GREEN HOME FESTIVAL

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13 CLIMATE ACTION

Leading and Transforming from within: Sustainable construction and Asset Management

Professor Christopher Gorse and
Jocelyne Fleming

LEEDS BECKETT UNIVERSITY

Loughborough University

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Will COP 26 make a difference?

Can we create an environment that gives our future generations more, with less?

The action zone and globe at the Hydro, Glasgow. Photograph: Alan Harvey/ UK Governmenthttps://www.flickr.com/photos/186938113@N07/51645001889/

"Is this how the story ends"

Smartest species doomed

– Instability

– Inequity

Sir David Attenborough speaks at the Opening Ceremony for Cop26 at the SEC, Glasgow.
Photograph: Karwai Tang/ UK Government
https://www.flickr.com/photos/186938113@N07/51647619786/

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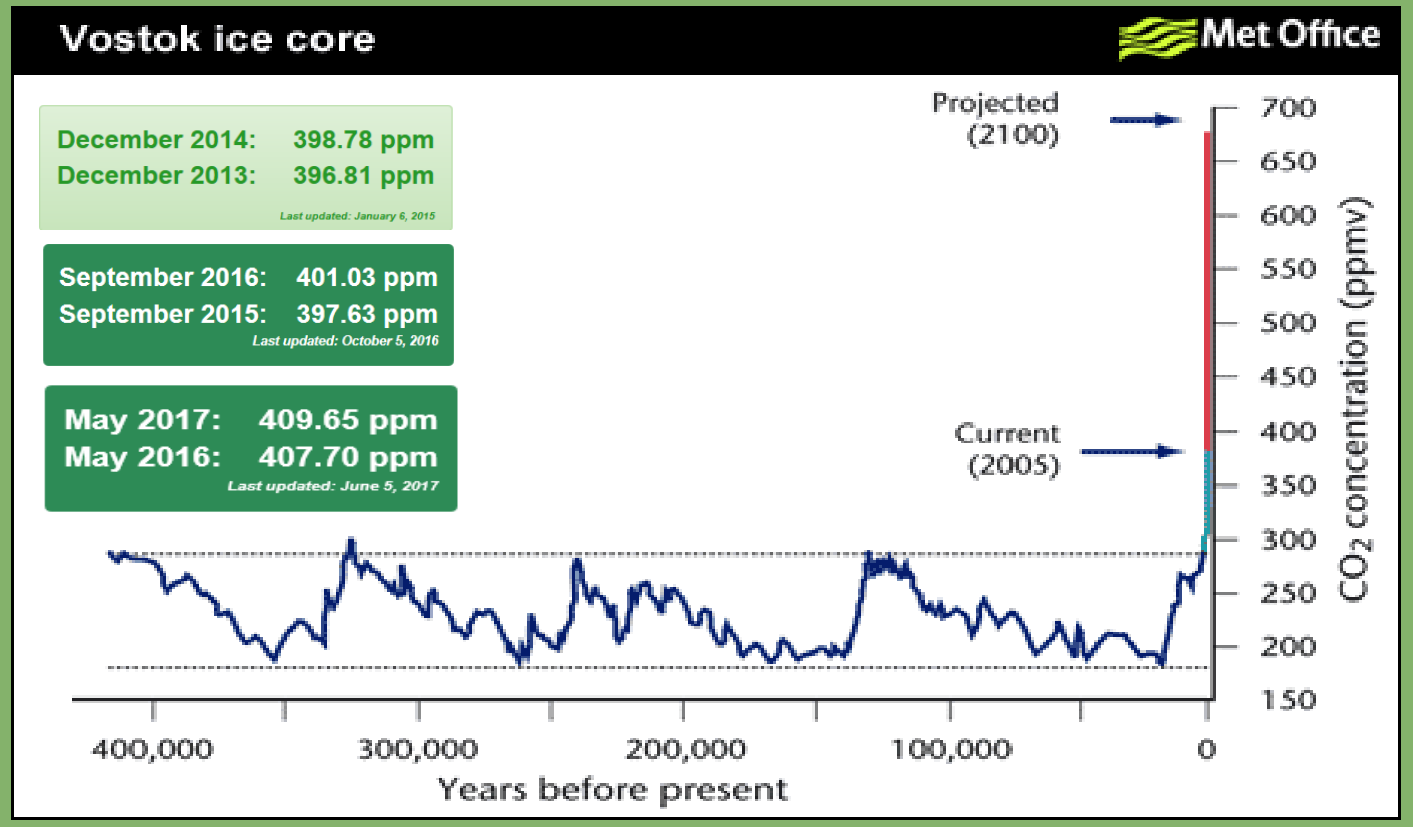
Week beginning on July 31, 2022: 418.19 ppm
Weekly value from 1 year ago: 415.10 ppm
Weekly value from 10 years ago: 393.55 ppm
Last updated: August 8, 2022

Week beginning on November 7, 2021: 414.97 ppm
Weekly value from 1 year ago: 412.97 ppm
Weekly value from 10 years ago: 390.09 ppm
Last updated: November 17, 2021



- 15 year impact – all our fault

https://www.esrl.noaa.gov/gmd/ccgg/trends/weekly.html

UK Baselines

Warmer dryer summers,

Wetter warmer winters.

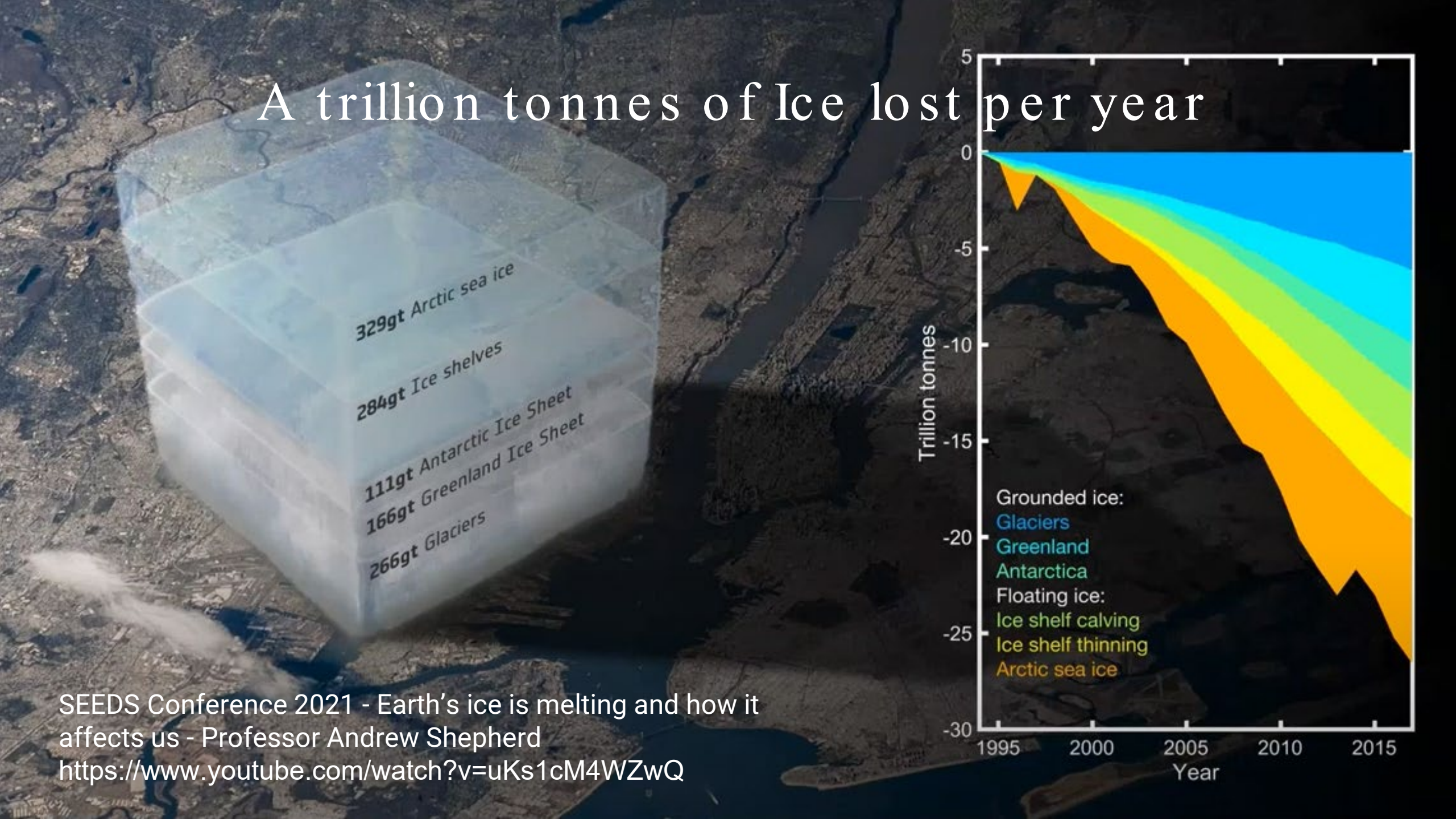
80% less snow!

- Kay, A. L. (2016) Centre for Ecology & Hydration
- Met Office regional climate

In 50 years biodiversity halved

Gifting our children more uncertainty than we've ever experienced.

A trillion tonnes of Ice lost per year



SEEDS Conference 2021 - Earth’s ice is melting and how it affects us - Professor Andrew Shepherd
https://www.youtube.com/watch?v=uKs1cM4WZwQ

The future?

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- Electric, diesel or hydrogen?
- What will a digital transform look like, how will it shape our homes, work and lives?

https://www.thetimes.co.uk/article/the -future-of-electric-vehicles-cars-will-fly-8bhxzxgl2

Environmental data and Systems Engineering

Sputnik1 was launched by the USSR 4 Oct 1957 – used to understand the upper atmosphere.

1969 Neil Armstrong and Buzz Aldrin Landed on the Moon

1972 Eugene Cernan – Lunar Roving Vehicle

https://history.nasa.gov/sputnik/sputnik1 -mockup.jpg

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RIBA

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Aligning outcome with whole life cycle metrics

RIBA Sustainable Outcomes Metrics

1 Net Zero Operational Energy/Carbon - *kWh/m2/y, kgCO2e/m2/y*
CIBSE TM54, Passivhaus, Living Building Challenge

2 Net Zero Embodied Carbon - *$kgCO_2e/m^2$*
RICS Whole Life Carbon, BREEAM, Living Building Challenge

3 Sustainable Water Cycle - *litres/person/day*
Living Building Challenge, BREEAM Water

—

4 Sustainable Connectivity and Local Transport- *$kgCO_2e/km/p/y$*
BREEAM Transport

5 Sustainable Land-use and Ecology - *various metrics*
Living Building Challenge, BREEAM Bio-diversity

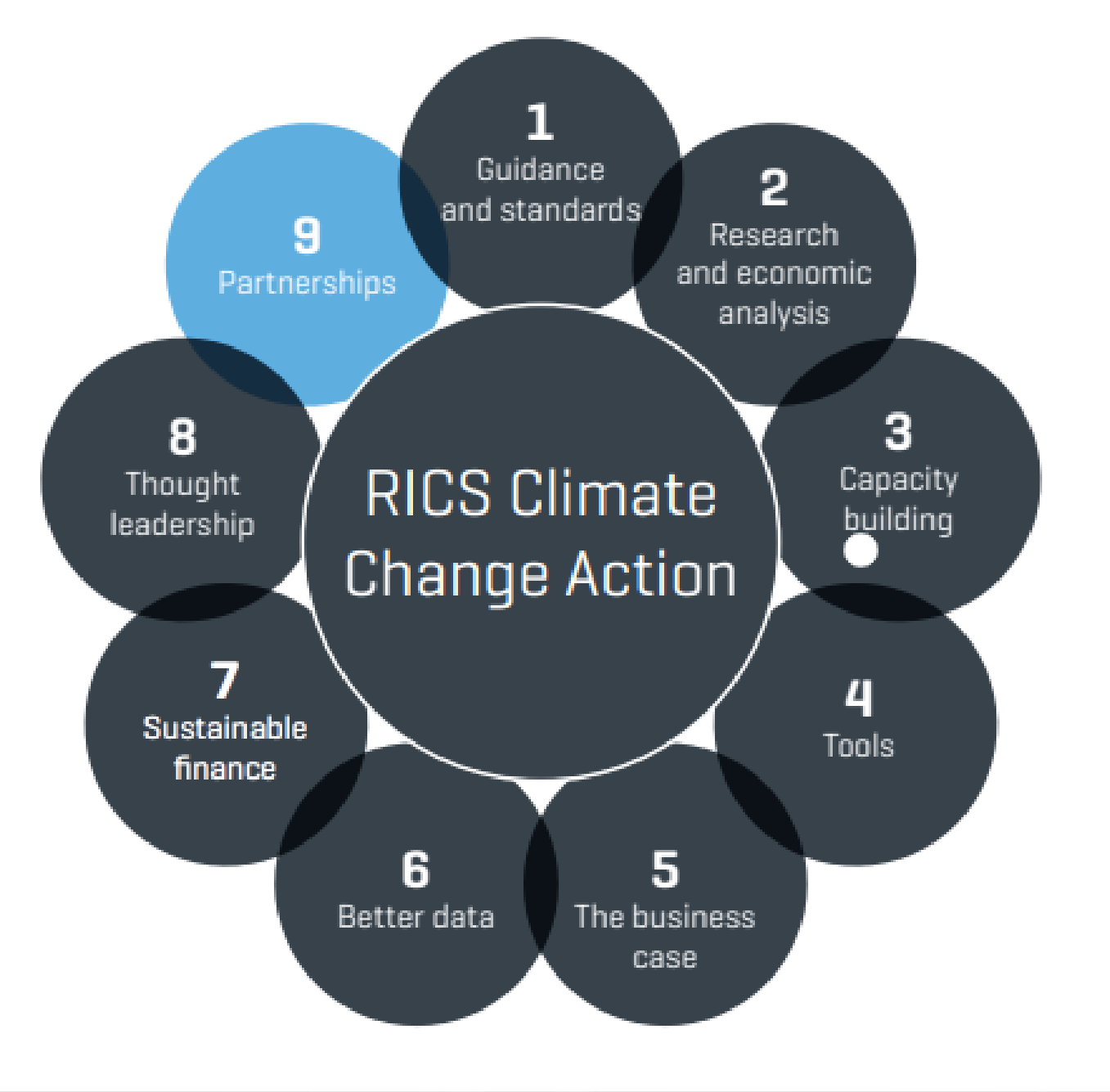
6 Good Health & Wellbeing - *various metrics*
BREEAM, Well building Standard- light, air, water, noise, overheating

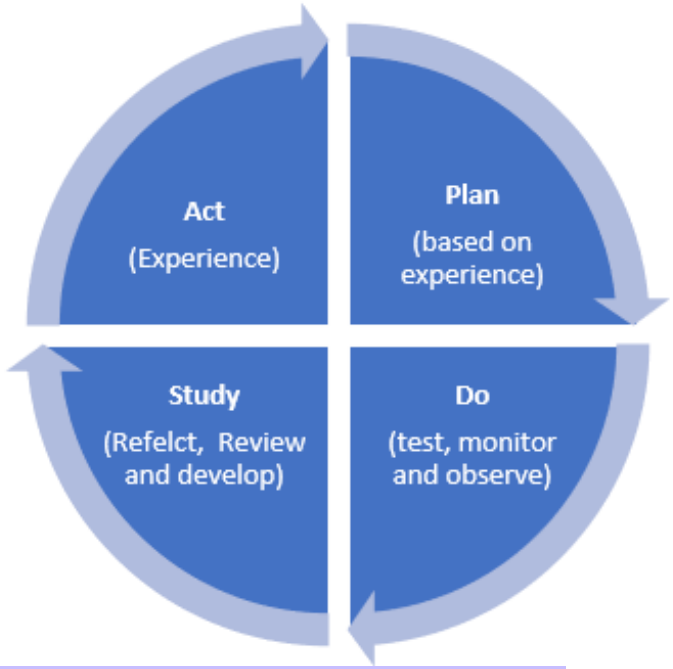
7 Sustainable Communities and Social Value - *various metrics*
Living building Standard, BREEAM, Well building Standard, RIBA Social Value Toolkit

8 Sustainable Life Cycle Cost - *$£/m^2$*
ICMS Whole Life Cost

Climate Action

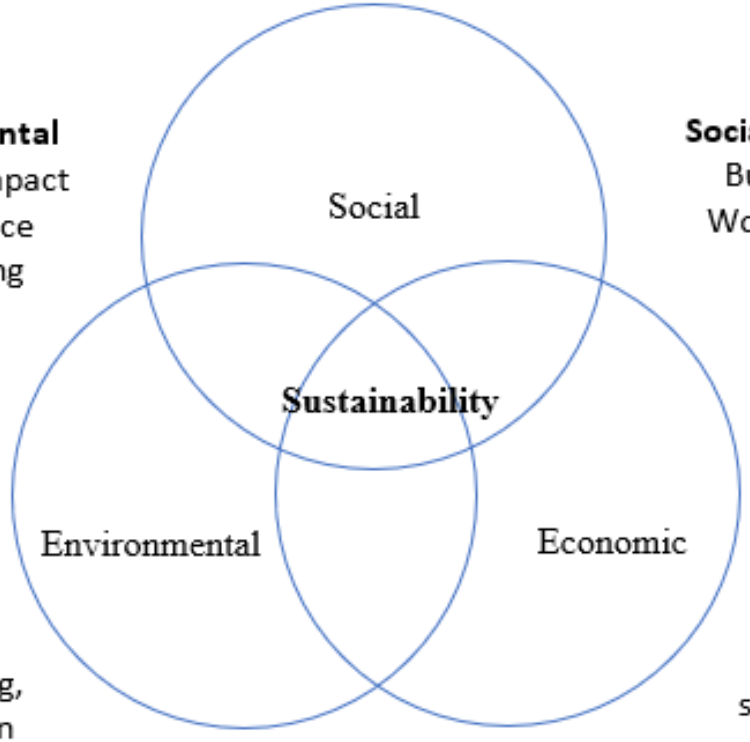
RICS





Stewardship
Culture
Social benefits, social value, addressing inequity, community and need, wellbeing, fairness, Including and respect

Social - Environmental
Local and Global impact
Stewardship & justice
Responsible sourcing



Social - Economic
Business ethics
Worker benefits
Fair trade

Environmental
Green building, rewilding, renewable energy, energy, materials, resource, recycling, ecology, waste and pollution

Economic
Circular and Green economy
Legislative drivers
Green grants, ethics, energy security, financial sustainability

Environmental Economics
Green and renewable technology
Incentives, green finance, subsidies, protection and restoration of natural resource

Leadership that Enables

Insight, data and capability

13 CLIMATE ACTION

Efficiency
Zero Carbon,
Health & Wellbeing

Energy Security

Resource Efficiency

Common standards

Technical performance

Social Value

8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
7 AFFORDABLE AND CLEAN ENERGY
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
14 LIFE BELOW WATER
15 LIFE ON LAND
3 GOOD HEALTH AND WELL-BEING
6 CLEAN WATER AND SANITATION
10 REDUCED INEQUALITIES
5 GENDER EQUALITY
4 QUALITY EDUCATION
1 NO POVERTY
17 PARTNERSHIPS FOR THE GOALS
2 ZERO HUNGER

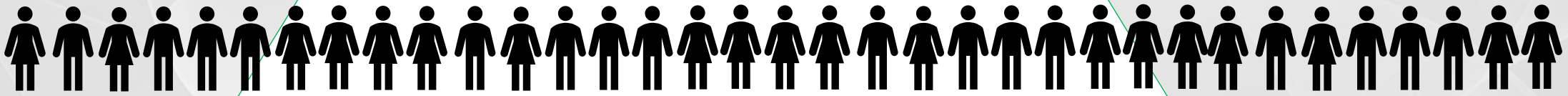
Core Goals

Immediate connections

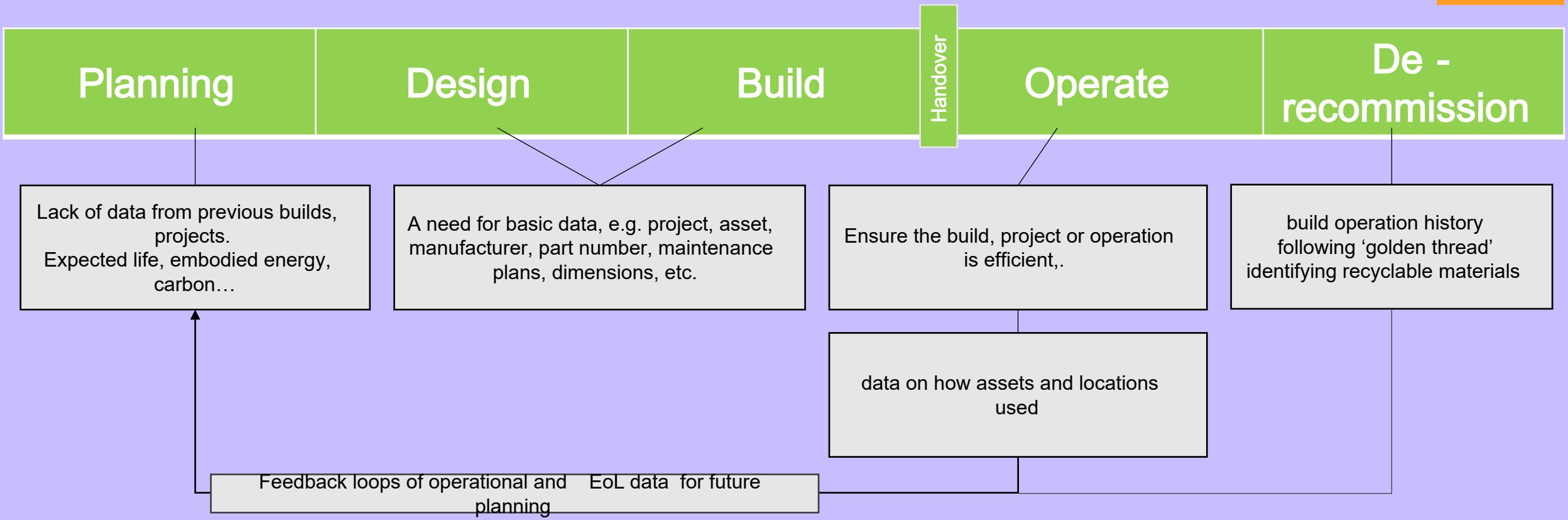
Critical linkages

Wider foundations

Transparency and Ethics



Understanding the problem: Whole System Data



- Planning & managing for optimum delivery - data requirements : feedback for FM, occupants, patients, practitioners, clinicians, estates
- Build for operation - optimum useability – user input
- Circular economy relies on asset data – maintenance
- Operate / Decommission / Replenish

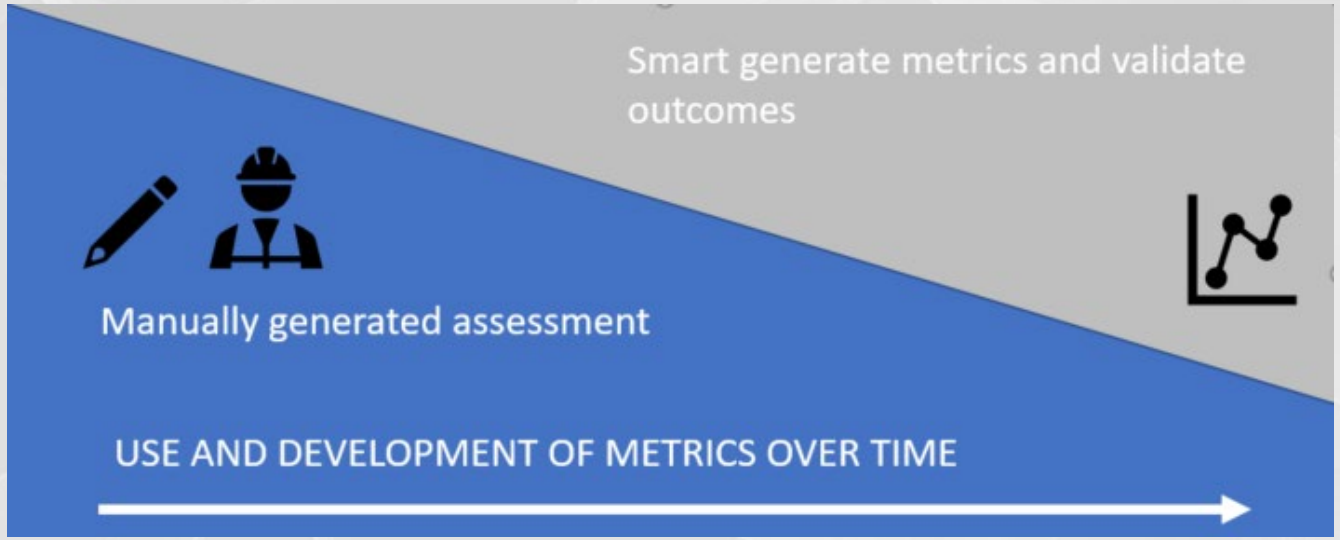
Radical Transition: System Engineering to improve Patient Outcomes

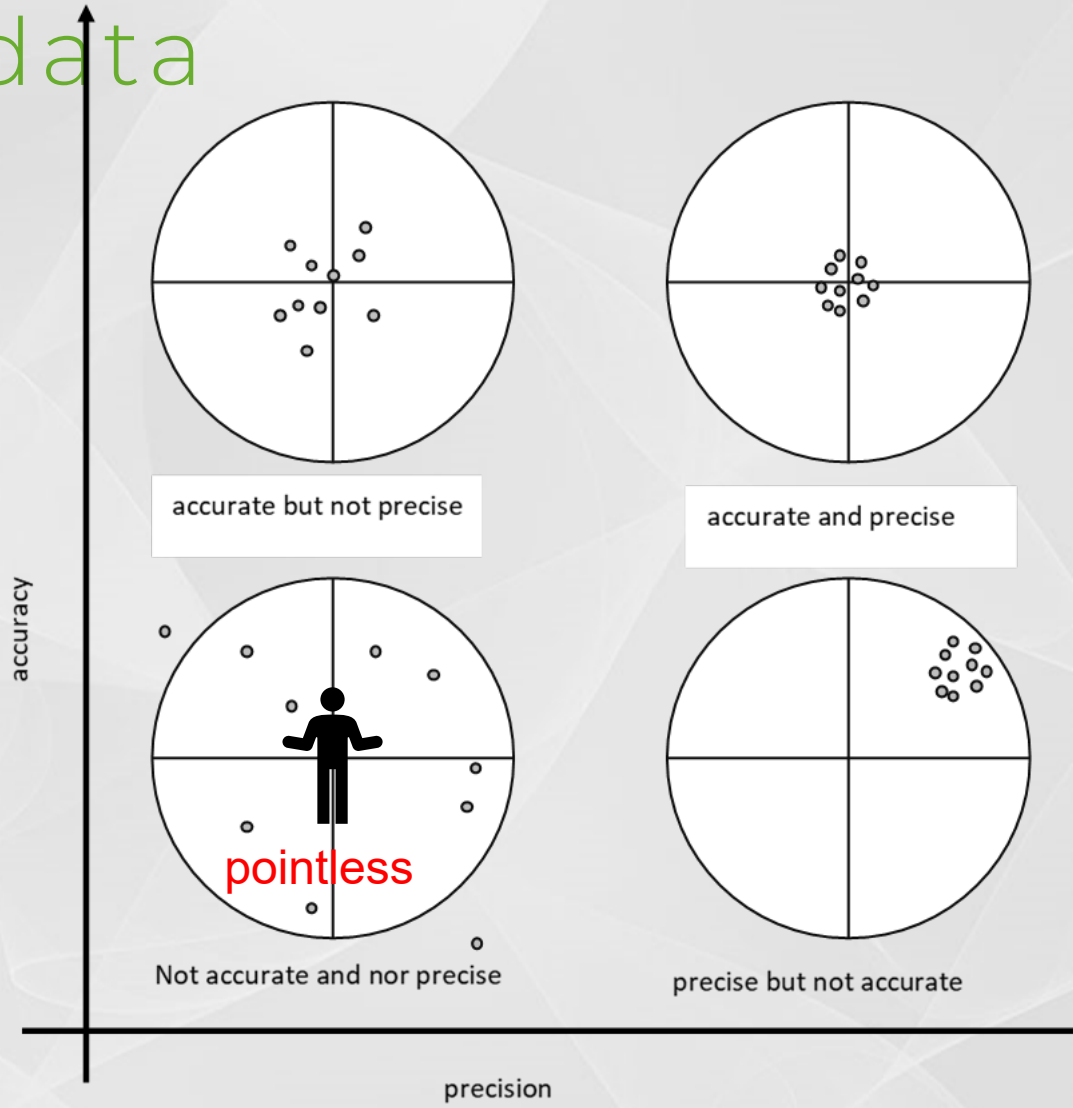
- Tailored patient environment
- Maximise use and efficiency of assets, space, beds, medical equipment and staff
- Environment (CO2, temp., humidity, noise, etc.) impacts on sleeping patterns and overall patient care and recovery?
- Energy usage trends by season?
- Room occupancy versus energy consumption?
- External, socioeconomic factors versus ailments, treatment and length of stay?
- Optimise medical and non-medical resource performance.
- Scheduling and capacity planning: appointments, car parking, equipment, etc.

Managing the transition to healthier, more efficient environments that ensure better patient outcomes

Reliability

Sustainable insight and data





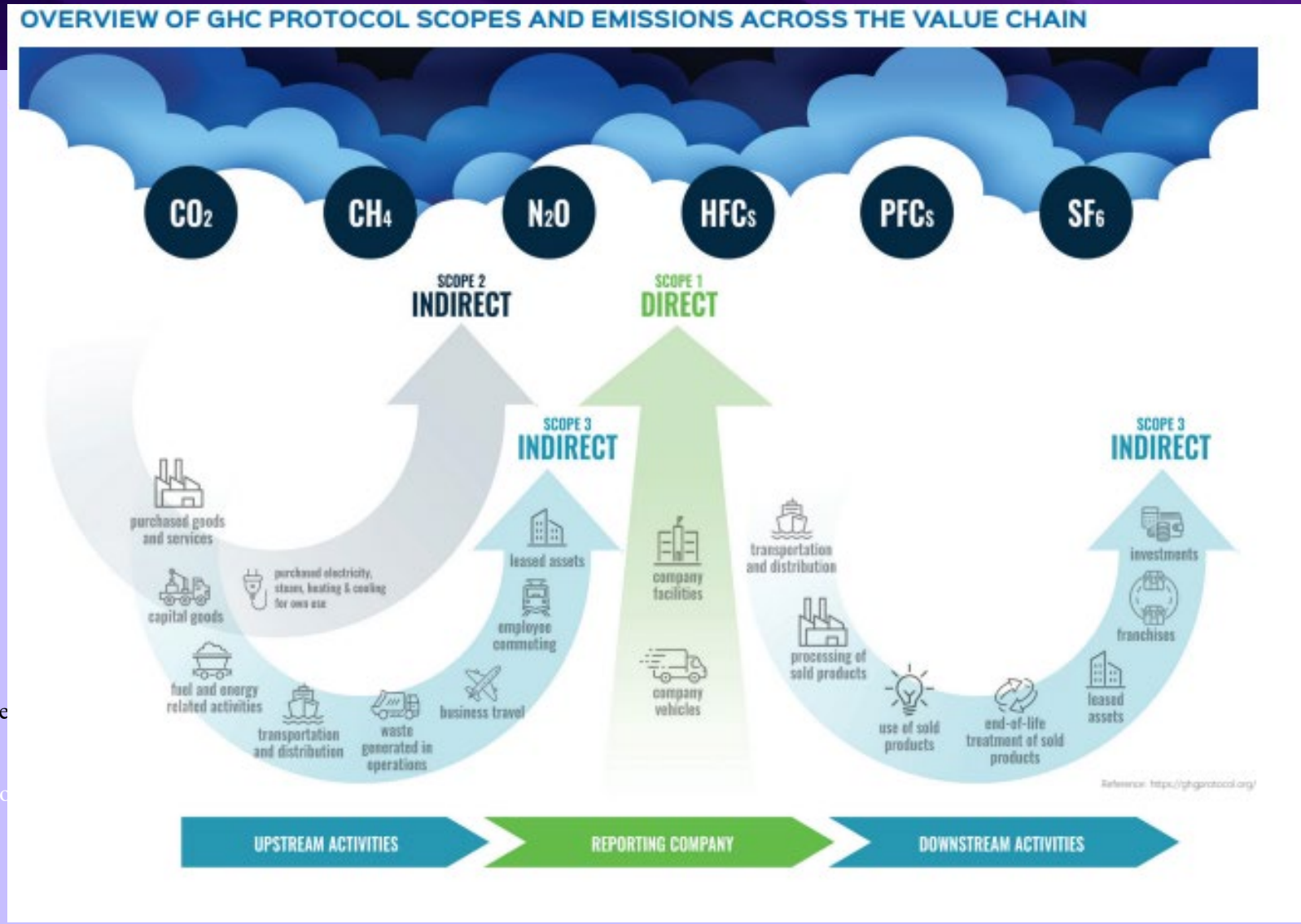
energy and carbon: Right across the system

Scope 1 – **direct emissions** organization owned and directly controlled

Scope 2 – **indirect emissions** – purchased energy heating and cooling, fleet vehicles controlled

Scope 3 – products purchased, suppliers and others in the value chain

Scope 4 – avoided emissions – anything outside the above – could included influence or ability of consumers, stakeholders to make informed choices e.g. workforce, customers, other beneficiaries



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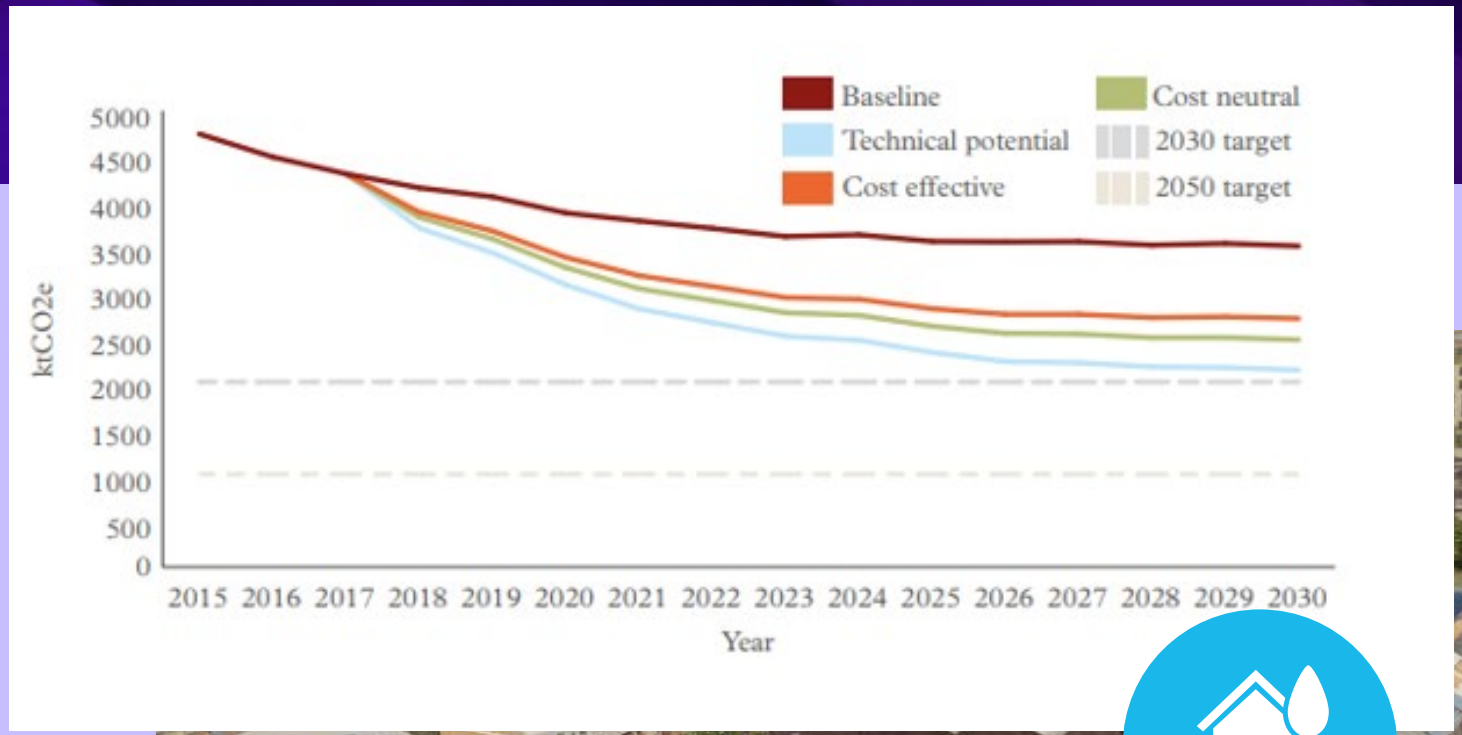
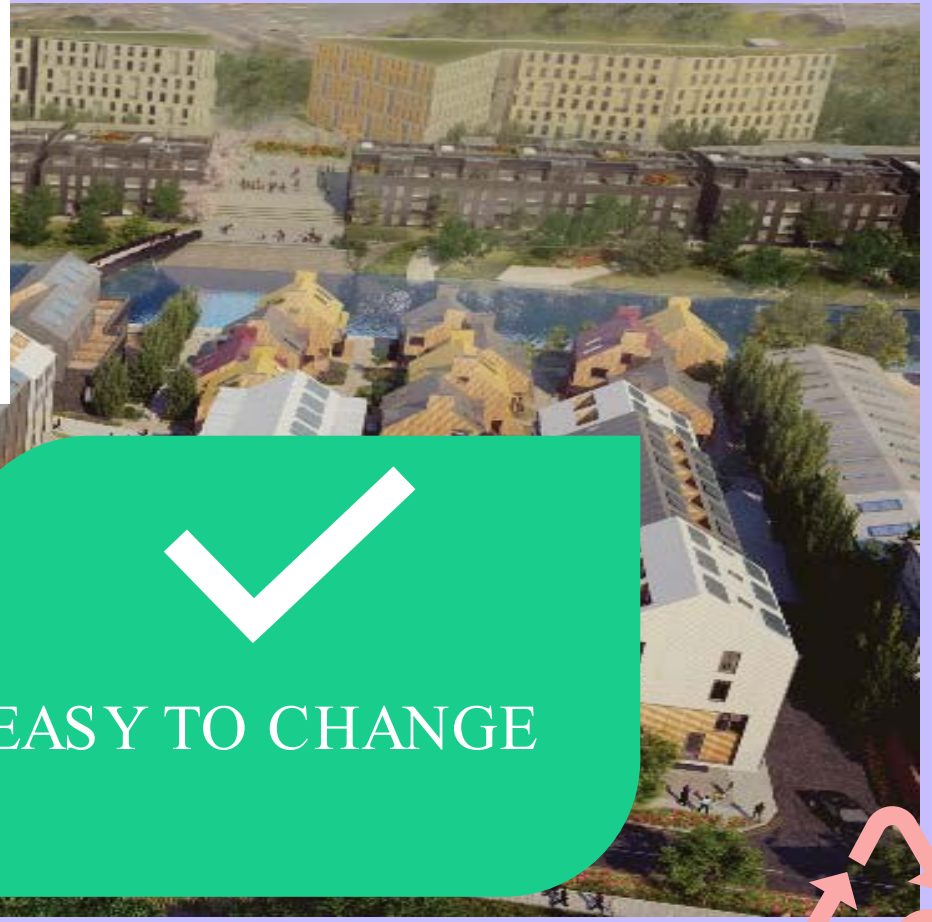
11 SUSTAINABLE CITIES AND COMMUNITIES



Developments that Evolve

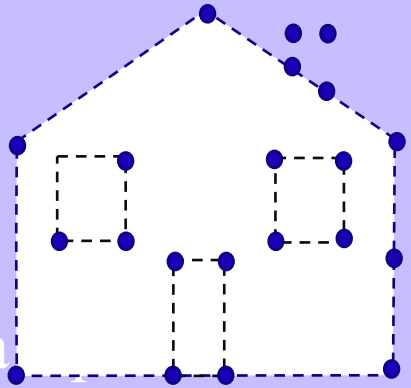


BUILDINGS AND INFRASTRUCTURE

Built environment
40% UK
Emissions

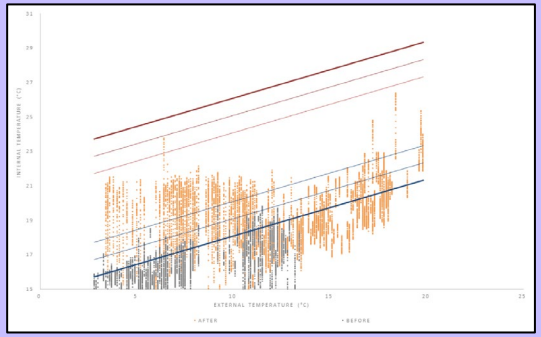
EASY TO CHANGE

Indifference



Primary motivation is to do things as quickly and cheaply a
rather than to deliver quality homes which are safe for people to live in

(Hackitt, 2018)



Sustainability Guide

Sustainability Guide - Michael Yam

Sustainability Policy Forum – Eddie Tuttle

Sustainability Advisory Group

- Working with Renewable Energy Providers (Energy Hubs)
- Building efficient and effective infrastructure
- Building Sustainability Leadership

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Haigh Hall Solar Farm

A zero carbon community project

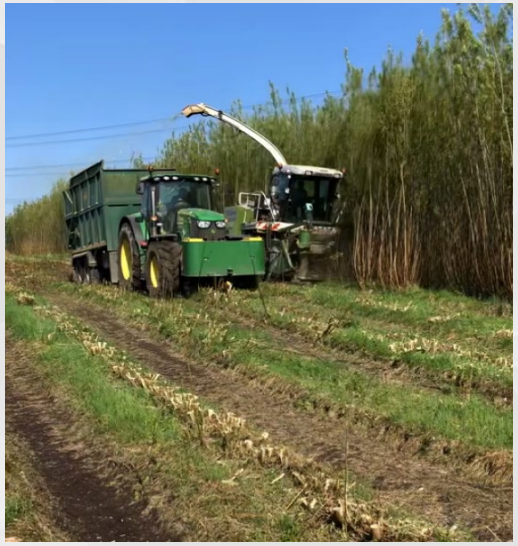
Developing an off grid integrated solution

Involving the community

Robin Dummett - Local energy assets and hubs

James Taylor - Coca Cola Europacific Partners - utilising

Green energy, Willow – biofuel, restoring Ecology



Energy House 1 & 2

Leeds Beckett University
University of Salford
Saint-Gobain

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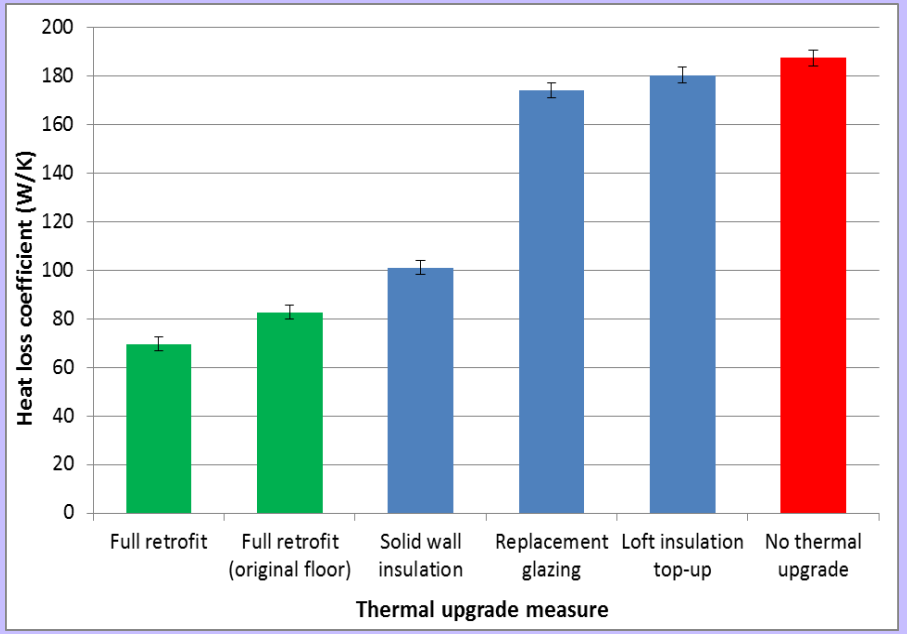

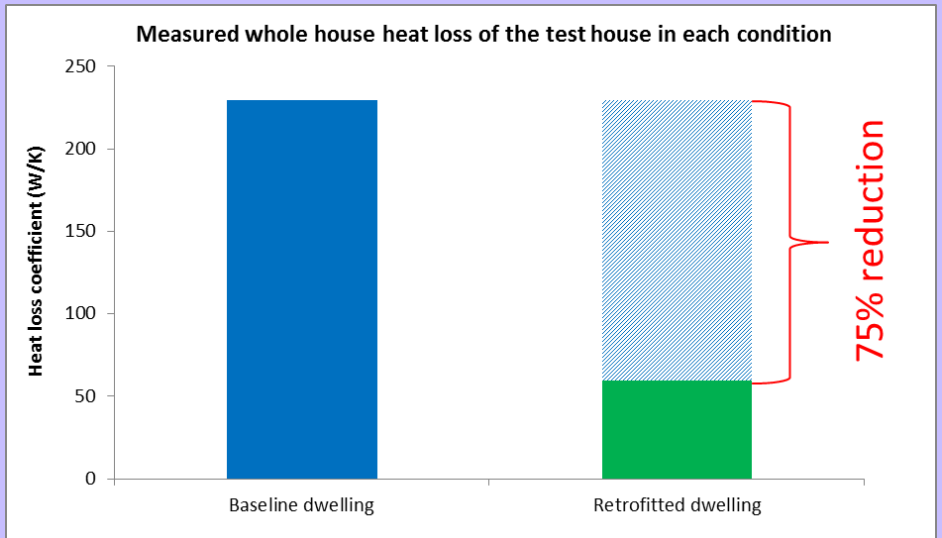

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I don’t pretend we have all the answers. But the questions are certainly worth thinking about.

Arthur C. Clarke

Thank you for listening

Professor Christopher Gorse and Jocelyne Fleming

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Levelling the playing field, not Scotland's built environment: *a case for retrofit over demolition?*

11/08/2022

The tax system could be used as a powerful financial lever for improving the quality, sustainability and energy efficiency of our built environment.

The current state of affairs

- Under the current UK tax structure, 20% VAT is applied on most repair and maintenance.
- Most demolition and new build projects are not charged VAT at all.
- Therefore, the UK's current VAT structure financially incentivises demolition and rebuild over renovation and retrofit projects.

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The energy used to build, operate, and demolish buildings makes up 9% of global greenhouse gas emissions and 40% of the world's energy use.

Yeatts et al., 2017

At present, more than half of the UK's Construction & Development Waste goes directly to landfills.
(Ghaffar et al, 2020)

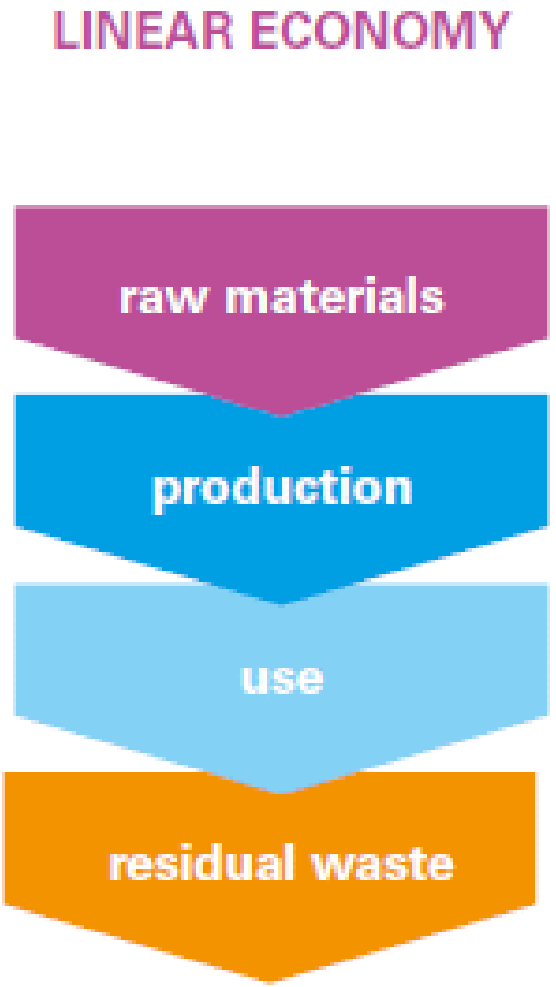

Image via: Özdenkçi and Sarwar, 2017

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First reduce – then reuse and recycle

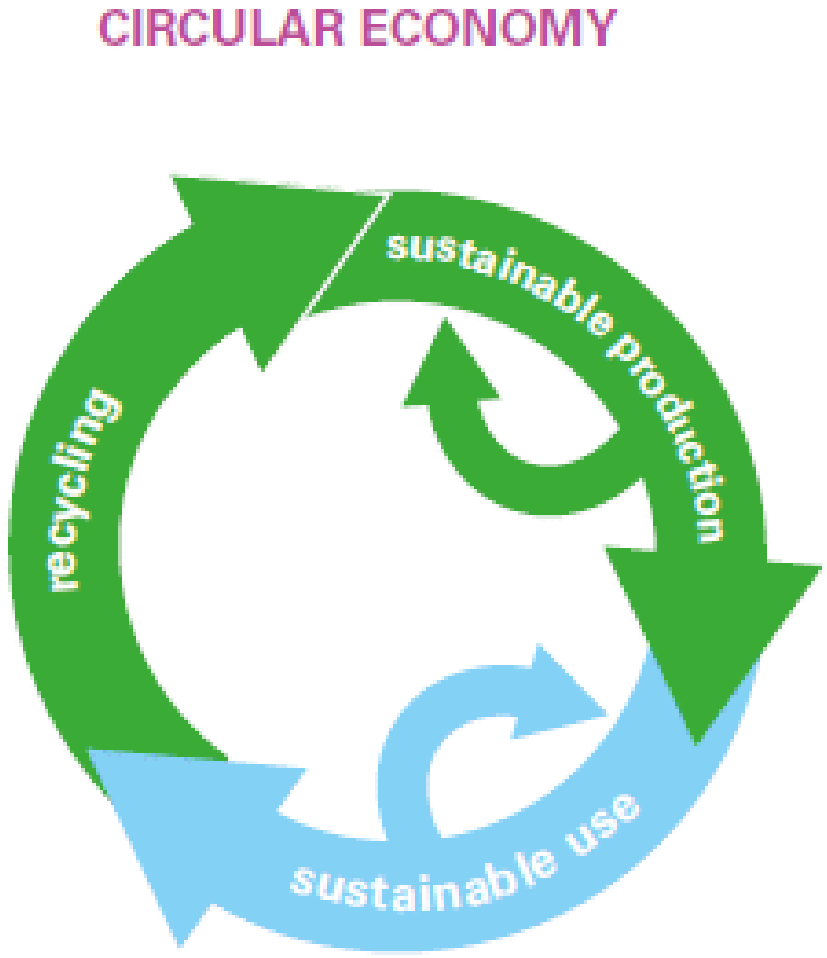

Image via: Özdenkçi and Sarwar, 2017

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In support of retrofit

- The National Engineering Policy Centre (NEPC) suggests that in many cases, options for retrofit may perform better in carbon terms than in new build options
- Research suggests that if VAT on the sector was reduced from 20% to 5%, it could generate £80-400 million in Scottish GVA and support between 1,500-7,500 full-time equivalent jobs in Scotland. (Nelson and McKinney, 2021)

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How could Scotland use its devolved powers to mitigate the perverse impacts of the current VAT structure on our built environment?

Levelling the playing field: a policy proposal

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Devolving demolition: a policy proposal

- Regulatory measures have been proven effective in undergirding similar types of sectoral culture shifts in the UK.

- International research concluded that levies were more effective at CDW mitigation than financial incentives, achieving the targeted 30% reduction in CDW two years sooner (Calvo et al., 2017)

- revenues from demolition levies could support green initiatives

Assessing the (literal) damage: to repair or rebuild?

'one size fits all' rarely applies to the construction industry

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Our ambition in developing this report is to stimulate discussion and think creatively about how Scotland's devolved powers can be best leveraged to support the construction industry's important role in realising our collective sustainability goals.

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Addressing the sustainability of the built environment will require coordinated, long-term action.

References

- Calvo, N., Varela-Candamio, L. and Novo-Corti, I., 2014. A dynamic model for construction and demolition (C&D) waste management in Spain: Driving policies based on economic incentives and tax penalties, *Sustainability* , *6*(1). 2017.
- Ghaffar, S.H., Burman, M. and Braimah, N., 2020. Pathways to circular construction: An integrated management of construction and demolition waste for resource recovery, *Journal of cleaner production* , *244*, 2020.
- National Engineering Policy Centre. Decarbonising construction: building a new net zero industry, no date.
- Nelson, G., and McKinney, J., Forum backs Minister's call for VAT cut to boost economy, 23 March 2021.
- Özdenkçi, K. and Sarwar, G., The Role of Biomass Conversion Processes on Circular Economy. CONSTRUCTING A GREEN CIRCULAR SOCIETY, 2017.
- Yeatts, D.E., Auden, D., Cooksey, C. and Chen, C.F., A systematic review of strategies for overcoming the barriers to energy-efficient technologies in buildings, *Energy research & social science* *32*. 2017.

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