MIDLANDS GREEN INNOVATION NETWORK

Together for net-zero

WELCOME

THE IMPACT OF SUSTAINABLE DESIGN

Thursday 20th April 2023
11:00 to 13:30
Vijay Patel Building;
De Montfort University

DESIGN UNIT

DE MONTFORT UNIVERSITY LEICESTER

Delivery partners

MIDLANDS ENGINE

ENERGY RESEARCH ACCELERATOR

fsb Experts in Business

MIDLANDS GREEN INNOVATION NETWORK

Together for net-zero

EVENT SCHEDULE

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11:00	**Guests arrive with morning reception**	**Presenters**
11:25	Event opens with an overview of the Midlands Green Innovation Network and ERA	**ERA Team**
11:30	Welcome to the Impact of Sustainable Design event by Professor Christine White, Director of the Design Unit	**Professor Christine White, Director of the Design Unit, Professor of Art and Design. Deputy Dean of Art, Design and Humanities**
11:35	A series of short presentations by DMU discussing the impact of sustainable design from a variety of disciplines and its relation to industry: Karl Letten, Mark Charlton, Carolyn Hardaker, Angela Davies, Claire Lerpiniere, Kyungeun Sung, and Christine White	**Karl Letten;** Sustainability Manager **Mark Charlton;** Associate Director of Sustainable Development Goal Impact/Net Zero **Professor Carolyn Hardaker:** Head of School of Fashion and Textiles **Angela Davies;** Programme Leader MSc Textile Design, Technology and Innovation **Dr Claire Lerpiniere**; Associate Professor in Sustainable Textiles **Dr Kyungeun Sung;** Senior Lecturer in Product Design **Professor Christine White;** Director of the Design Unit
12:35	Audience Q&A with all presenters	**All presenters**
12:50	Event closing with sum-up of findings and debates	**ERA Team**
13:00	Lunch hospitality along with tours of the building	

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Sustainable Design and Climate Reporting

Karl Letten, Sustainability Manager, Estates & Facilities, DMU

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DMU Sustainability Team

- Sustainability team
- Based in Estates & Facilities
- Mix of staff, placement student, Frontrunners
- Work to embed sustainability across institution
- Work closely with:-
  - SDG Impact Team
  - Education for Sustainable Development Lead

Keep in touch with DMU Sustainability Team

facebook.com/sustainableDMU

twitter.com/sustainableDMU

instagram.com/sustainableDMU

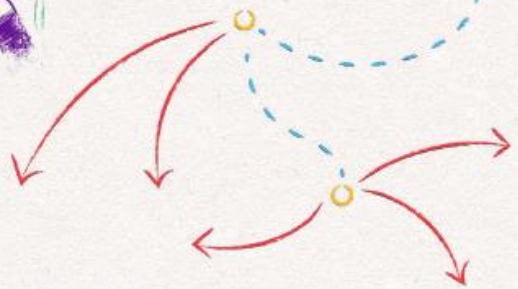
sustainabledmu

sustainability@dmu.ac.uk

THE EMPOWERING UNIVERSITY

OUR MISSION

Discovering gateways of opportunity that empower students, staff and our community to create a fairer society.



OUR VISION

Creating a community of participation, fairness and collective responsibility; transforming individual lives and championing a fair and sustainable society.

OUR VALUES

We support each other, we value difference and are honest and compassionate towards others. Together we will be courageous in exploring possibilities, breaking down barriers and re-imagining new horizons.

OUR STRATEGY

LEARNING FOR LIFE

- **Flexible learning** for students of any age, fostering a love of learning and knowledge, delivered through our innovative Education 2030 programme.
- **Learning beyond the classroom** provided through practical experiences in local, national and global arenas.
- **Creative approaches to learning delivery** that ground students in digital literacy, and are focused on employability, building entrepreneurial and life skills.

KNOWLEDGE CREATION

- **Fostering interdisciplinary research** that has impact: building on individual skills and knowledge for collective impact.
- **Integrated approach to knowledge exchange:** sharing and learning with external organisations, industry and the community.
- **Nurturing the next generation** of diverse researchers through developmental programmes.

EMPOWERING PEOPLE

- **Delivering an engaged experience** for all students; building their confidence and fostering belonging and fulfilment so students can learn well and live well.
- **Championing diversity** of our students and staff, a nurturing community which is inclusive and dynamic, drawing on our diversity to challenge the status quo and to drive change.
- **Campus collectives** around themes which bring together research, teaching, staff interest and external engagements.

PARTNERSHIPS WITH PURPOSE

- **Leicester local:** creating strategic partnerships to enrich the business and cultural community and support social and economic needs.
- **Creative by design:** develop national and global partnerships that create resilient, self-motivated and inquisitive graduates, transform relationships and impact local, national and global communities.
- **Valuing social responsibility** through our voluntary support by staff and students which helps local and regional initiatives.

CROSS CUTTING THEMES: EQUALITY FOR ALL | SUSTAINABILITY AND THE SUSTAINABLE DEVELOPMENT GOALS | DIGITAL TRANSFORMATION | FINANCIAL STRENGTH

SUCCESS

Closing the Leicester skills gap; ensuring graduates access employment opportunities which meet their ambitions.

International reputation for our research themes; our research makes a difference to lives.

A diverse, engaged community; no pay or awarding gaps; positive health and wellbeing amongst students and staff.

Addressing local and regional needs; realising national and global opportunities of mutual benefit.

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SUSTAINABLE DEVELOPMENT GOALS

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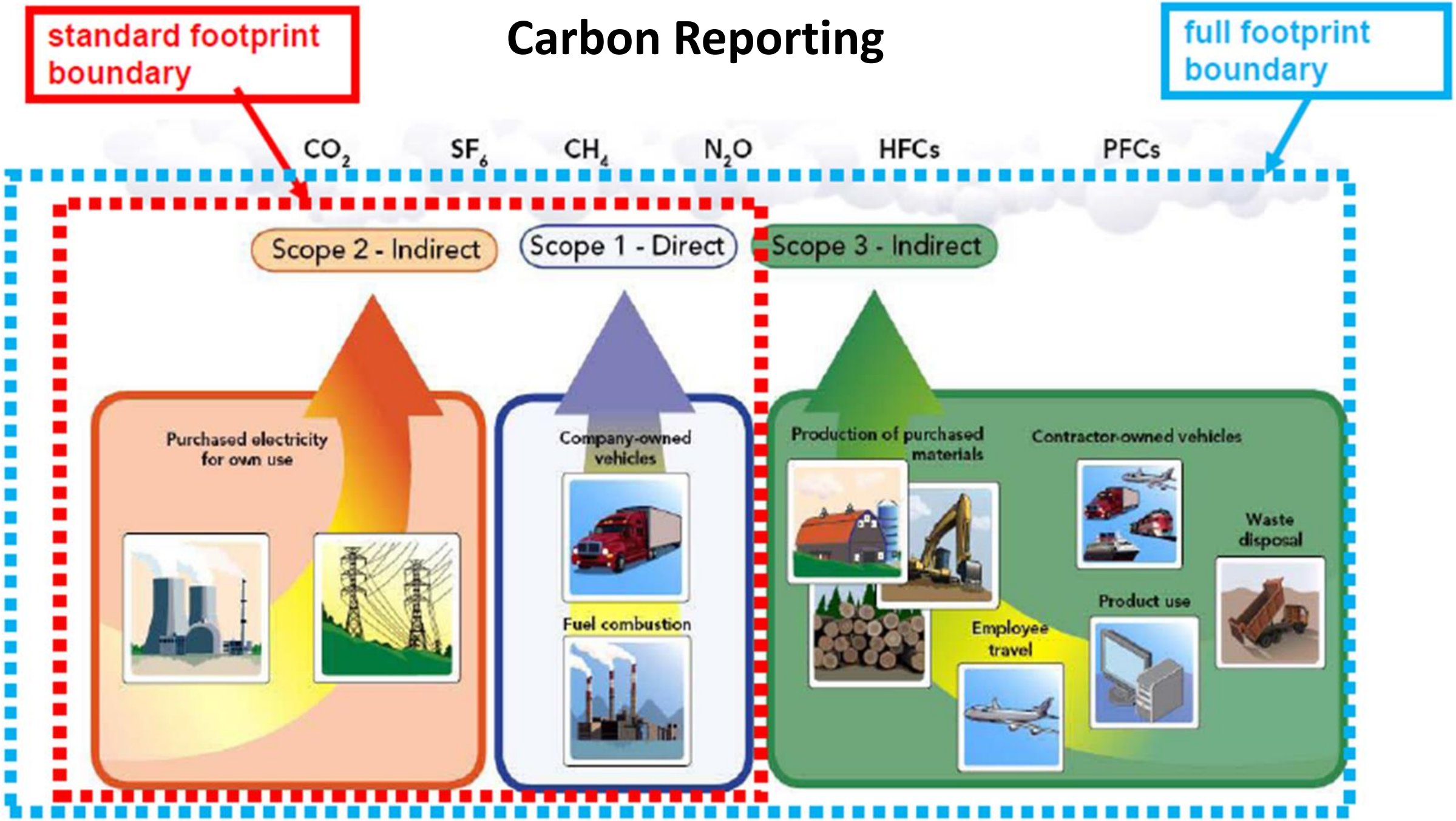
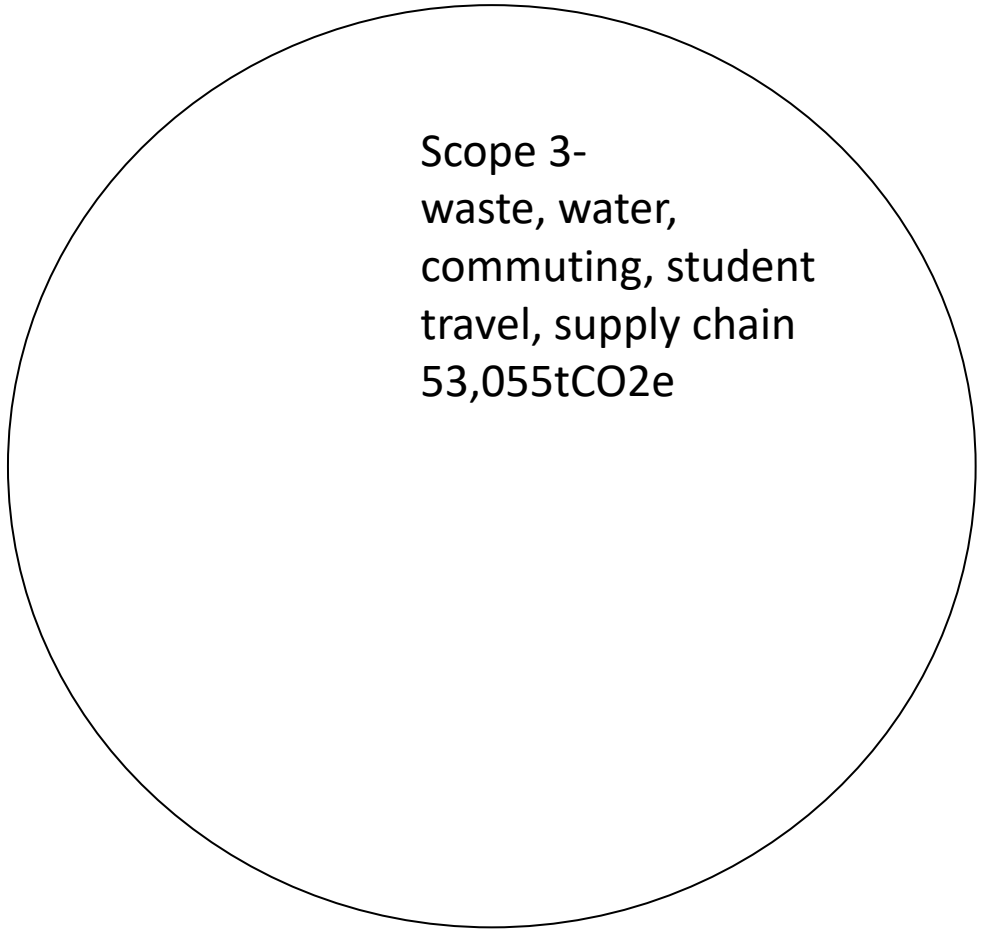
Carbon Reporting



Measuring and reporting carbon emissions



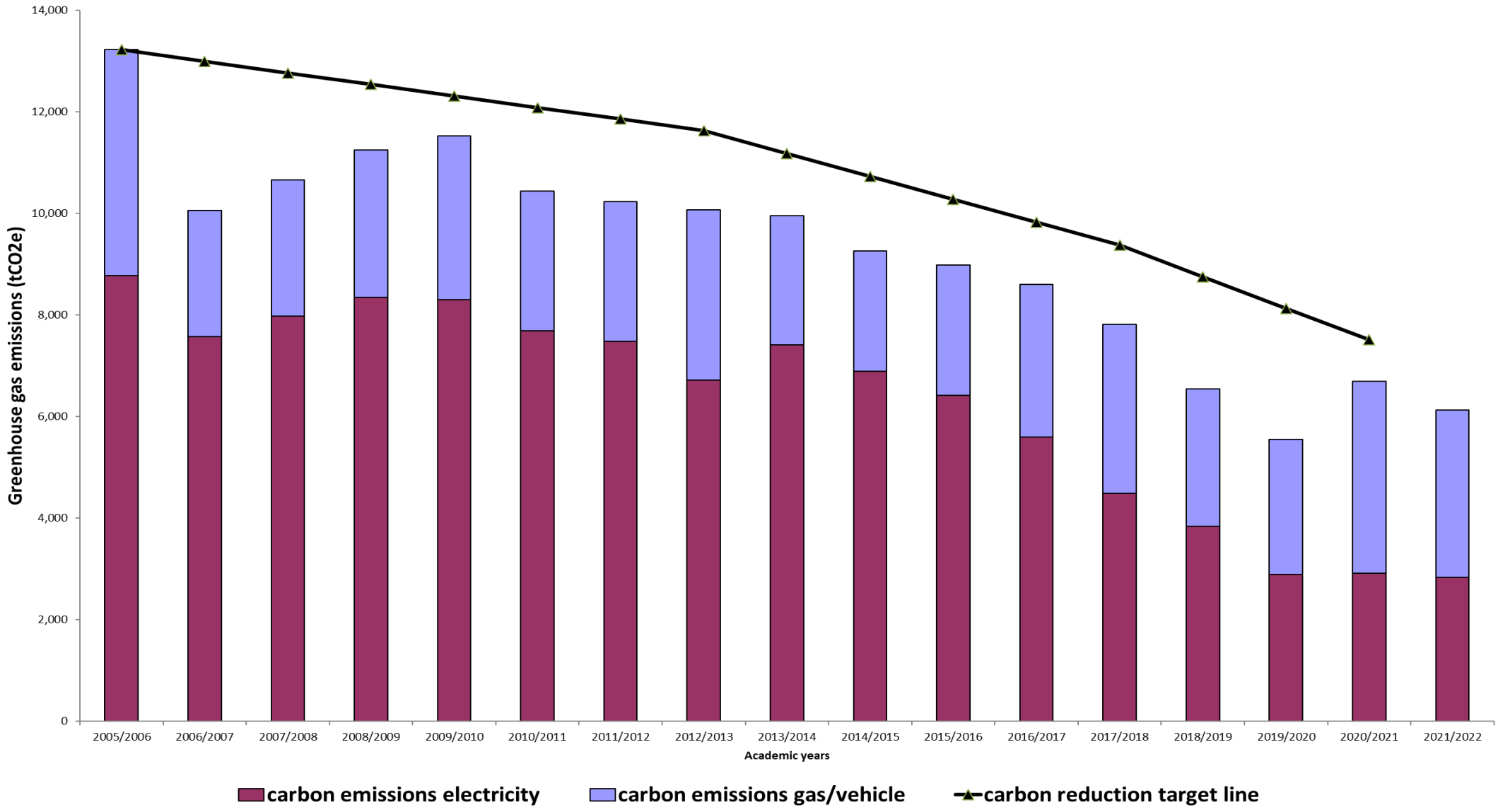
Scope 2 –
electricity
4,485tCO2e

Scope 1-
gas and vehicles
3,324tCO2e

Carbon commitments

- Commitment to achieve net zero emissions
  - By 2032 for energy and own vehicles
  - By 2045 for all other activities under DMU's influence
  - Progress so far: 54% reduction in 2021-22 and 49% reduction in 2020-21 (Interim Target: 43% by 2020-21)
- 90% reuse and recycling achieved (Target: 85% by 2017-18 and 94% by 2022-23)

Carbon Emissions at DMU from Gas, Electricity and DMU vehicles for 2005 - 2021 (tCO_2e)



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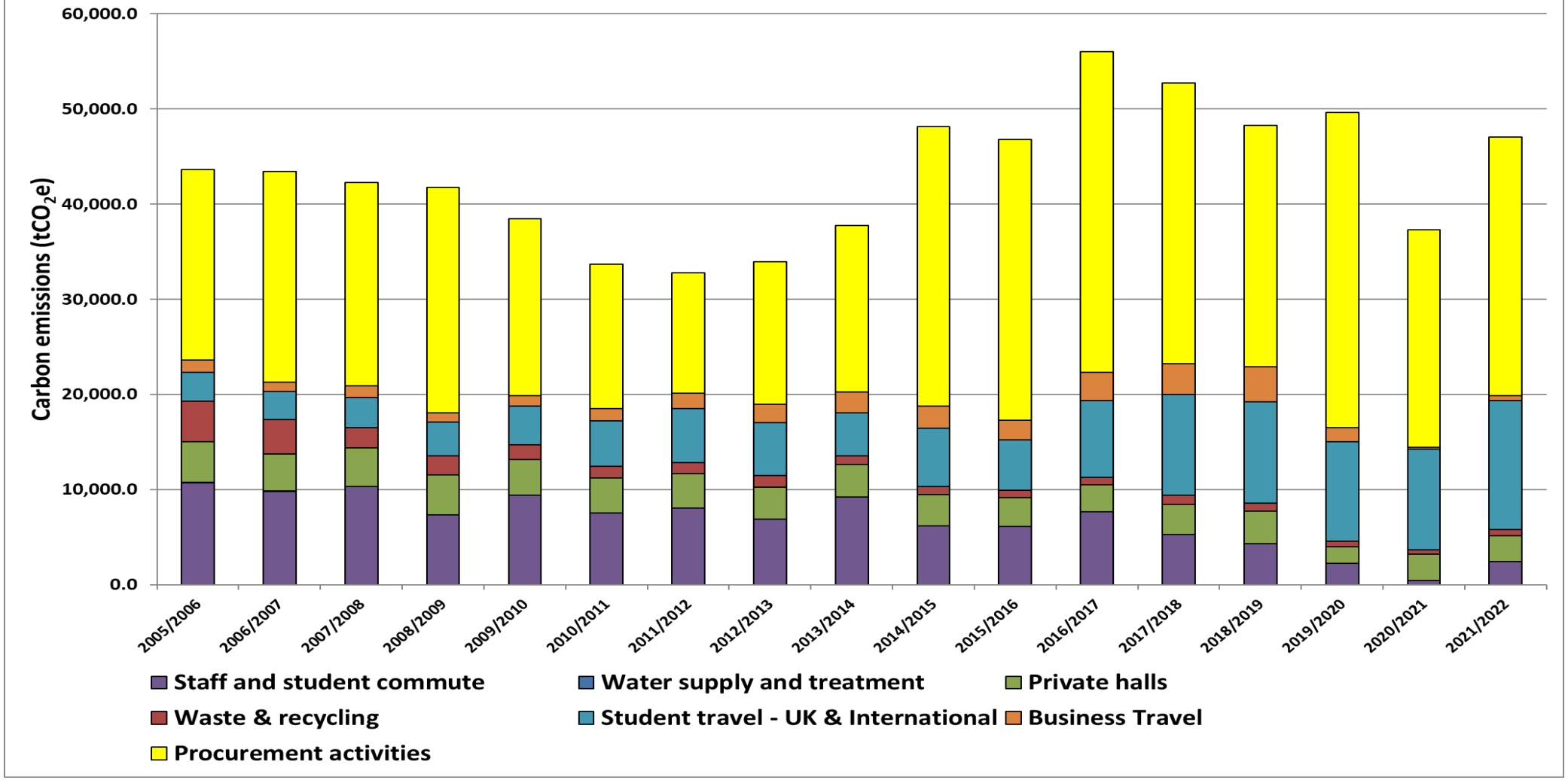
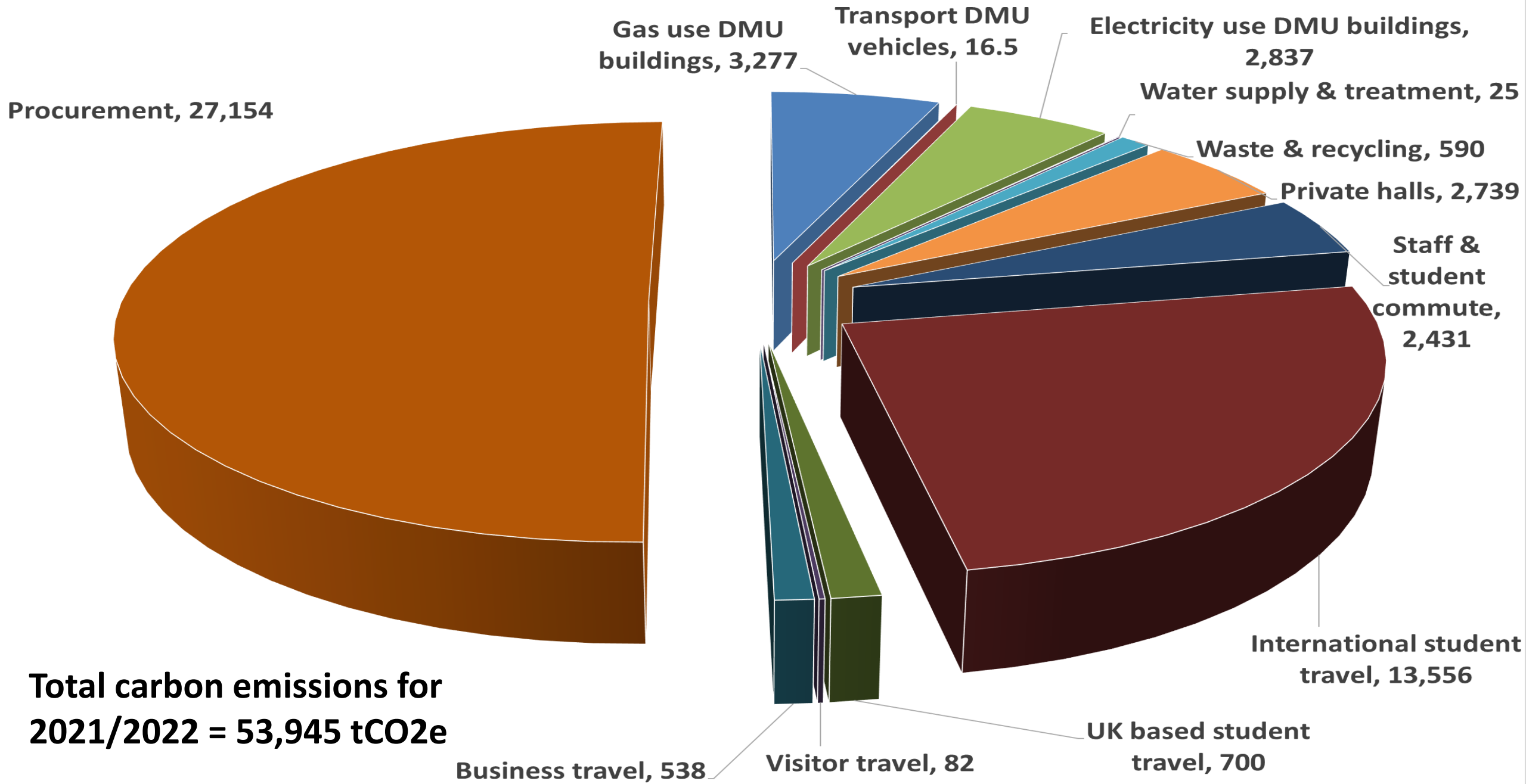
Carbon Emissions from Scope 3 Sources at De Montfort University 2005 - 2021 (tCO_2e)

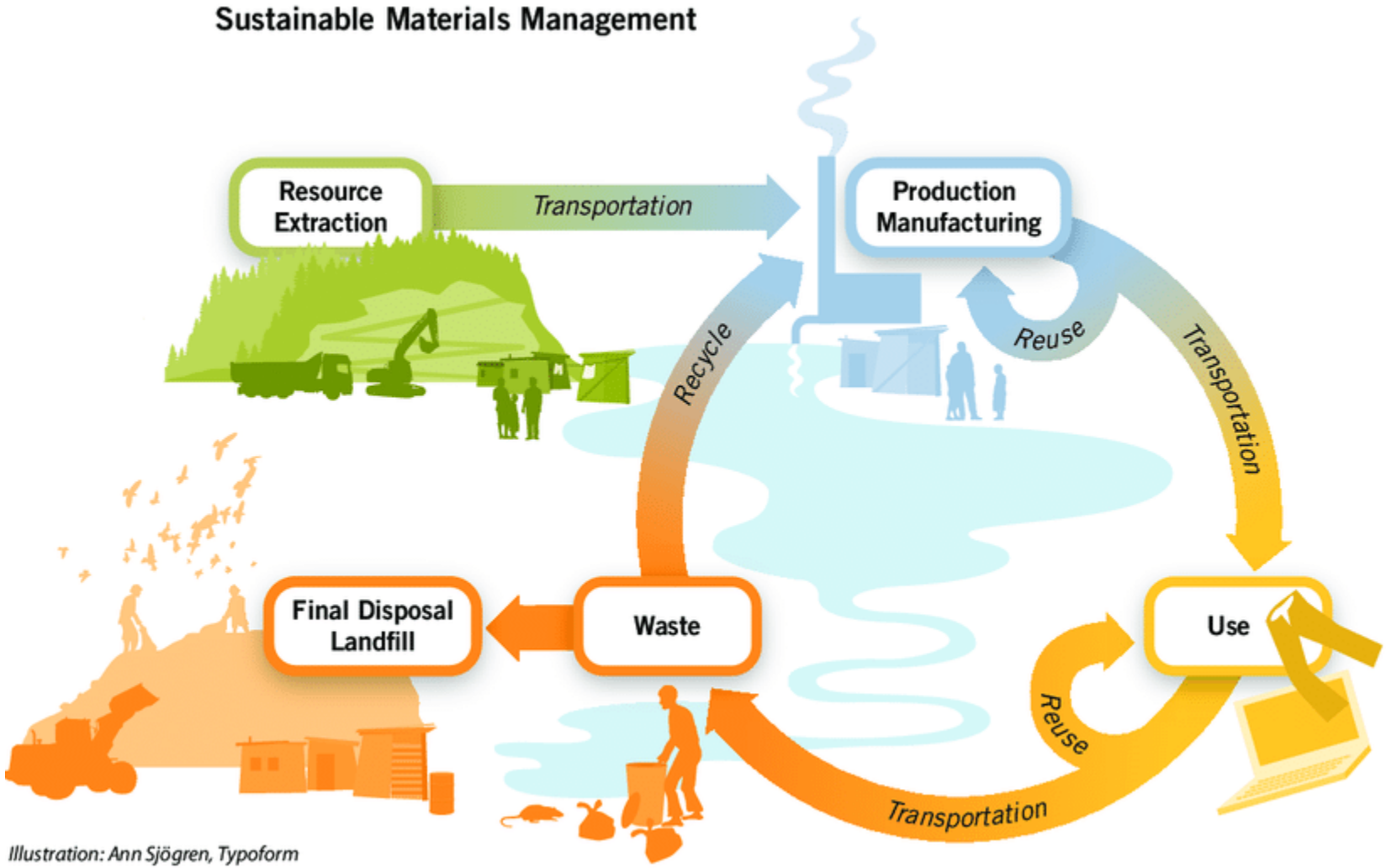


Carbon emissions from detailed sources 2021/22



Total carbon emissions for 2021/2022 = 53,945 tCO2e

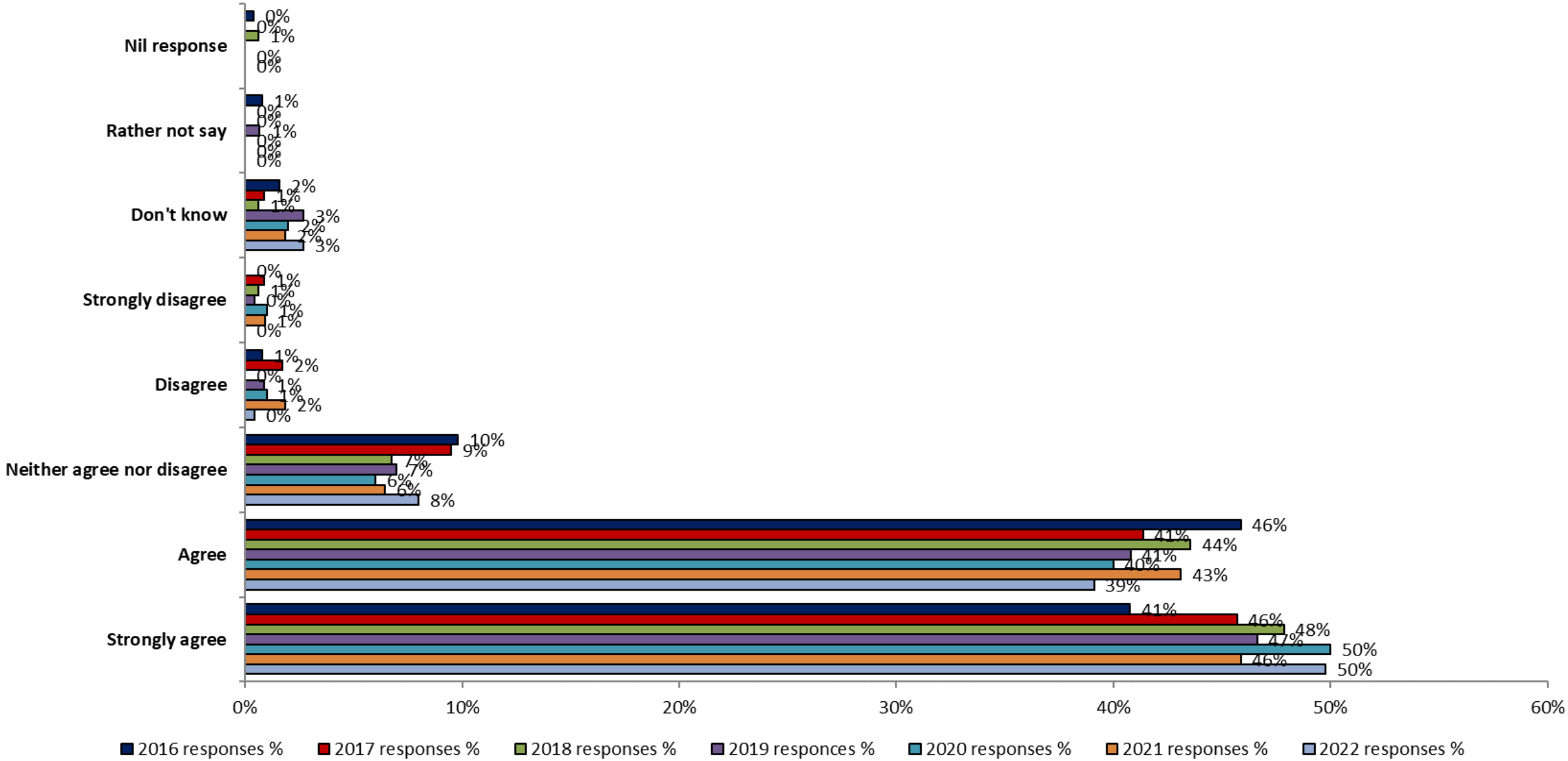
Addressing embedded emissions



Addressing embedded emissions

- Including carbon related criteria within procurement documentation and assessments
- Encouraging energy efficiency, recyclability, reusability in products
- Encouraging suppliers to adopt:-
    - Net zero targets
    - Net zero plans and strategies
    - Reporting commitments on scope 1, 2 and 3 emissions

Sustainable development is something which universities / college should actively incoporate and promote



Ethical Business

- UK ethical purchases valued at £121bn in 2020 (£17bn in 1999)
- Eco travel £12.2b in 2020 (£301m in 1999)
- Vegetarian and plant based increased by 34% now worth £1.5bn (£885m 2017, £452m 1999)
- Value of ethical boycotts £3.8b

Ethical Consumer 'Markets Report 2020'

UK Ethical Consumer Markets Report | Ethical Consumer

	1999	2010	2020
Ethical Food & Drink	1,037	5,421	14,089
Green Home	1,387	7,644	20,503
Eco-travel & Transport	301	1,641	12,207
Ethical Personal Products	362	909	1,898
Community	8,065	11,110	12,155
TOTAL ETHICAL SPEND	11,152	26,725	60,851
Boycotts	761	2,485	3,875
Ethical Money	5,171	21,947	57,181
GRAND TOTAL (£ millions)	**17,084**	**51,156**	**121,908**

Sustainability Reporting

www.dmu.ac.uk/sustainability

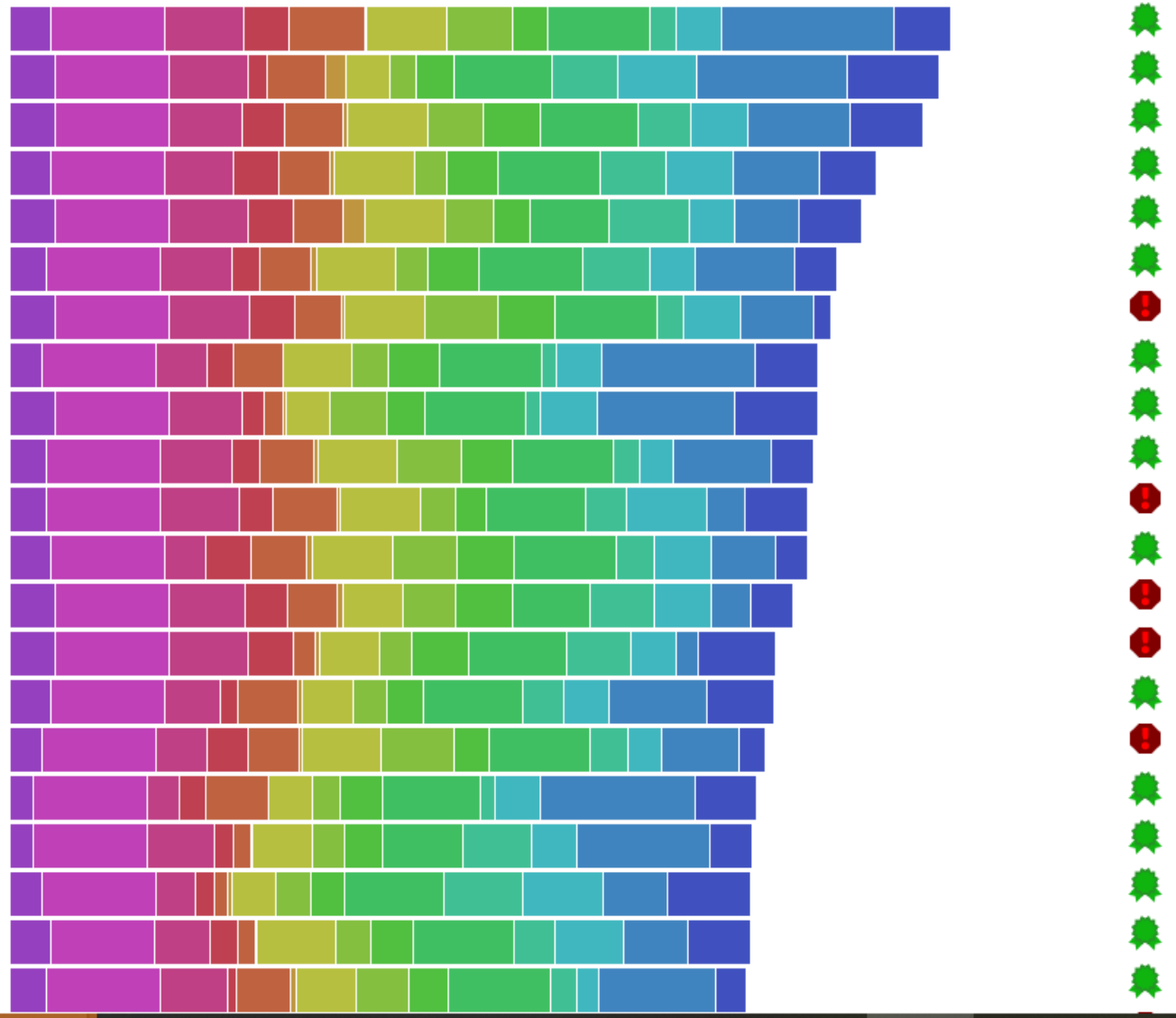
people & planet About Resources & Training Get Involved Donate

UNIVERSITY LEAGUE

- People & Planet – University League 2022
- https://peopleandplanet.org/university-league

1ST CLASS UNIVERSITIES

1	Cardiff Metropolitan University
2	University of Bedfordshire
3	Manchester Metropolitan University
4	University of Reading
5	University of The Arts London
6	University of Exeter
7	University College London
8	University of Greenwich
9	University of Salford
10	Bangor University
11	Nottingham Trent University
12	King's College London
13	Swansea University
14	University of Worcester
15	Northumbria University
16	University of Bristol
17	University of West London
18	Bath Spa University
19=	Bournemouth University
19=	De Montfort University
21	Newcastle University



19= De Montfort University

down 15 from last year

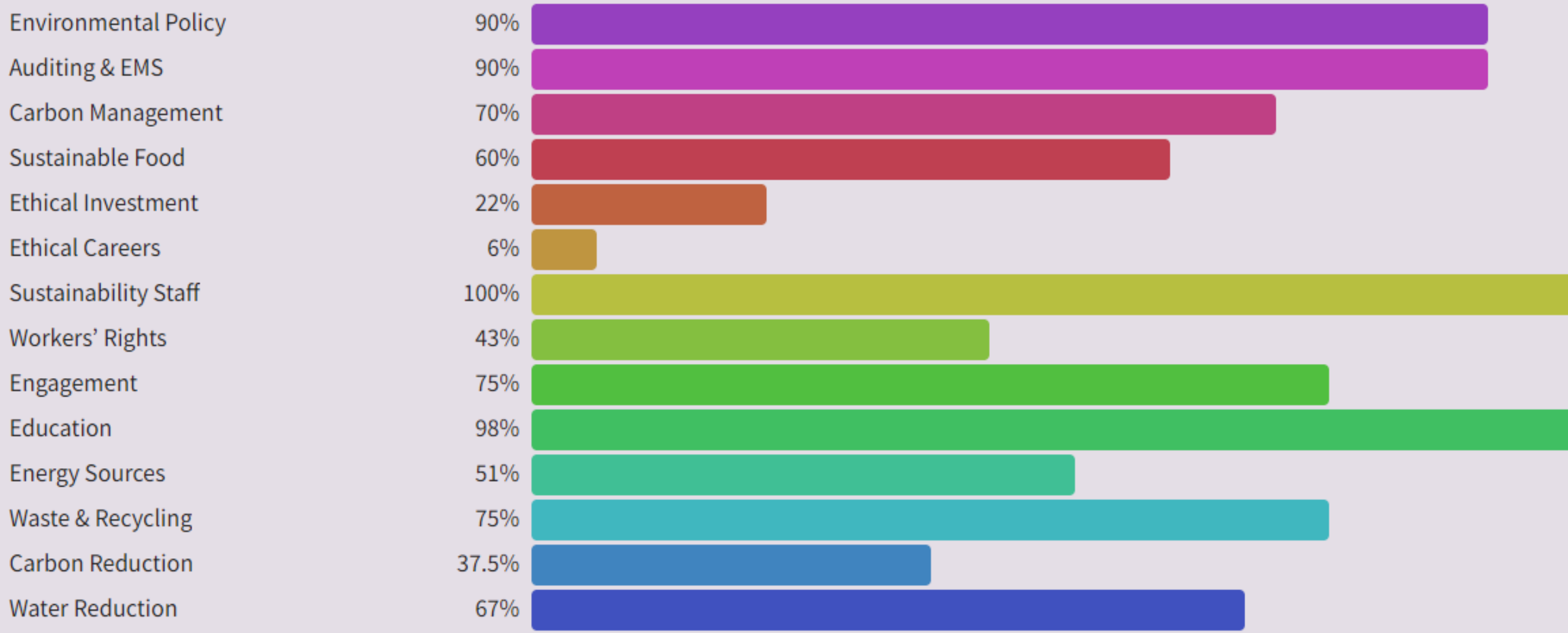
Met emissions reduction target

1st award class

people & planet UNIVERSITY LEAGUE 2022/2

Total Score: 64.7%

Full Details Close



Carbon Literacy Training

- Carbon training for staff and students
- Assessed short course on climate change
- DMU is a Carbon Literate Organisation
- Carbon Literacy Taster sessions
    - Contact sustainability@dmu.ac.uk for details

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Impact of Sustainable Design: Hidden Voices of Climate Change

Mark Charlton

Associate Director of Sustainable Development Goal Impact

Net Zero and Climate Action Research Theme Director
& Politics Lecturer at De Montfort

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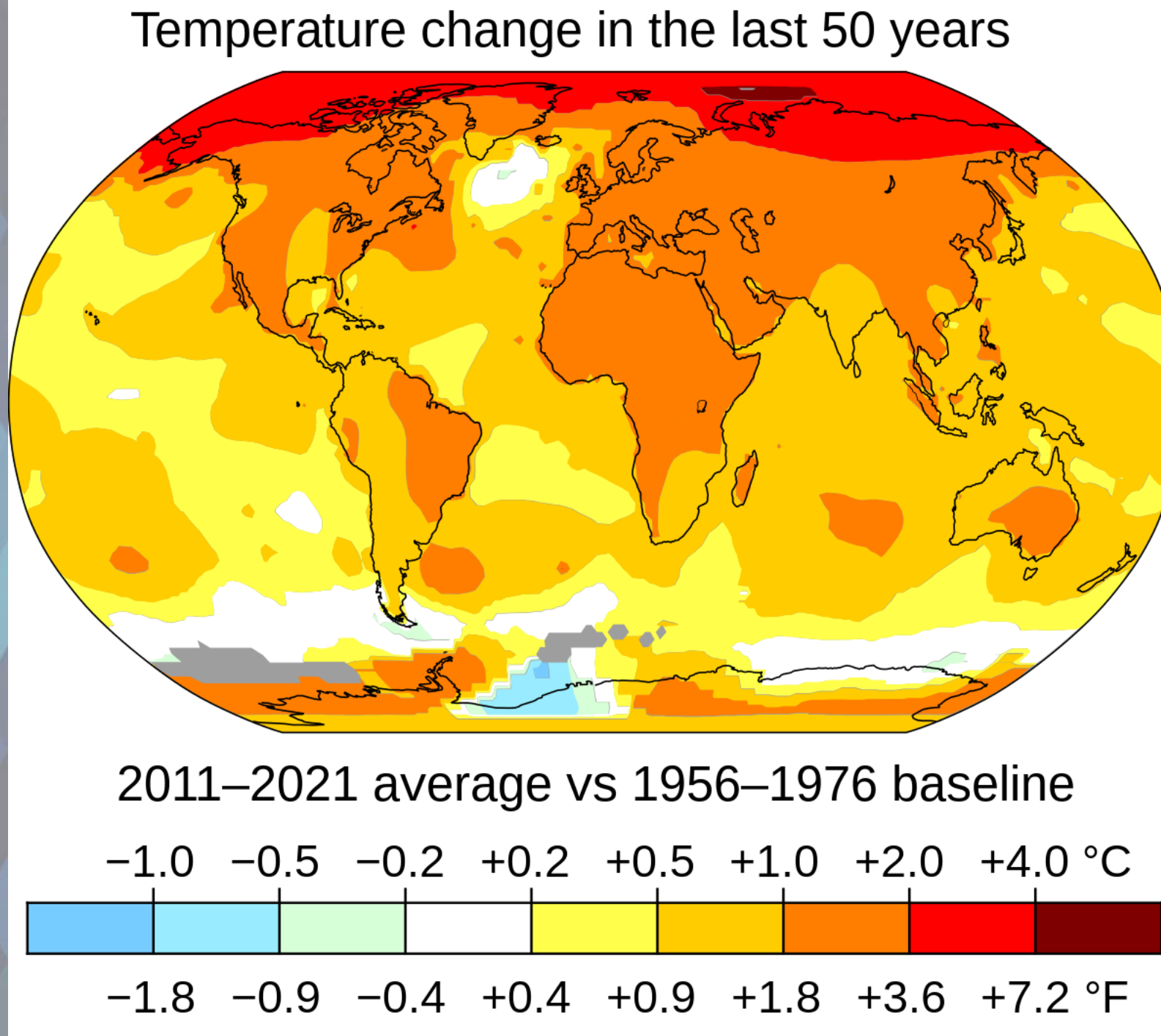
Temperatures are going up primarily due to burning fossil fuels like coal, oil and gas

Greenhouse gas concentrations are at their highest levels in 2 million years

Scientific consensus agrees limiting global temperature rise to no more than 1.5°C would help us avoid the worst climate impacts and maintain a livable climate.

(UN, 2023)



We **all** need to reduce our carbon emissions (and other environmental impacts) – now!

(UN, 2023)

Yet climate action is primarily supported by middle class people

(Saunders et al., 2020)

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Voice of communities is crucial
Politically – making things better
Design implications – making things better
Sustainability starts with survival…

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If your community is starving (SDG1) you are not going to worry about climate (SDG 13)

If you are extremely poor (SDG 2) you are not going to worry about climate (SDG 13)

If your community is violent, corrupt or at war (SDG 16) you are not going to worry about climate (SDG 13)

We need to tackle all these issues

Back to the main story…

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Climate and extreme weather events are already causing 20 million a year to be displaced.

UNHCR says Around 84% of the world's refugees live in 'climate change hotspots' likely to be affected by the adverse impacts of climate change.

The climate crisis is a human crisis. It is driving displacement and makes life harder for those already forced to flee when they settle.

(UNHCR, 2023)

Past two images show drought in a developing country in the Middle East

Poorer communities in richer nations will also face the worst impacts

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Hurricane Katrina showed Climate Change is devasting for poor communities in the US

Natural disasters compound issues in deprived neighbourhoods – least resilient

These areas which typically include high migrant populations, including refugees, asylum seekers, are those with the most vulnerability and least resilience

Compounds issues of structural racism in society

(Williams, 2021)

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Summer 2022 - UK

Hottest summer on record (40 degrees+) exposed:

- Lower income households are much more likely to live in homes that overheat
- 1 in 4 poorest families live in homes that regularly overheat, compared to 1-in-20 of the richest household
- Flats in built up areas have huge issues
- People in fuel poverty rarely have an air-cooling system
- Exposed how accommodation needs innovative design – not mechanical solutions

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Vulnerable and marginalised communities are also the communities least likely to vote - for many reasons for example time, location, expense, knowledge, registration etc, etc…

(*See: Uberoi and Johnson, 2019; Park, 2016; Foa et al., 2020; Henn et al., 2005; Kimberlee, 2002; Verba and Nie,1972; Abrams and Little, 1965; Bennett, 1997 ; Jennings and Niemi,1968; Tedin,1974; Sandell and Plutzer, 2005*).

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Democratic voice

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(Political) voice is important

Make changes you want to see

Communities know solutions to their problems better

‘Nothing About Us Without Us’ – term for disability oppression, racism, sexism, and colonialism

(Charlton, 2000) – not me btw!

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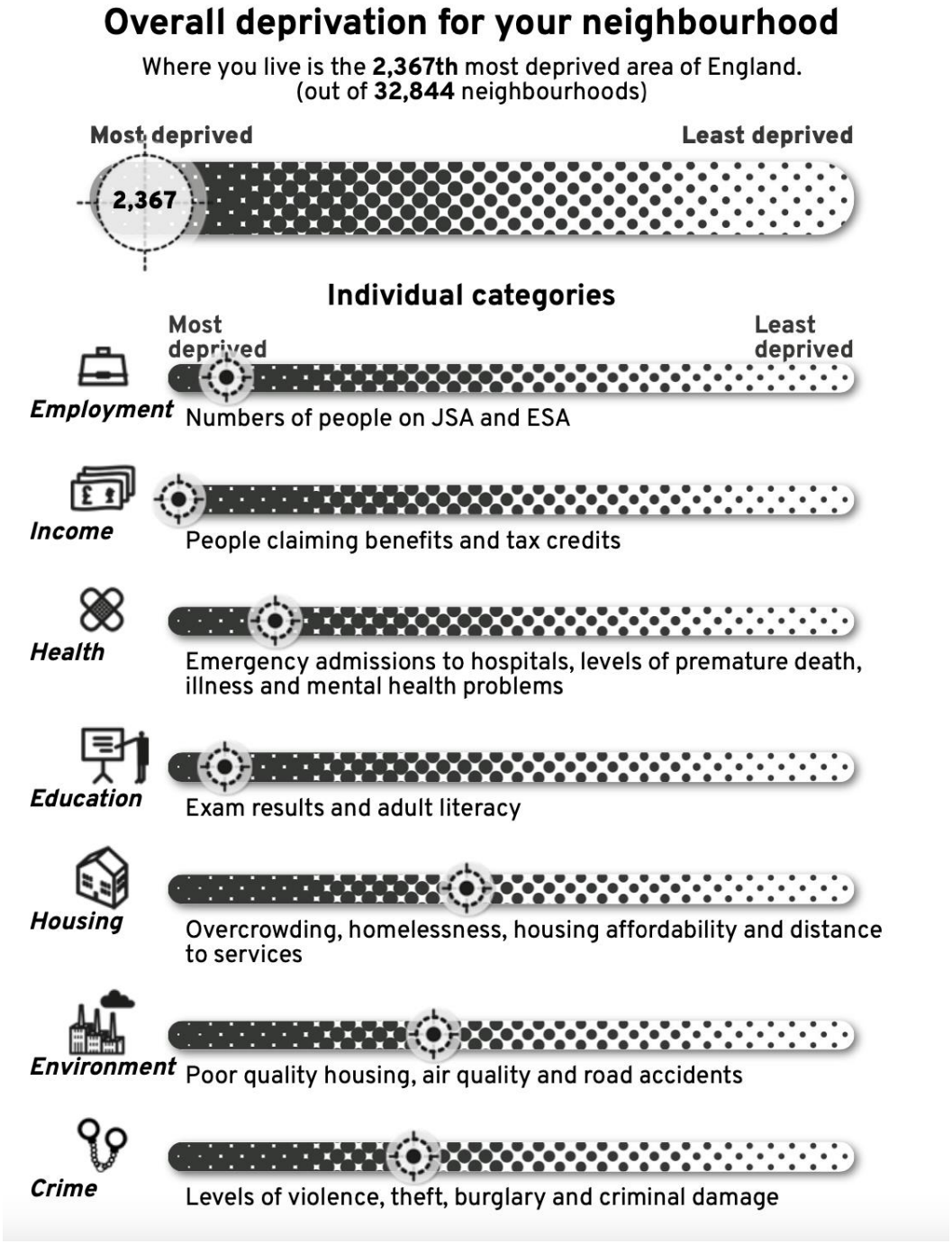

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Data for Highfields, Leicester, from the ONS, 2019

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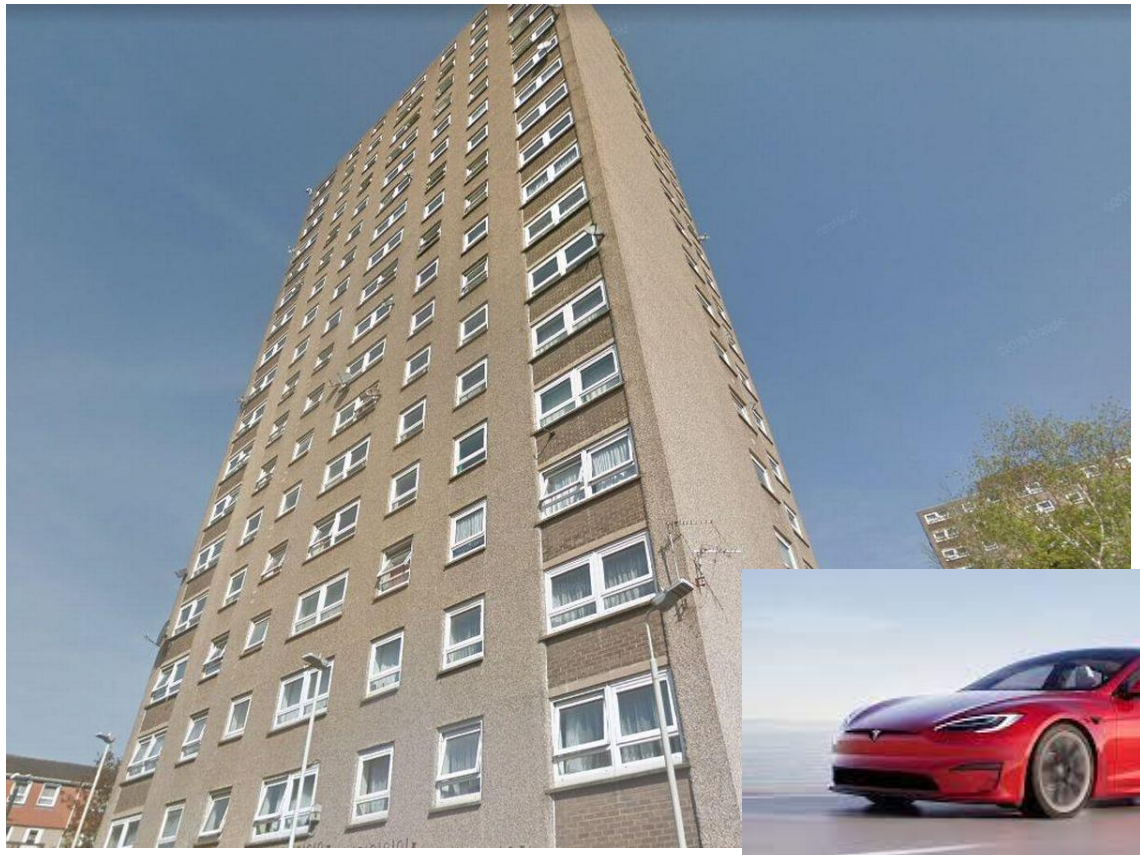
“We are 1,000 young people from Highfields and St Matthews and we would like you to help us to take climate action and be Britain’s first Net Zero amateur football club…”



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Contrasting challenges between communities:

“I can’t own a bicycle because I live with my family at the top of these flats in Highfields…”

And:

“Which Tesla will give me the most miles…?”

Yet, we know everyone must make changes…

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HIDDEN VOICES | COMMUNITY FOOTBALL AND CLIMATE CHANGE

Providing skills to tell the story of the estate, the threat of climate change and the challenges they face to become Net Zero.

The chance to train as Citizen Scientists and be co-researchers to write, record or create their concerns about climate change and the changes they want to see with the goal of empowering them to have voice

Stunning online research repository designed by Arch Creative powered by DMU alumni (launching soon)

Led to developing new design ideas for social change

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HIDDEN VOICES | COMMUNITY FOOTBALL AND CLIMATE CHANGE

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Educating on how we reduce climate change

Demonstrating how they can be the change for their communities and develop a more resilient future

Research will reveal the challenge people living in areas of high deprivation face to become Net Zero

Project has just begun. Get involved!

So far – Engineers, Educators, Nutritionists
Psychologists, Health, History and Politics experts Involved

We need more designers!

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Identified design needs

- Education to participate in design
- Designing or rethinking sports buildings
- Designing a clubhouse for women’s football
- Reimagining empty spaces for community sports
- Developing a community football exhibition
- Participating in ‘hackathons’

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Interest is high

Clubs and universities also participating in:

- Germany
- Ireland
- Malaysia
- The Gambia
- Republic of Benin
- Spain
- Each location has its own social context

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- United Nations Football for the Goals
- UK Government Environmental Audit Committee
- Leicester, Leicestershire and Rutland Sport
- Sport England

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Get Involved or find out more

mcharlton@dmu.ac.uk


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Fashion and Textiles

BOF

The Best Fashion Schools in the World 2019

Green Gown Awards 2021

Winner

www.greengownawards.org.uk

The GATE of OPPORTUNITY

LEICESTER COLLEGE
of ARTS & CRAFTS

Heritage

FASHION + TEXTILES

50 academics
34 technical instructors
~1100 students
~120 international students
8 UG and 6 PG programmes
Textile Engineering and Materials Research (TEAM) group
~ 20 PhD students

A Rare Portfolio

DESIGN PRACTICE/
COMMUNICATION/
BUYING/
MANAGEMENT

CONTOUR FASHION

FOOTWEAR

COMMUNICATION

& STYLING

BUYING

Source: Intergovernmental Panel for Climate Change and WRAP
Image: Fashion United showing landfill in the Atacama Desert, Chile

$2.5
TRILLION

100,000,000,000
GARMENTS PER YEAR

4% GHG
2.1 BILLION TONNES CO_2

430,000,000
INDUSTRY WORKERS

30%
LANDFILL

1%
TEXTILES
RECYCLED

Circularity

Mariah Esa | Browns

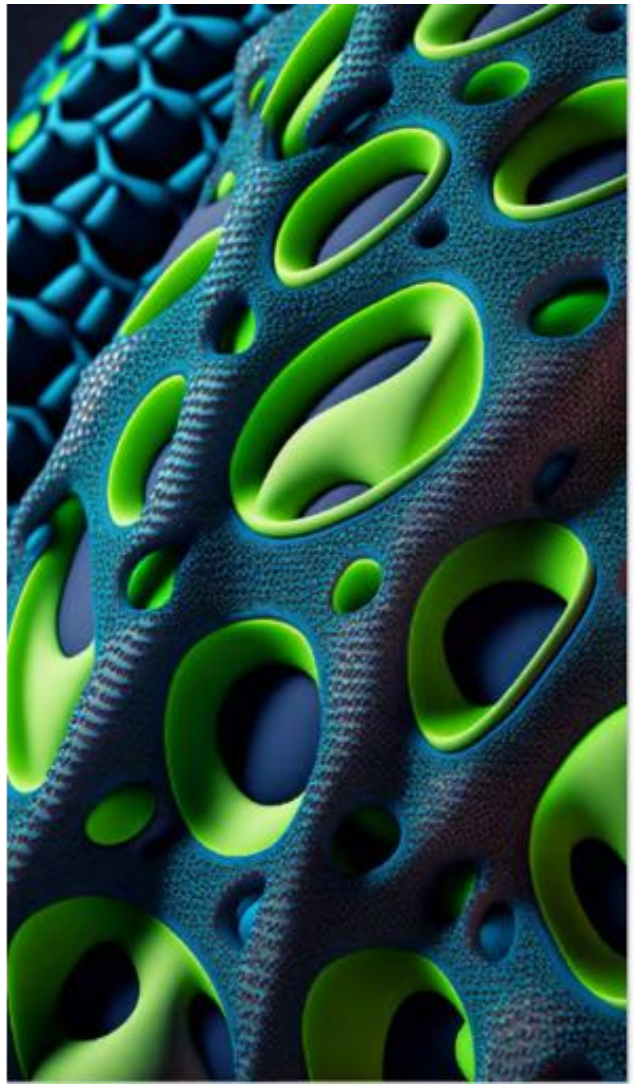
Daniella Hutmanova | Beauty from Waste
ASBCI

Posie Upshall | Biodegradable lingerie | POSIE

Abi Smith | Love our Oceans

Craft and making

Digital transformation



HM Government

Leicester City Council

FASHION ENTER

Project Delivery Partners:

FASHION ENTER

Leicester City Council

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Community Renewal Fund Project:

£500,000 collaborative project

with Leicester City Council and Fashion Enter.

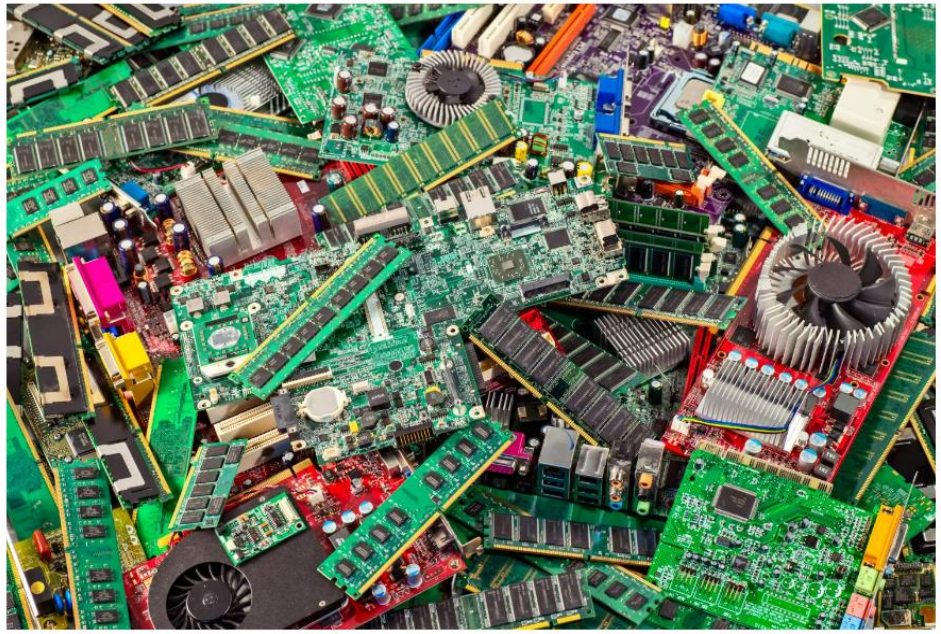
DMU working on:

- sector intelligence, including supply chains,
- green product and process innovation,
- marketing and product innovation plans

Outcomes include:

- Bespoke Innovation Plans (July 2022) for 20 local fashion SMEs
- Product Development Knowledge Exchange for 3 local fashion and textiles businesses
- Areas covered include: future knowledge exchange, UG and PG student placements, graduate champions, and further business innovation support

BBSRC biotech boost drives UK towards circular bioeconomy



Research helping to build a more sustainable circular bioeconomy has been boosted by the announcement of BBSRC's £5.3 million circular bioeconomy fund.

UK Research and Innovation

Approaches of enzyme-based biotechnology to achieve textiles recovery and reuse for circularity

Lead Research Organisation: De Montfort University
Department Name: School of Fashion and Textiles

This project will develop enzyme-based biotechnology to recover valuable resources from wool blended fabrics for recycling and reuse to support textile sectors transition towards circularity.

Organisations

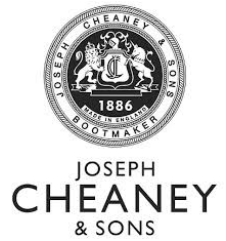
- De Montfort University (Lead Research Organisation)
- Loughborough University (Project Partner)
- Fox Brothers & Co Ltd (Project Partner)
- The Woolmark International Pty Ltd (Project Partner)
- Camira Fabrics Ltd (Project Partner)

LEGENDARY DESIGNER ZANDRA RHODES TO DONATE DECADES OF ARCHIVE MATERIAL TO DMU

“I learned about the hard work and education that De Montfort put into preserving the work of working artists and designers for future generations.

“The facilities for students and staff are impressive. I knew I wanted to learn more about the institution and build a future connection and resource for the next generation of designers."

Employability



Impact

Developing innovative teaching and learning, research, industry engagement and entrepreneurship.

Approximately 350 graduates entering the industry per year,

Global recognition through the Green Gown Awards.

Maarya Khatum: Final collection constructed from 100% deadstock fabrics donated from Leicester fast fashion factories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Sustainable Fashion and Textiles: Design for the Circular Economy

Dr Angela Davies
Programme leader MSc Sustainable Textile Technologies
School of Fashion and Textiles
TEAM Research Group – (Textile Engineering and Materials)

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Sustainable and technical textiles

- PhD as part of TEAM- medical textiles and 3D structures

Areas of interest include:

- product performance and quality control (testing and safety),
- Sustainable textile innovation
- Medical and healthcare textiles
- Performance textiles
- Wearable technologies

TEAM research group

- Established in 1992
- TEAM- multidisciplinary research group
- Focusing on the research to develop environmentally friendly textile processes and sustainable textile materials
- High performance textiles with multifunctionality

Sustainability and product performance teaching

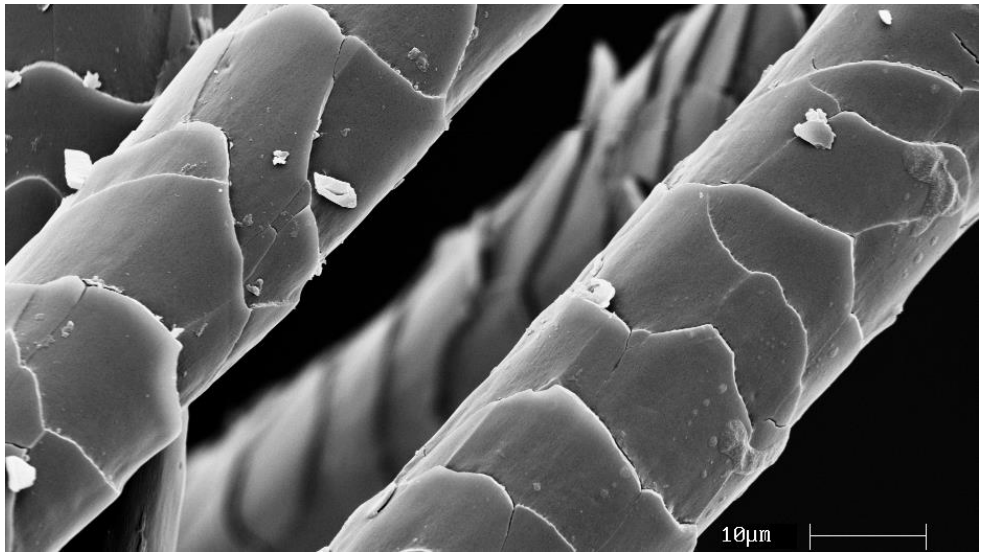
- Undergraduate- BA Fashion Buying and BA Textile Design
- Postgraduate-MSc Sustainable Textile Technologies and MA Fashion Management with Marketing.
- PhD research within fashion and textiles and collaborating with other faculties (HLS, BAL and CEM)

MSc Sustainable Textile Technologies industry collaboration

- Industry focused -MSc Sustainable Textile Technologies (Formally MSc Textile Design, Technology and Innovation)
- Bridging the gap between design and technical understanding strengthening student knowledge, skills and employability.
- Students from a range of backgrounds from designers, buyers, technologists through to those from scientific and business backgrounds
- Multidisciplinary learning environment with a common interest in sustainable and innovative textile technologies.

MSc Sustainable Textile Technologies industry collaboration

- Work closely with industry
- Guest talks providing industry insight
- Trips to companies- technical companies, test labs, manufacturers
- Diverse topics and projects with industry- live projects such as textile testing, product development and analysis
- Live competitions with industry with prizes such as work experience/mentoring



MSc Sustainable Textile Technologies industry collaboration

- MSc student coursework on lab-based modules linked with companies (testing company samples, experimenting with finishes)
- Student final projects (MSc dissertations with industry)
- Student work-based projects (placement year or short placement module)
- Students into careers - high end brands, high street retail, sportwear, product development roles, design roles, technology, production, merchandising, buying, regulatory, business development, sustainability and innovation roles

Our facilities

- Broad range of facilities to test textiles in our labs
- Textile dyeing, finishing and printing facilities
- Full range of textile testing equipment
- Air-conditioned room
- Other specialist equipment such as laserscan, UV-Vis
- Work closely with other facilities such as microbiology, engineering and computing

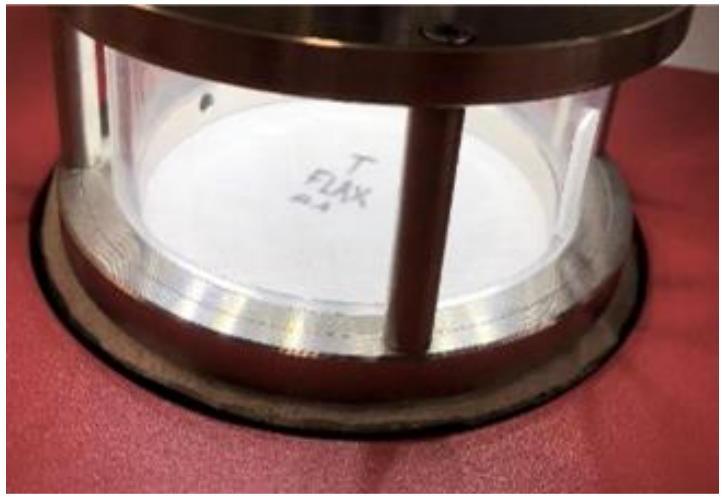
Past textile knowledge exchange projects

- Involved in support projects with Leicestershire textile businesses for product development, diversification, sustainable practices.
- SmarTex- Leicestershire SME's
- TekTex – East Midlands SME's
- InnoTex- Eastern Europe SME's
- TEAMnet cross cluster best practice platform supporting innovation

- KTPs

Recent student/industry projects through coursework

- Strategies to utilise British wool for performance wear
- Embedding textile knowledge and garment knowledge for a wearable life and health monitoring device. To improve and extend product range to diversity into new sectors and to offer a more refined and cost-effective product.
- Effectiveness of a fluorocarbon-free water repellent finishes on a range of eco-friendly fabrics after simulated wear.



Recent knowledge exchange consultancy with industry

- Consultancy - wearer trial set up and product development for effective wearable technology for blue light services and security
- Effective performance
- Comfort during use
- Fit and ease of movement
- Recommendations for future development

Recent knowledge exchange projects with industry

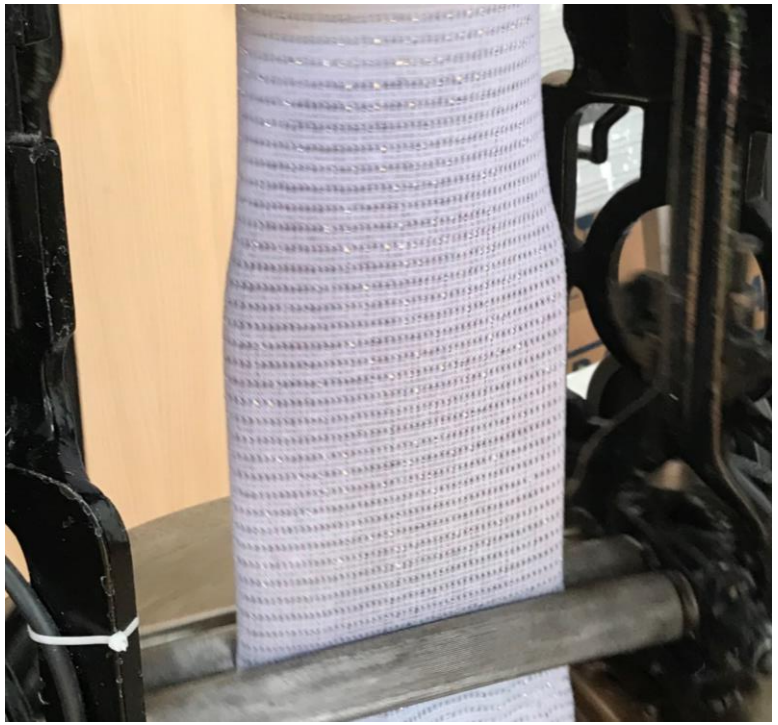
- Community Renewal Fund (CRF) supporting Leicester textile SMEs with Prof Rachel Granger and Dr Claire Lerpiniere
- Worked with Leicester textile businesses
- Innovation
- Sustainable practices
- Lead to knowledge exchange projects

Recent knowledge exchange projects with industry

- Part industry part DMU funded project (QuIDS)
- Local textile business focused on sustainable sportswear development and viable supply chain.
- Market scoping
- Material selection
- Potential for wearable technology to be integrated

Recent knowledge exchange projects with industry

- Part industry part DMU funded project (QuIDS)
- Local textile business focused on assessment and improved development of effective and sustainable cleaning products
- Lab testing to assess performance
- Microbiology testing



Recent knowledge exchange projects with industry

- Part industry part DMU funded project (QuIDS)
- UK based company
- Assessing the potential for automation of textile processes
- Competitors, processes, viability

Current knowledge exchange projects

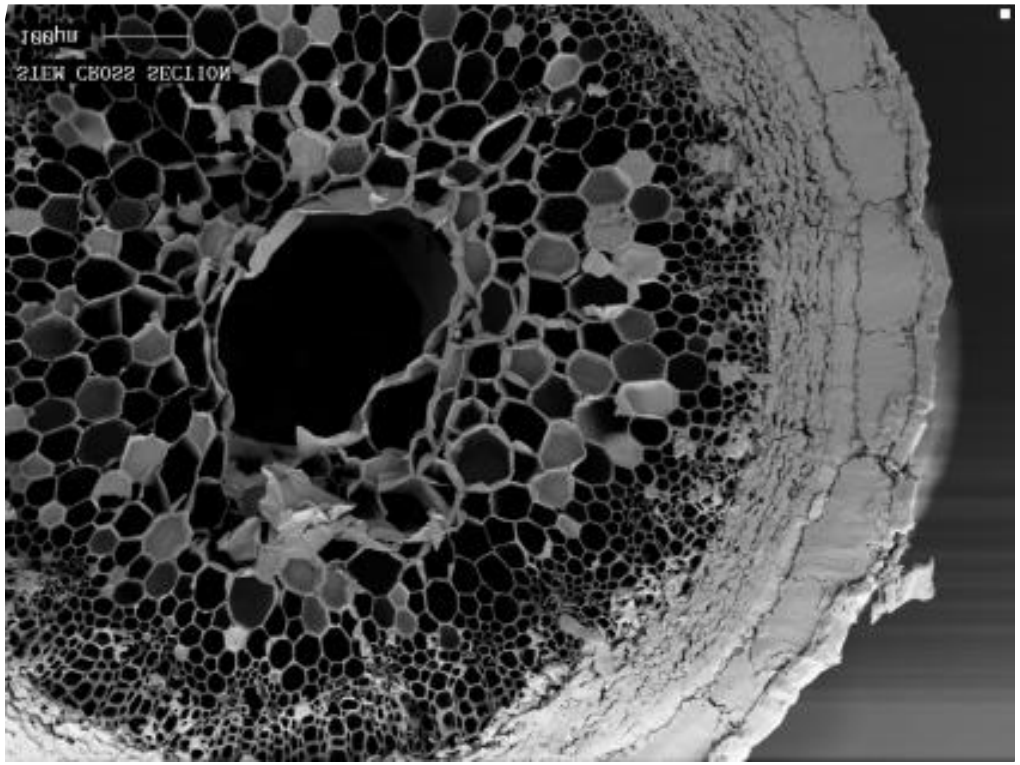
- Collaborative project with Leicestershire police
- Part police part DMU funded project (QuIDS)
- Focused on designing, wearer trialing and preparing for manufacture a universally accepted uniform hijab
- Addressing comfort, safety, culturally appropriate

Current knowledge exchange projects

- AHRC Design Exchange Partnership Femme Tasse project with local SME
- Focusing on sustainable period products: mitigating beach waste and period poverty.
- Working with host company and Welsh councils tackling waste, poverty and confidence.
- Redesign of existing period pants focusing on sustainability, efficacy and working towards establishing a UK based supply chain.

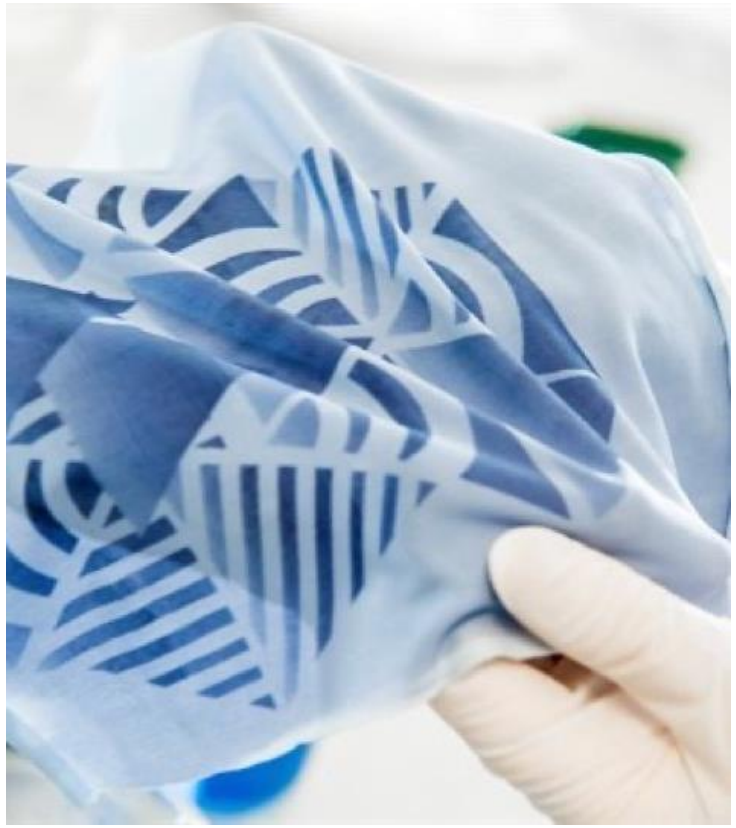
Technical support for businesses

- Sustainable materials
- Quality and longevity – improving quality and product lifespan
- Performance- finishing for added extra properties (health, wellbeing, performance, longevity) or to substantiate claims
- Product performance, quality and benchmarking



Technical support for businesses

- New product development
- Diversification into new product areas and / or sectors to expand product range, try higher value markets
- Redesign/ improvement of existing products
- R & D process and key considerations for new markets, sustainability, performance, end of life management



Contact

Dr Angela Davies amdavies@dmu.ac.uk

TEAM research

https://www.dmu.ac.uk/research/centres-institutes/iad/team.aspx

MSc Sustainable Textile Technologies (Formally MSc Textile Design, Technology and Innovation)

www.dmu.ac.uk/tdti


DESIGN
UNIT

Sustainable Fashion and Textiles: Design for the Circular Economy

Dr Claire Lerpiniere

Associate Professor – Sustainable Textiles

School of Fashion and Textiles

TEAM Research Group – (Textile Engineering and Materials)

DE MONTFORT UNIVERSITY LEICESTER

Fashion and Textiles: Global challenges

- Ethical employment practices
- Greenhouse gas emissions
- Water stewardship
- Health and wellbeing
- Supply chain transparency
- Toxins in the supply chain
- People, planet, animals: welfare & protection
- Inclusivity and diverse voices – producer and consumer

PhD graduate Dr Nalinee Netithammakorn

Knowledge Exchange and Research for Industry Impact

- Sector transformation at the intersection of innovative sustainable practices, technologies and futures
- Vision of the University for the social, environmental and economic good

£500k funding boost for Leicester's garment industry

The sector has received a boost after the city council was successful in a bid to the Government's Community Renewal Fund (CRF).

It means Leicester City Council will receive £500,000 to work together with partners Fashion-Enter Ltd and De Montfort University (DMU) to offer co-ordinated support to textiles manufacturers and local textiles workers.

The project will see all three partners providing lots of practical support to participating businesses to ensure ethical compliance and best practice, support innovation and develop their workforce skills.

UK COMMUNITY RENEWAL FUND

Project Delivery Partners:

FASHION ENTER

Leicester City Council

UK Government

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Industrial Revolution 3.0 - 4.0

- Digital and sustainable intersections
- Anticipate and plug skills-gaps
- Creating systems thinking problem-solvers

Right: Virtual trainer developed in Romans CAD and rendered in Keyshot by Jake Collinson.
Far right: Dress developed in Clo3D by Yen Le Thi, Fashion Buying alumna (@ytl_designs).

A DIGITAL WORLD

How the School of Fashion and Textiles at De Montfort University is embracing digital transformation.

The School of Fashion and Textiles at De Montfort University is embracing digital innovation with a comprehensive approach across all its courses. Already well known for its practical design focus and specialist courses in footwear design and contour fashion (a term that covers lingerie, athleisure, swimwear, corsetry, and loungewear design), the school also has ambitions to lead the way in digital fashion and textiles education.

As environmental challenges drive the industry to become more sustainable, digital transformation is a key response. Using 3D computer-aided design methods in the design development process can reduce the number of physical samples required, which saves on raw materials and reduces the carbon footprint associated with their transport.

These software applications can also help to enhance inclusivity. The development of a diverse range of avatars enables designers to develop and fit their designs across a broader range of sizes and body types.

The opportunities presented by digital transformation are not reserved for real-life design, however. They are also key to the new marketplace in the metaverse, where the demand for digital fashion for an individual's own avatar, or digital twin, is experiencing huge growth.

The school's focus on digital transformation has been highlighted in a recent rewrite of the curriculum, with students now able to create final design outcomes that are either physical or virtual. This has required an investment in software, and students now have access to a range of titles: Clo3D, Lectra Modaris 2D and 3D, Romans CAD, AVA, Scotweave and the Abode Creative Suite.

Student feedback shows that they are enjoying the opportunity

Business support opportunities

- Digital Fashion
- Clo-3D modelling support
- Lectra Modaris 2D and 3D pattern cutting
- Zero waste pattern cutting

- E-commerce support
- Fashion communication and styling
- Digital Marketing

- Technical testing
- Benchmarking
- Product scoping and new business
- Sustainable textiles

IN ASSOCIATION.

Right: Virtual trainer developed in Romans CAD and rendered in Keyshot by Jake Collinson. Far right: Dress developed in Clo3D by Yen Le Thi, Fashion Buying alumna (@ytl_designs).

A DIGITAL WORLD

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Student feedback shows that they are enjoying the opportunity

New Horizons – Design solutions for:

- The Green Claims Code and Greenwashing (UK, Jan 2022): 2nd wave of investigations in Fashion, upcoming powers to fine up to 10% of global turnover

- Extended Producer Responsibility (UK, consultation was due from Q4 2022, postponed)

https://greenclaims.campaign.gov.uk/

New Horizons – Design solutions for:

European Green Deal, including:

- Strategy for Sustainable and Circular Textiles (EU, 2022 onwards)
- European Green Deal Industrial Plan (EU, 2023 onwards)
- Circular Economy Action Plan (EU, GD building block 2020 onwards)
- Directives on Corporate Sustainability Due Diligence (EU, CSDD)
- Ecodesign for Sustainable Products Regulation (EU, proposed 2024 onwards)
- Digital Product Passport (EU, proposed 2026)

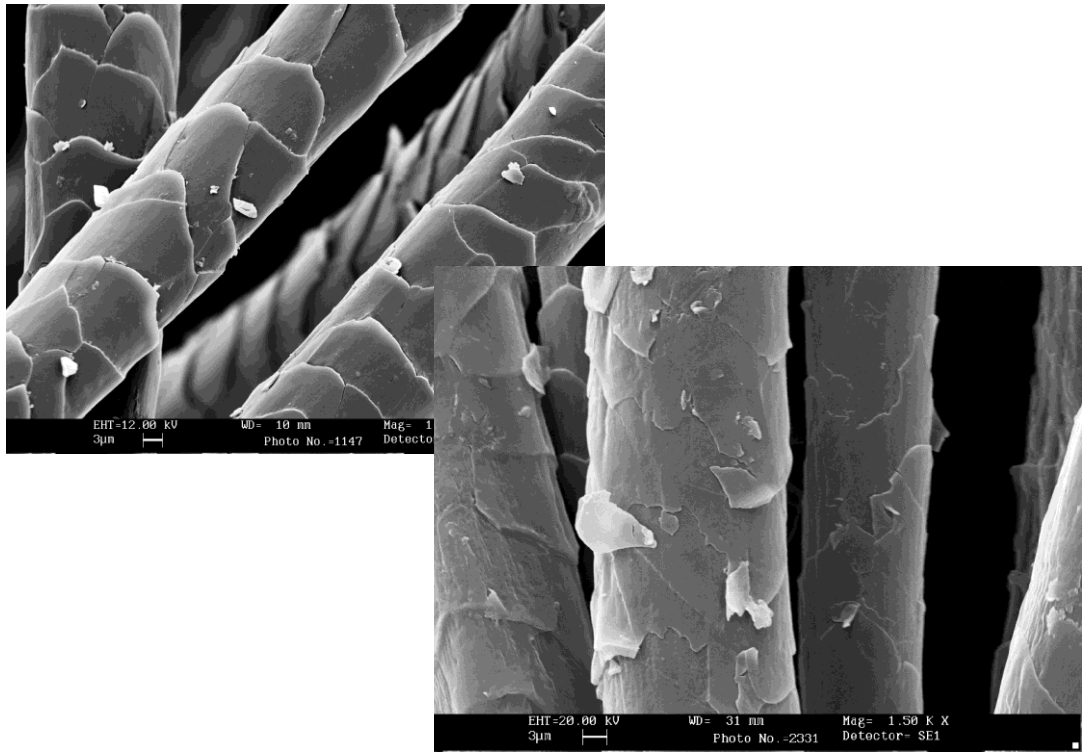
Design for – Voluntary schemes:

- EU Ecolabel criteria for Textile Products (EU, 2024)
- GPP Criteria for Textiles Products and Services (EU, 2016 onwards)
- Textiles 2030 (WRAP, UK)
- Ellen MacArthur Foundation (UK)
- OEKO-TEX, bluesign (Global)

TEAM Research:
Textile Engineering & Materials Research Group

Interconnected Areas of Research:

- Textile Products and Processing
- Enzymes and Sustainable Technologies
- Agriculture and Natural Fibres
- Material Performance and Design
- Circular economy and sustainable industry
- Healthcare textiles



Enzyme bioprocesses

with proteases for machine washable wool

TEAM: Enzyme-based Biotechnology Research

- Using enzymes as sustainable alternatives to textile wet processing techniques
- Energy and water saving
- Reduction of waste effluents

TEAM Research: Laser enhanced dyeing of wool and wool blend textiles

54% reduction in energy

High fastness to washing and rubbing against consumer testing benchmarks

https://www.dmu.ac.uk/research/centres-institutes/iad/team/research-areas-and-projects.aspx

SUSTAINABLE DEVELOPMENT GOALS

8 DECENT WORK AND ECONOMIC GROWTH

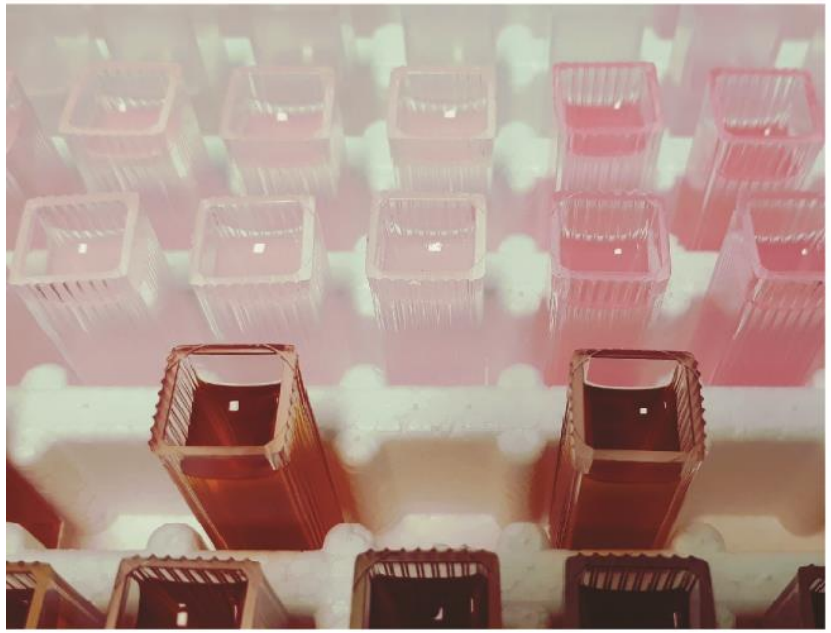
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

Enzymes are proteins which catalyse specific chemical reactions and are known as ‘bio-catalysts’

- biodegradable and reusable
- operate under mild conditions
- accelerating reactions
- safe and easy to control



DESIGN UNIT

DE MONTFORT UNIVERSITY LEICESTER

Textile Engineering and Materials (TEAM) Research Group: Wool research led by Professor Jinsong Shen

Laser technology for wool surface coloration and patterning (LEBIOTEX project)

pH	Wool			Nylon		
	1:1	1:2	1:4	1:1	1:2	1:4
3	L^* 28.08 a^* 15.21 b^* 12.66	L^* 43.13 a^* 15.98 b^* 2.70	L^* 33.53 a^* 16.56 b^* -2.56	L^* 56.65 a^* 11.70 b^* 17.55	L^* 49.53 a^* 10.77 b^* 1.33	L^* 44.61 a^* 12.74 b^* -2.87
4	L^* 35.53 a^* 15.28 b^* 17.95	L^* 22.18 a^* 13.48 b^* 9.71	L^* 16.21 a^* 8.32 b^* 2.32	L^* 66.71 a^* 14.87 b^* 27.61	L^* 58.64 a^* 16.52 b^* 24.96	L^* 54.23 a^* 16.33 b^* 22.20
5	L^* 42.19 a^* 15.26 b^* 19.79	L^* 29.76 a^* 15.22 b^* 17.09	L^* 21.91 a^* 13.00 b^* 10.20	L^* 77.75 a^* 8.55 b^* 25.33	L^* 68.03 a^* 17.15 b^* 32.32	L^* 64.13 a^* 15.27 b^* 33.11
6	L^* 50.99 a^* 14.18 b^* 22.04	L^* 40.32 a^* 15.28 b^* 21.58	L^* 31.04 a^* 14.44 b^* 18.02	L^* 87.22 a^* 1.52 b^* 16.35	L^* 82.95 a^* 7.38 b^* 27.14	L^* 79.46 a^* 8.71 b^* 32.52
7	L^* 61.40 a^* 9.95 b^* 24.70	L^* 49.16 a^* 13.17 b^* 25.61	L^* 39.21 a^* 13.22 b^* 20.25	L^* 88.97 a^* 0.79 b^* 6.20	L^* 88.77 a^* 1.58 b^* 12.65	L^* 86.02 a^* 3.16 b^* 20.40

Wool and nylon fabrics dyed in-situ by laccase with a 2,5 DABS precursor under different pH

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Problem solving needs:

Systems thinking and networks

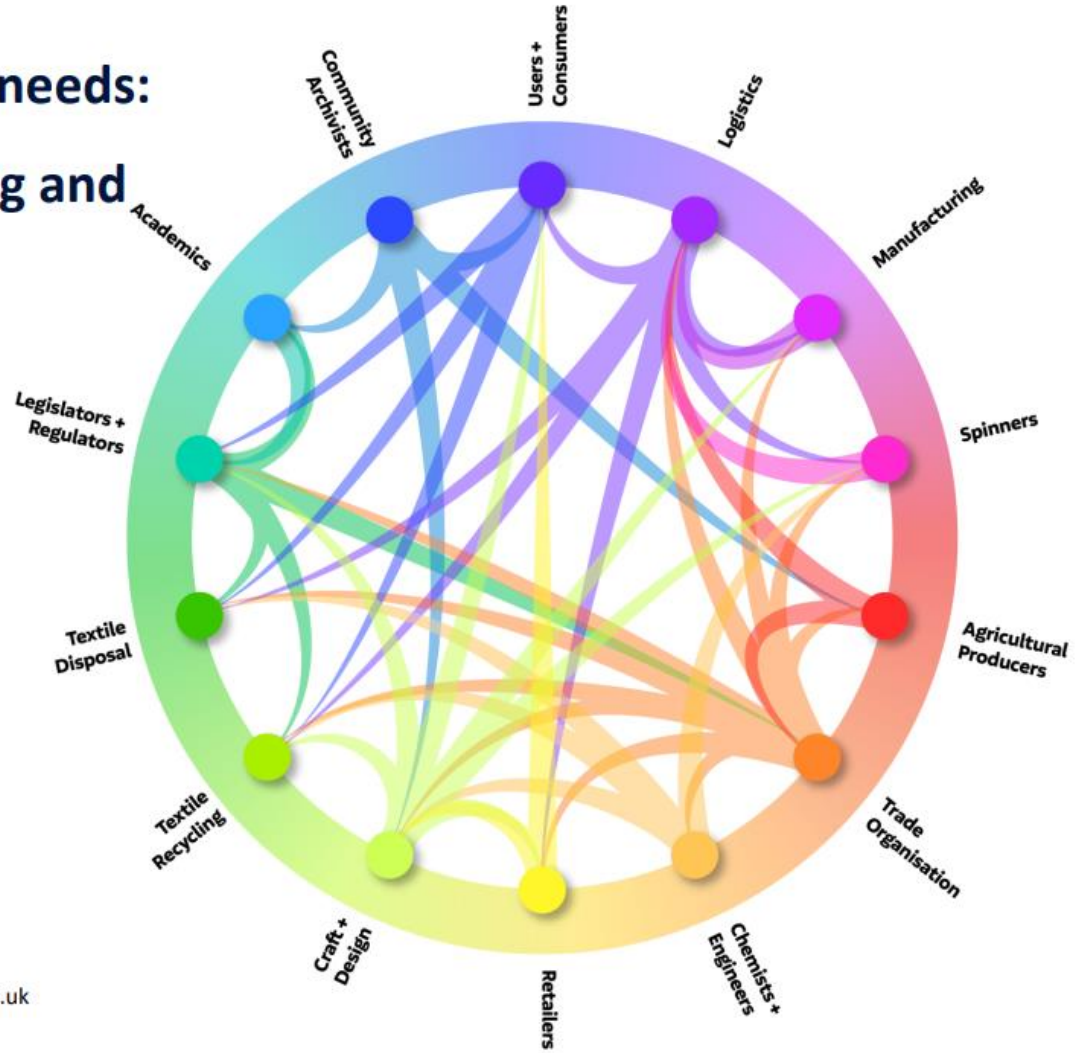
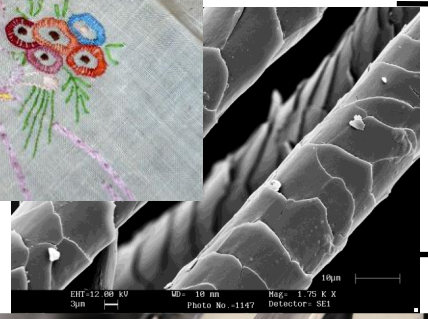
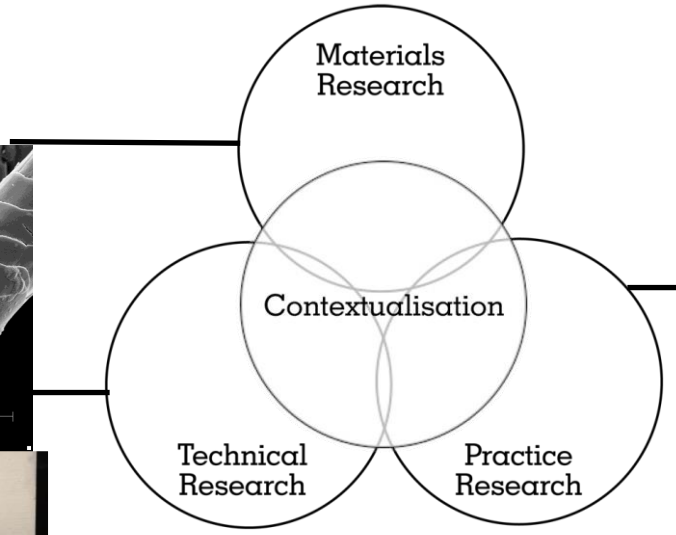
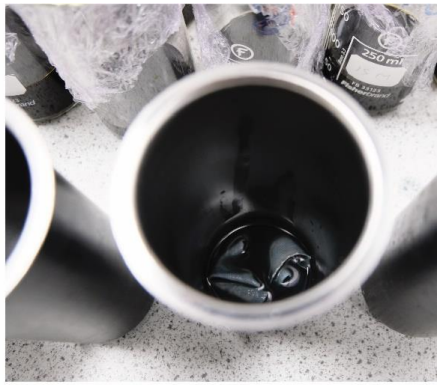


Image: C Lerpiniere clerpiniere@dmu.ac.uk

Contextualised Industry: Theory, Materials, Practice







Tacit Knowledge for the Circular Economy

- ‘We know more than we can tell’ (Polanyi)

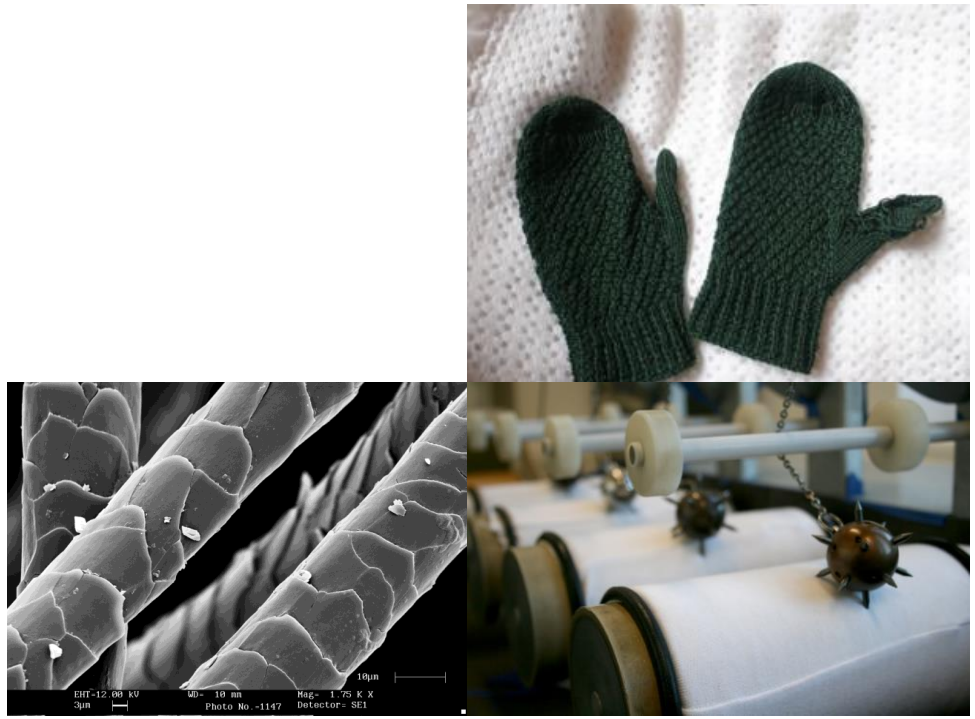
- **Practice is often:**
- Embodied
- Intuitive
- Experiential
- Reflective
- Crafted / ‘crafty’ in the old sense of the word (requiring skill, dexterity, or being skillful, clever and learned)

Education for Sustainable Futures

- Transformative educational opportunities for:
- Employability and future-proofing
- Cascading into research and industry for paradigm change
- Transition to the circular economy
- Disruption and opportunity in the digitisation of fashion and textiles

Transition design: intersections of disciplines, social groups, biological and natural systems

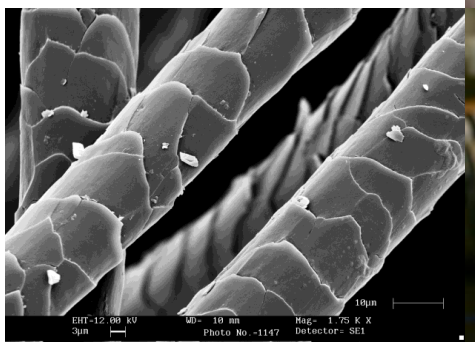
- Haptic, tacit knowledge bases
- ‘Everyday life discourse’ (Irwin et al. 2015)
- Artefacts ‘co-existing’ with humans



Irwin, T., Kossoff, G., Tonkinwise, C., & Scupelli, P. (2015a). *Transition Design: A New Area of Design Research, Practice and Study That Proposes Design-Led Societal Transition Toward More Sustainable Futures*

Transition design: intersections of disciplines, social groups, biological and natural systems

Creating a space for conversations, connection, and interventions through the interplay of design, science, technology, testing, and industry




DESIGN
UNIT

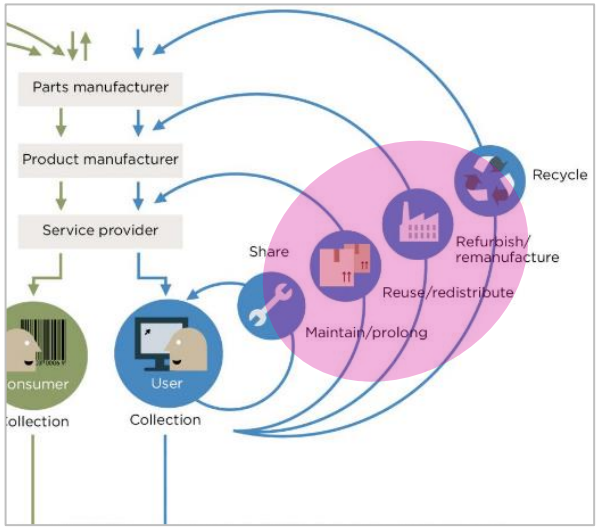
Sustainable production and consumption by upcycling for the transition to the circular economy

Dr Kyungeun Sung

DE MONTFORT UNIVERSITY LEICESTER

Upcycling

- Creation or modification of a product from used materials, components or products which is of equal or higher quality or value than the compositional elements
- Neologism and umbrella concept
- ‘creative’ or ‘advanced’ repair, reuse, refurbishment, redesign, remake, upgrade, recreation, remanufacture, recycling,…
- Main practices in circular economy
- Alternative consumption (cf. replacement purchase)
- Alternative production (cf. based on virgin materials)



Benefits of upcycling

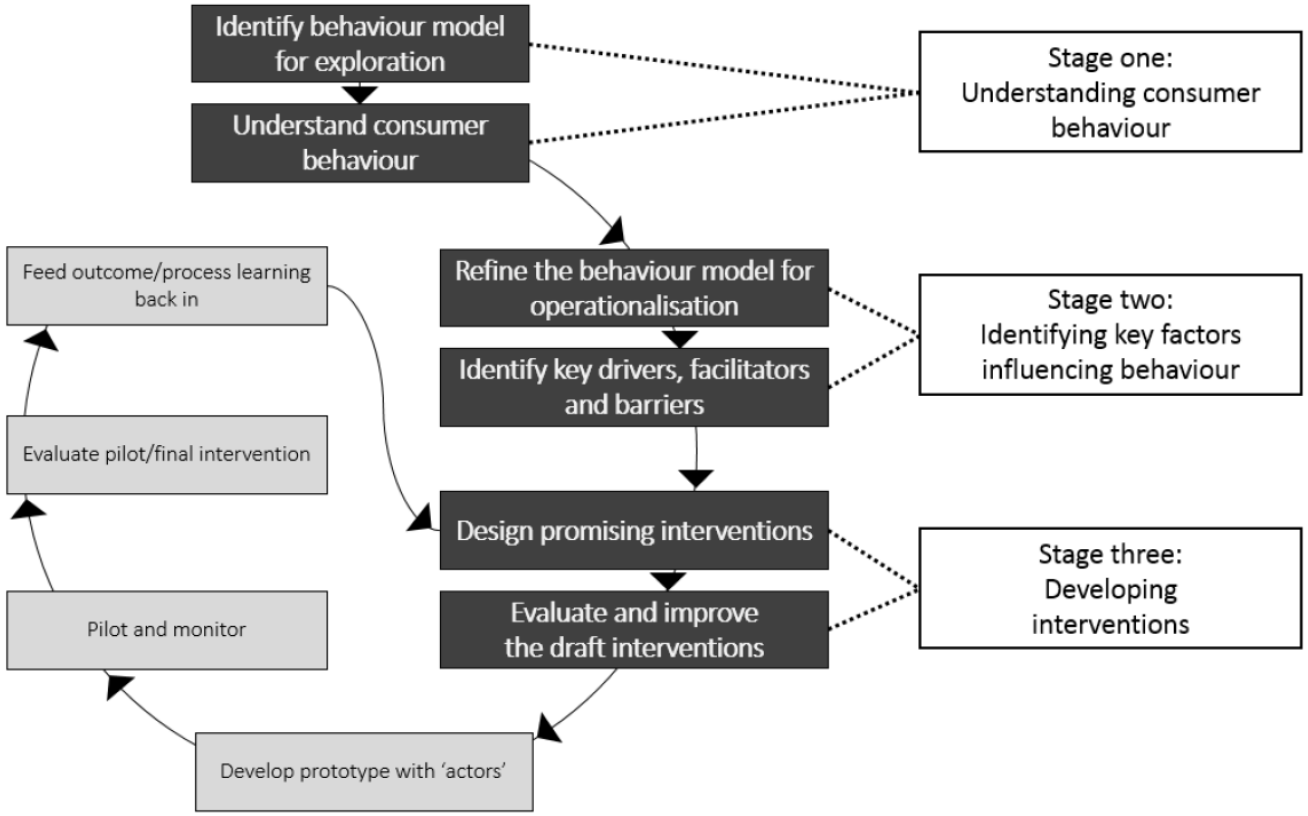
- Environmental: extending lifetimes of products, components and materials > increasing material efficiency > reducing solid waste > reducing industrial energy consumption > lowering GHGs
- Economic: creating jobs (industry) + saving money (households)
- Social: emotional/psychological well-being (households)





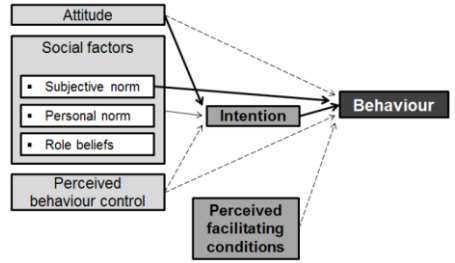
Consumer/citizen upcycling

Sustainable production and consumption by upcycling: Understanding and scaling up niche environmentally-significant behaviour



Sustainable Development Research at Universities in the United Kingdom pp 193-227 | Cite as

Individual Upcycling in the UK: Insights for Scaling up Towards Sustainable Development

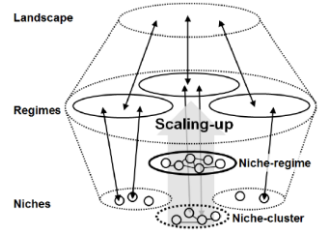


sustainability

Article

Factors Influencing Upcycling for UK Makers

energies



Article

Developing Interventions for Scaling Up UK Upcycling

Upcycling in businesses

Challenges and opportunities for scaling up upcycling businesses: textile and wood upcycling businesses in the UK

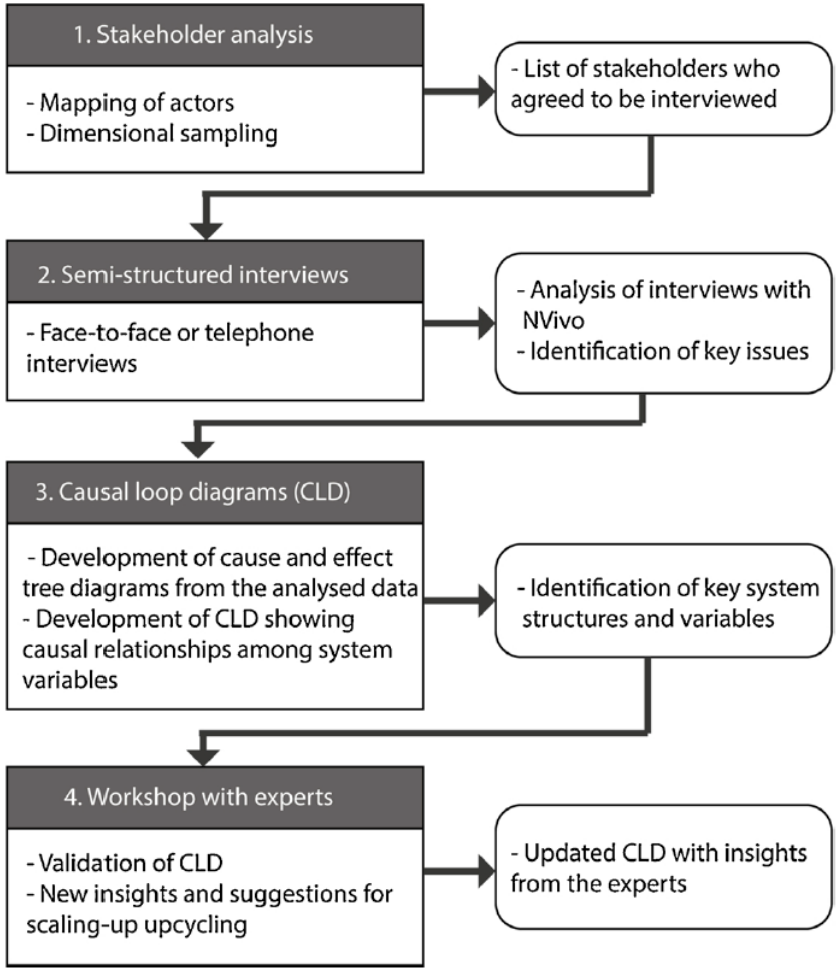


Fig. 1. Stages in the methodology employed in this study.

Full length article

Challenges and opportunities for scaling up upcycling businesses – The case of textile and wood upcycling businesses in the UK

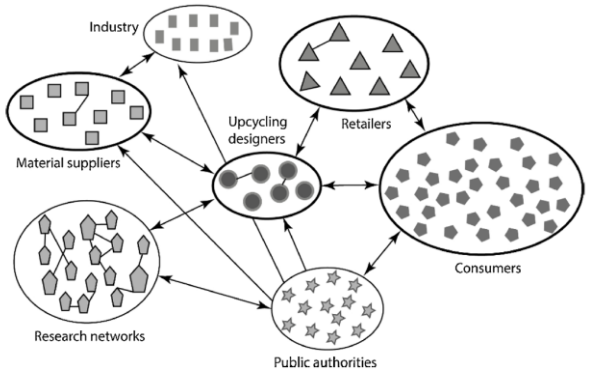


Fig. 2. An overview of relevant actors across the upcycling value chain.

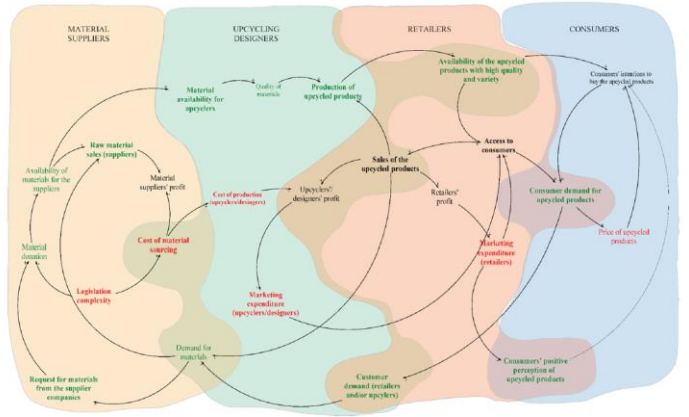


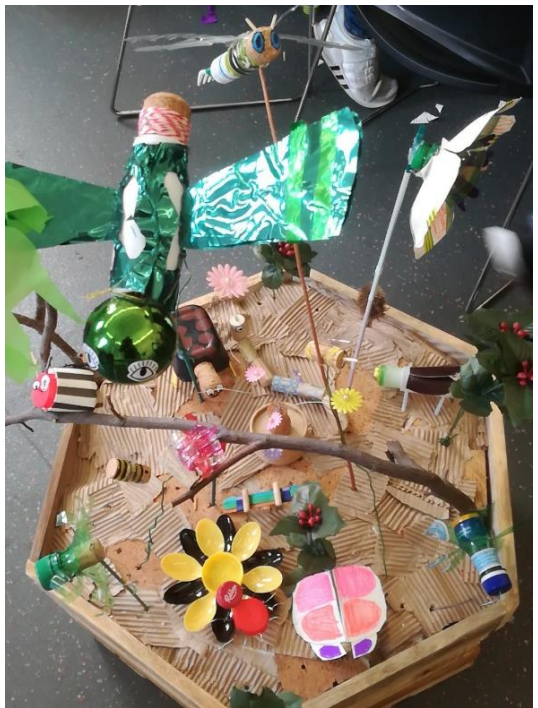
Fig. 8. Causal loop diagram linking various challenges and success factors in the upcycling value chain.

Impact activity: stakeholder workshop

Joint workshop and networking between industry and academia: Scaling up upcycling SMEs

Impact activity: community workshop

Being Human 2018 Festival:
Art with upcycling



Impact activity: upcycling competition

UPCYCLING

ART, CRAFT AND DESIGN COMPETITION

School of Art, Design and Architecture
School of Fashion and Textiles
DMU Sustainability Team

DE MONTFORT UNIVERSITY LEICESTER

LCB

DESIGN UNIT

DE MONTFORT UNIVERSITY LEICESTER

Impact activity: upcycling exhibition

International Upcycling Symposium 2020

DESIGN UNIT

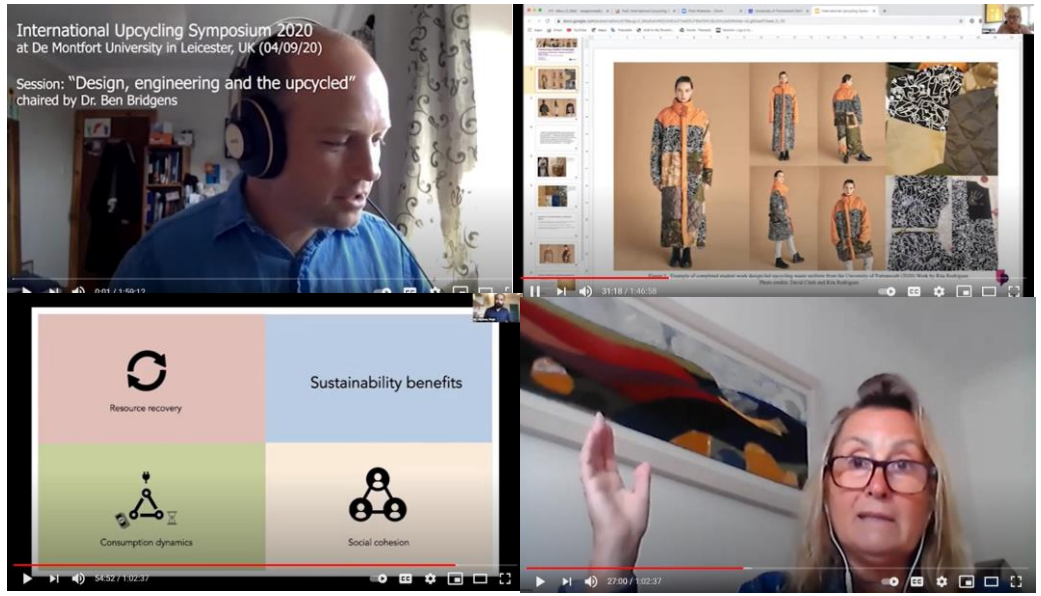
International Upcycling Symposium 2020

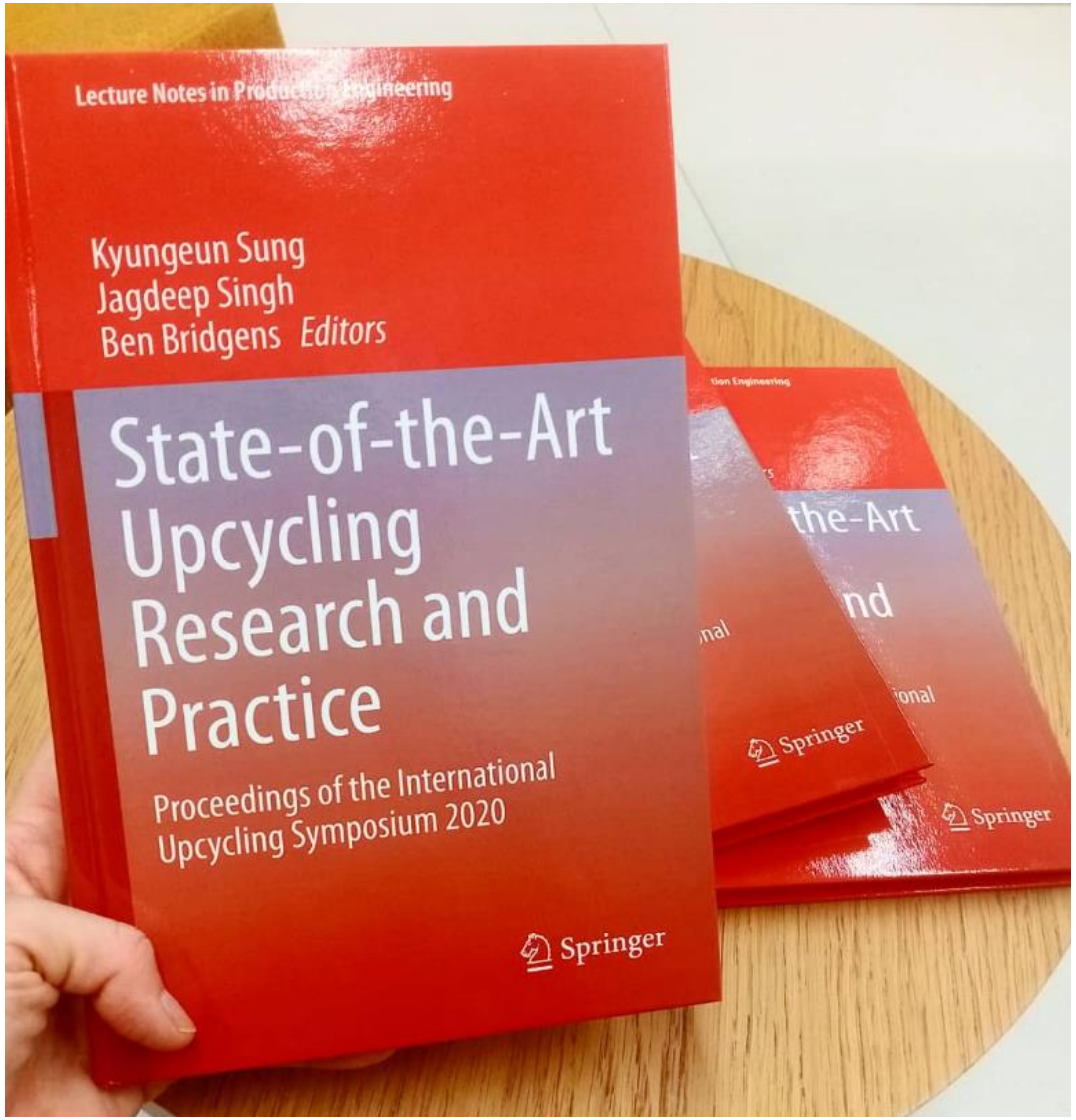
Research and Practice

De Montfort University, Leicester, UK (online)

4 September 2020

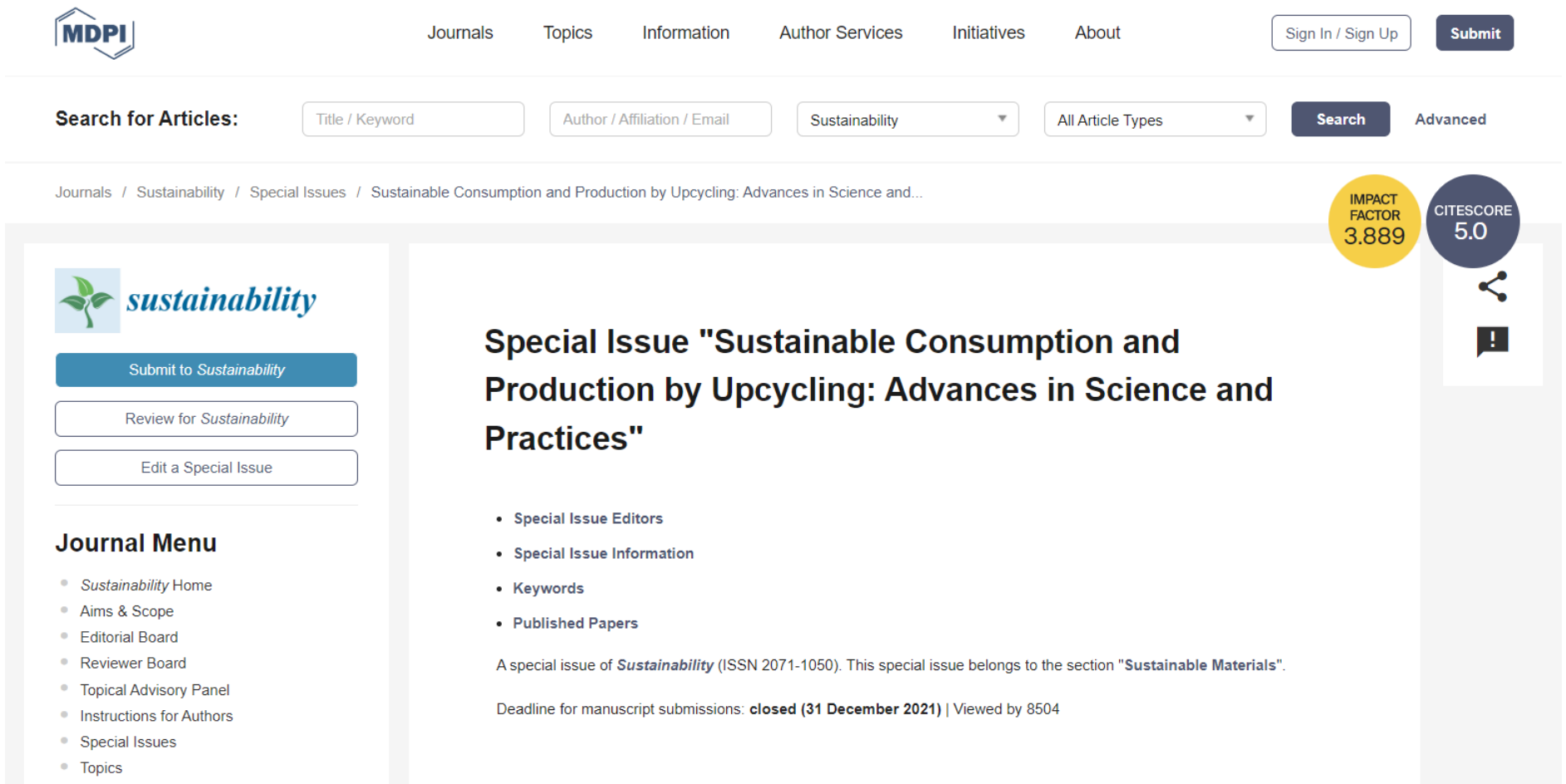
DE MONTFORT UNIVERSITY LEICESTER · LUND UNIVERSITY · NOTTINGHAM TRENT UNIVERSITY · Newcastle University





DE MONTFORT UNIVERSITY LEICESTER

Special Issue of *Sustainability* in 2021



International Upcycling Research Network

- **UKRI AHRC Research Networking grant (AH/W007134/1):** £42,787
- **Project start:** 01/06/2022
- **Project duration:** 24 months
- **Background:** Moving from a niche to a mainstream practice could realise the full potential of upcycling. Despite recent increase in publications, initiatives and businesses in upcycling, research is still embryonic. Development of upcycling theory and practices across industries, disciplines and countries is required for growth.
- **Purpose:** the world's first long-term platform to facilitate such cross-industry, multidisciplinary and international research

International Upcycling Research Network

- **Aim:** create positive synergies between various international actors for collaborative endeavours to understand and promote upcycling
- **Two short-term objectives:** (i) expand our understanding of current upcycling research and practices (seminars); and (ii) collaborative investigation into the global challenges for scaling up upcycling (ISM workshops)
- **Two medium-to-long-term objectives:** (i) develop new cross-industry, multidisciplinary, international collaborative research projects and initiatives (meetings); and (ii) create the network website as a long-term platform

Upcycling station

‘Upcycling Station’ – a drop-in event as part of the LCB Depot Takeover of the British Science Festival 2022 in partnership with DMU, co-organised with Dr Mary O’Neill and her Fine Art students (over 150 community people)

Upcycling seminar series

DE MONTFORT UNIVERSITY LEICESTER

Upcycling seminar series

Seminar on Upcycling in Australia and Europe

Tuesday 17 and Thursday 19 January 2023

AHRC-funded International Upcycling Research Network

DE MONTFORT UNIVERSITY LEICESTER · UNIVERSITY of BOTSWANA · UKRI Arts and Humanities Research Council

Seminar on Upcycling in Americas

Monday 7th of November 2022

AHRC-funded International Upcycling Research Network

DE MONTFORT UNIVERSITY LEICESTER · UNIVERSITY of BOTSWANA · UKRI Arts and Humanities Research Council

DE MONTFORT UNIVERSITY LEICESTER

International Upcycling Festival 2024

- **Aim:** showcase the network activities and outcomes, expand the network, and engage businesses and consumers for direct impact
- **Full paper submission by 31 July 2023**
- **Day 1 on Thursday 11th April 2024 (9am-5pm) at DMU:** academic presentations and discussions
- **Day 2 on Friday 12th April 2024 (12pm-9pm) at LCB Depot:** engaging businesses and consumers for awareness raising, knowledge transfer, new data collection and networking through a public lecture series, stakeholder workshops, family-friendly activities
- **Installations:** Poster presentations, film screening, mini exhibitions, etc.
- **Gala dinner**: informal networking between advisory board and network members

International Upcycling Festival 2024

https://upcyclingfestival2024.our.dmu.ac.uk/call-for-papers/

International Upcycling Festival 2024

11-12 April 2024 at De Montfort University and LCB Depot in Leicester, UK

IUF2024 Timeline 2023/2024 Call for papers Call for other contributions Venue Programme and speakers Registration

Upcycling is a promising, circular-economy-based, green solution utilising multiple innovative material processes involving minimisation of waste and toxicity, saving in energy and water, and reduction in emissions and pollution, in order to transform used/waste products and materials into new/modified products and materials with higher quality and/or values compared to the compositional elements. Upcycling not only benefits the environment, but also creates new job opportunities and contributes to

NPD4CE

- **New Product Development (NPD) for Upcycling and Circular Economy (CE)**
- Short-term project (2022-2023)
- Funded by DMU (De Montfort University) HEIF (Higher Education Innovation Funding), £11,086.30
- This project aims to make radical innovations in new product development for upcycling and circular economy focusing on everyday use electronic products with mixed materials and multiple components (which are more difficult to remanufacture, recycle, etc.). Three student designers are working on the project under supervision. The project involves industry experts/stakeholders throughout the process.

NPD4CE

Supervisors

Dr Kyungeun Sung is a Senior Lecturer in Product Design, De Montfort University (DMU) in Leicester, UK. Her research broadly deals with design and sustainability focusing on upcycling and circular economy. She has investigated various aspects of upcycling and circular economy in the context of sustainable art, craft, design, manufacturing, production, businesses, supply chain management, consumption, behaviour and lifestyles. She is a Principal Investigator of the AHRC-funded International Upcycling Research Network (2022-2024).

Mik Pieniazek is a Senior Lecturer in Product Design at DMU, UK. He has extensive experiences as a professional product design practitioner and educator in multiple higher education institutions in the UK. His research interests include NPD processes, urban metabolism, sustainability, and collaborative processes.

Dr Abhishek Tiwary is Associate Professor in Engineering Management in the School of Engineering and Sustainable Development at DMU. He is recipient of Marie Curie Fellowship and Royal Academy of Engineering Industrial Fellowship to pursue interdisciplinary research and methods. His current research involves system-scale sustainability assessment of technology innovations, both in the UK and in international settings. He has been involved in numerous funded projects evaluating the feasibility of environmentally benign solutions to global challenges on pollution control, resource reuse and renewable energy, for both industrial and societal applications.

Student designers

Joe Shade is an emerging industrial designer and product design student at De Montfort University (DMU) in Leicester, UK. He has industry experience in furniture and product design, 3D Printing, and consumer electronics. He has a strong interest in sustainability and design for repair which he has explored through an Enterprise Placement Year.

Thomas Wylam is a Product Design student at DMU (Leicester, UK). He practises design as a trifecta with his other interests in business and psychology. Rooted in his manufacturing placements, his work for start-ups focuses on regenerative solutions and finding economic success that supports the growth of new metrics such as community, wellbeing, and meaning. As an advocate of co-design, he enjoys getting hands-on through prototyping and practical explorations with stakeholders.

Tony Lorance is an enthusiastic Design Engineer and Product Design student at De Montfort University (DMU) in Leicester, UK. He has thorough understanding and experience in CAD (Computer Aided Design) modelling, technical drawings, reverse engineering, and manufacturing process from the automobile industry. He has a keen interest in research, prototyping, testing, and product development.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christine.white@dmu.ac.uk

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