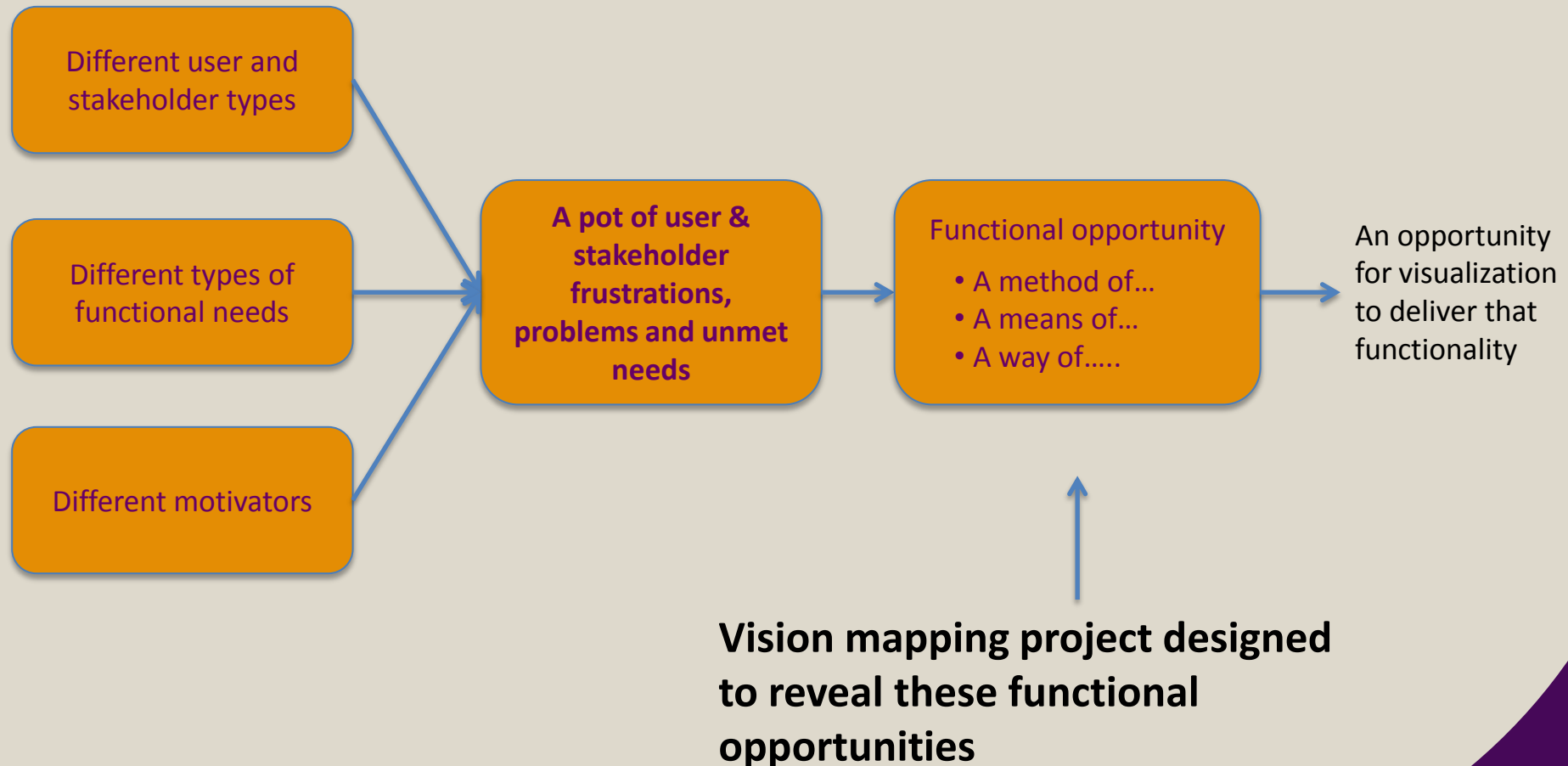**Where are there problems to be solved…**.

- Lack of knowledge or information
- Lack of control
- Inability to predict
- Wastage
- Silly bad habits
- Hassle/frustration
- Current crude solutions
- Poorly addressed issues of comfort

Its not just about end users!

- Energy managers
- Building services/maintenance
- Housing associations
- Security staff
- Cleaners
- Employees
- Even kids!

All could play a role in managing building energy better with the right visual tools

Drawing these ingredients together

Different user and stakeholder types

Different types of functional needs

Different motivators

A pot of user & stakeholder frustrations, problems and unmet needs

Functional opportunity
- A method of…
- A means of…
- A way of…..

An opportunity for visualization to deliver that functionality

Vision mapping project designed to reveal these functional opportunities

Functionality that visualization could play a role in

1. **A way** of knowing when you flick switch how much cost/hour will then be incurred, (and vice versa)

2. **A way** of knowing how much energy cost/hour is being consumed in a room when you walk into it

3. **A way** of knowing how much it just cost you to boil the kettle

4. **A way** of knowing how hot a a radiator is by looking at it (e.g. it glows red when hot)

5. **A means** of mapping the personal comfort preferences of people that work in my companies office block so I can bespoke program our building system

6. **A way** of visualizing waste heat in a production process

7. **A way** of seeing high quality granular peer energy use, say in my village, maybe broken down by energy use type (e.g. lighting/heating/cooking/hot water), as a way of engaging real change

Vision Mapping - Summary

- Visualization could make a significant contribution to the energy systems agenda
  - Both for end user engagement, AND
  - Benefit of other parties

- Vision mapping workshop Dec/Jan
  (+mini workshop at TEDDINET event 12 Oct)

- For further info on Vision Mapping project
  - mark.thompson@innovateuk.gov.uk
  - 07867 462690