

30
APR
2021

EIRES Lunch

**Energy, imaginaries, design,
and futures**

Dr. Dan Lockton | 12h00 - 13h00

EINDHOVEN INSTITUTE
FOR RENEWABLE
ENERGY SYSTEMS

TU/e

www.tue.nl/eires | eires@tue.nl



Industrial Design

HOME INDUSTRIAL DESIGN

EDUCATION

RESEARCH

VALORIZATION +

THE DEPARTMENT

WORKING AT

Welcome to the department of Industrial Design

We offer students and staff an international and academic, in other words intellectually stimulating, study and working environment that will inspire them to broadly-based personal development, social and cultural engagement and an entrepreneurial attitude. We are shaping a new discipline: designing and creating intelligent systems, products and related services. We combine cutting edge research in several domains to educate a new type of engineer.

Our industrial designers create connected solutions, combining products and services to suit individual needs. Both students and researchers can work with all stakeholders, customers and producers alike, who are not only involved, but are also essential contributors to the future sustainability of our world. Their role will be to mediate the developments in technology, the needs of people (culture & society) and the responsibility for properly using the power of ideas and values.



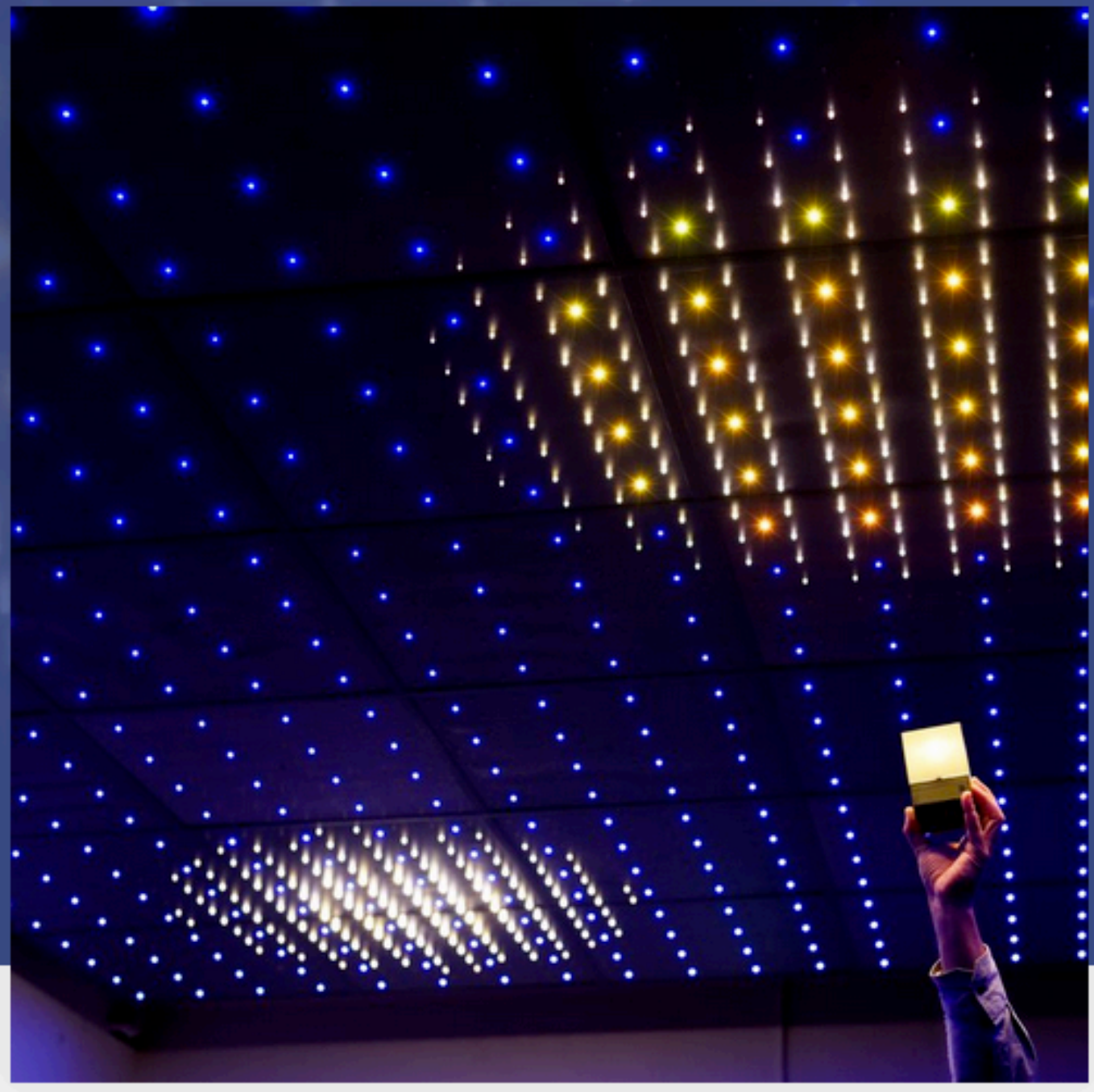
Education

Our unique educational model brings together

HOME / RESEARCH / RESEARCH GROUPS / FUTURE EVERYDAY

DEPARTMENT OF INDUSTRIAL DESIGN FUTURE EVERYDAY

Future Everyday aims at bridging the gap between emerging technologies and people's everyday life: how to deal with uncertainties that come naturally with new and still evolving technologies, and how to translate them into meaningful products, systems and services that seamlessly blend into everyday life.



THE FUTURE NEEDS TO BE TANGIBLE AND EXPERIENCEABLE, TO BE UNDERSTANDABLE

The cluster Future Everyday conducts research to understand, explore, and shape the everyday life of individuals and small groups, which encompasses the new reality of living, commuting, and working, with routines, rituals, and many nuances, in spaces that are becoming more continuous, dynamic, experiential, and responsive in the future with emerging technologies. We design and analyse the touch-points where humans and technologies meet and extend into each other - the permeable membrane between a system of technologies and a system of people. In the cluster Future Everyday, we carry on the proud tradition of the department to be always in the forefront of experimenting with emerging technologies. We currently focus on technologies such as internet of things, wearables and soft things, additive manufacturing, small and local data, artificial intelligence and machine learning, while exploring into smart materials and bio-materials.

READ MORE



**Carnegie
Mellon
University
Pittsburgh,
Pennsylvania
2016–2020**

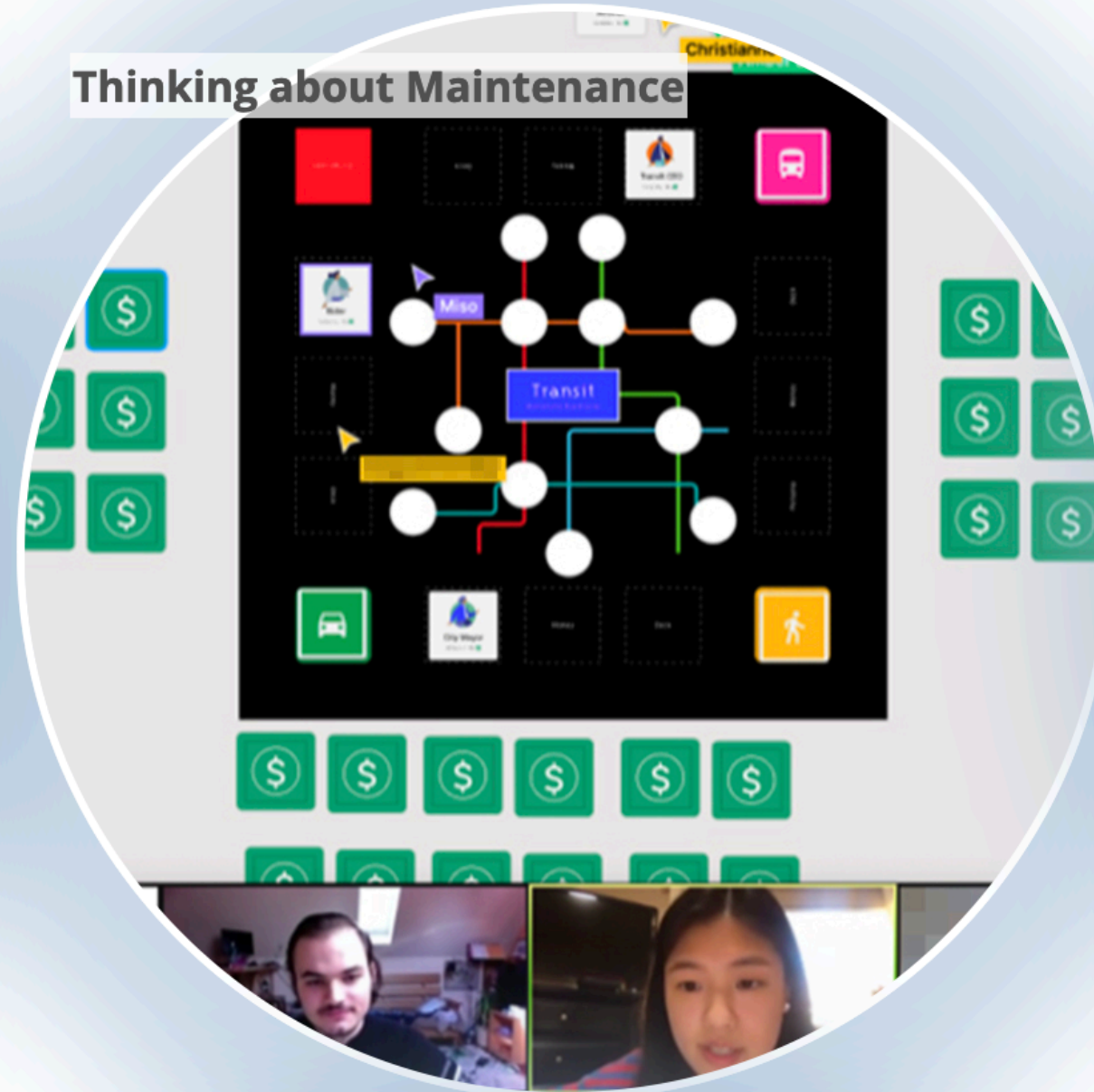
imaginaries lab

We're an international research studio using design methods to support people's imagining—new ways to understand, and new ways to live. →

Welcome to the Imaginaries Lab



Thinking about Maintenance



Imaginaries Lab: Maintenance project presentations, 31 October 2020



Spooky Technology



Sleep Ecologies presented at DIS 2020



New Metaphors



Royal College
of Art
London
2013–2016





**University of
Warwick
Coventry, UK
2011-12**

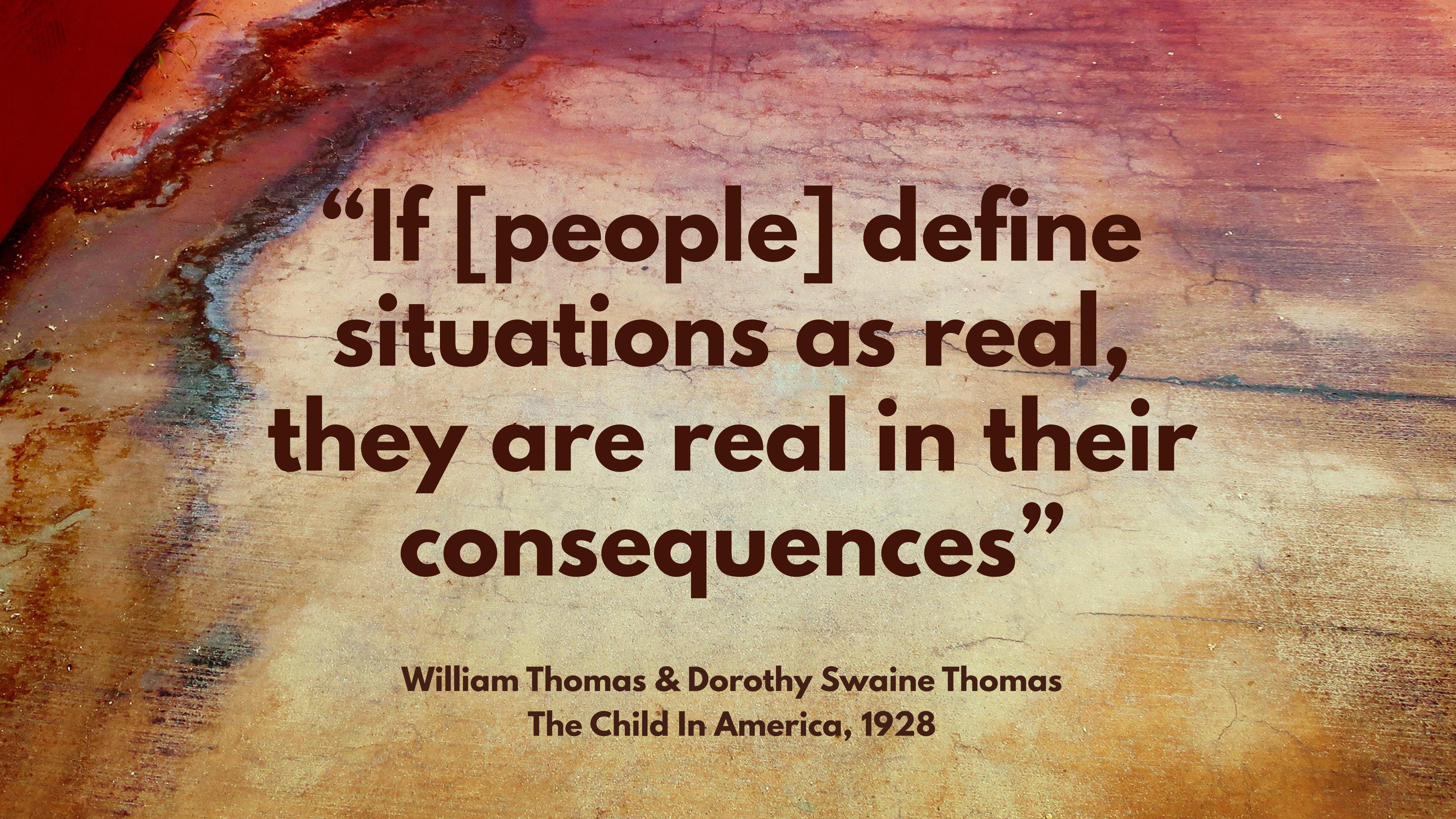
**Brunel
University
London
2007–2012**



**how design,
imaginaries, and
futures
relate to energy**



imaginaries



**“If [people] define
situations as real,
they are real in their
consequences”**

**William Thomas & Dorothy Swaine Thomas
The Child In America, 1928**



**how do people make
sense of things?**

**mental models
metaphors
mental imagery
folk theories
stories**

Imaginarities show how
“observed facts of nature are
refracted through **collective
desires for logic and order**,
producing authoritative
representations of how the
world works—as well as **how it
should work**”



Sheila Jasanoff
and Sang-Hyun Kim,
Dreamscapes of Modernity, 2015



**people often act
on their model
of the situation**

(designers work with this a lot)

**‘When we don’t know
how a thing works,
we make it up’**

**Lou Downe, former Head of Design,
UK Government Digital Service**



**‘We can only trust
something if we think
we know how it works’**

**Lou Downe, former Head of Design,
UK Government Digital Service**



climate crisis
public health (inc pandemics)
resources
social equity
the law
the government
the economy
quality of life

energy systems

‘transitions’

artificial intelligence

‘algorithms’

personal data and privacy

social media

‘the Internet’

cities (and rural areas)

neighbourhoods

communities

regions

organisations

nations



**why are we
finding it so hard
to do anything
about _____?**

**-our narratives, our
understandings of ourselves
and the systems we're in, are
limited by enormity or
complexity or invisibility**



**why are we
finding it so hard
to do anything
about _____?**

**-we're 'trapped' in
particular understandings
or ways of imagining how
things could be**



**why are we
finding it so hard
to do anything
about _____?**

**-there's been a focus on
individual behaviour change
rather than systemic and
infrastructural issues and
power structures**

**public
imagination**

- **how things work now**
- **how other people think**
- **how the future could be**

Google

[All](#) [Images](#) [News](#) [Videos](#) [Shopping](#) [More](#) [Settings](#) [Tools](#) [Sign in](#) [SafeSearch](#)

[concept](#)
[futuristic](#)
[sci fi](#)
[wallpaper](#)
[cyberpunk](#)
[green](#)
[minecraft](#)
[anime](#)
[beautiful](#)
[technology](#)
[underwater](#)
[cartoon](#)
[uto](#)

The grid contains 24 image search results, each with a thumbnail image and a caption. The captions include:

- sustainable cities could look ... nationalgeographic.com
- Why neuroscience research will be ... inverse.com
- Dreaming of the future cities - Smart ... smartcitiesworld.net
- Ten Steps to Build the Cities of the ... real-leaders.com
- SOM | SOM Collaborates with National ... som.com
- Future Cities Smart Cities Future For All futureforall.org
- Automated City of the Future Look Like ... smithsonianmag.com
- 7 Future Cities of the World helicopter-view.com
- Future Cities 2 - YouTube youtube.com
- City Concepts That Could Be Your ... zipcar.com
- Future Cities - CNN cnn.com
- Future cities | Shell Global shell.com
- Past visions of future cities were ... theconversation.com
- Smart vs Green: Technology Paradigms ... thenatureofcities.com
- Shaping Future Cities | FM Industry ... fmindustry.com
- Future Cities and urban transformation ... moderndiplomacy.eu
- Smart to Future Cities Reveals Key ... itprotoday.com
- Virtual cities: Designing the ... bbc.com

A row of 7 additional image thumbnails showing various futuristic cityscapes, including tall skyscrapers, green buildings, and abstract architectural forms.

Related searches

- [futuristic future cities](#) >
- [cyberpunk future cities](#) >



Global energy in 2050 – can renewables...
physicsworld.com



Siemens signs up to blockchain energy ...
smartcitiesworld.net



New Thermal Battery Could Be A 'Game ...
forbes.com



Global Energy Review 2020 – Analysis - ...
iea.org



Energy Security | OSCE
osce.org



New Energy Solutions
wbcsd.org



Renewable energy empowers consu...
theneweconomy.com



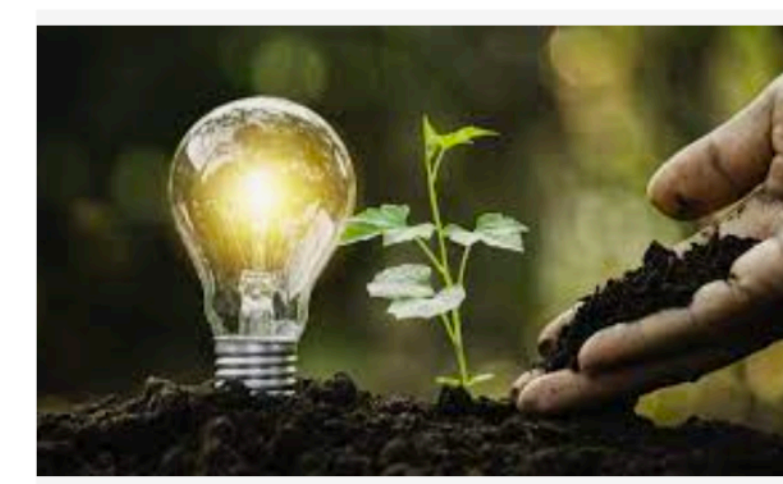
Energy Return on Investment ...
greentechmedia.com



IPMVP: Understanding Energy Savings ...
gridpoint.com



grid-scale battery installation ...
techcrunch.com



Hotel Energy Solutions (HES) | UNWTO
unwto.org



Fostering Effective Energy Transition ...
weforum.org



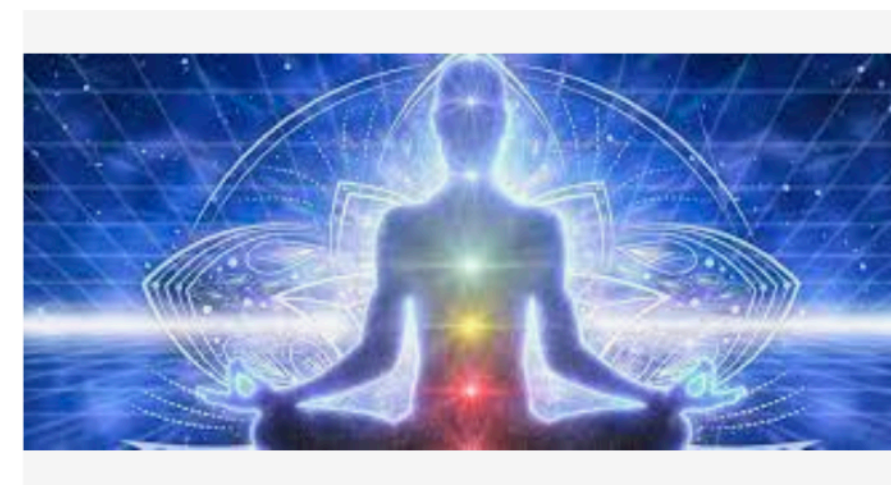
7 Renewable Energy World
forbes.com



call for 100% renewable energy scenario ...
euractiv.com



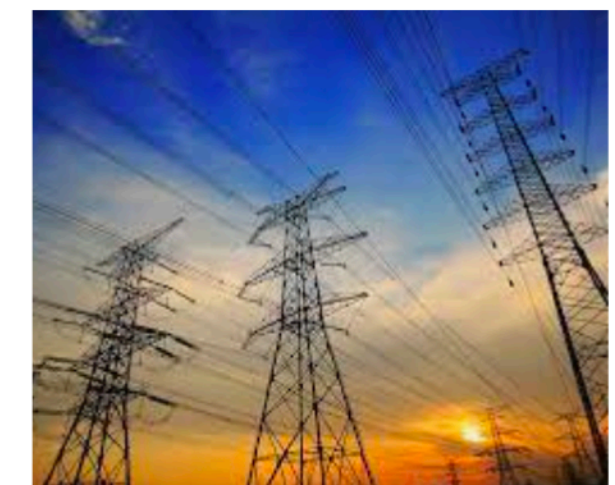
Potential and Kinetic Energy Explained ...
justenergy.com



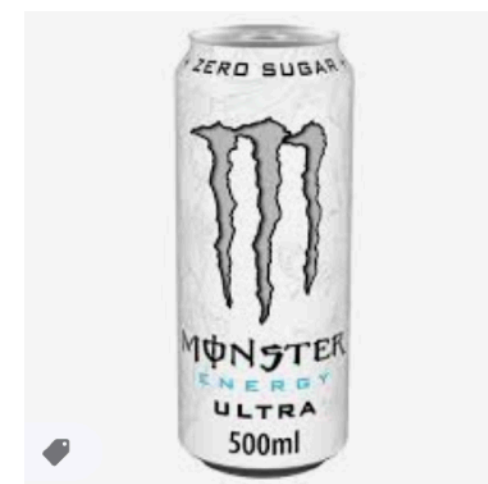
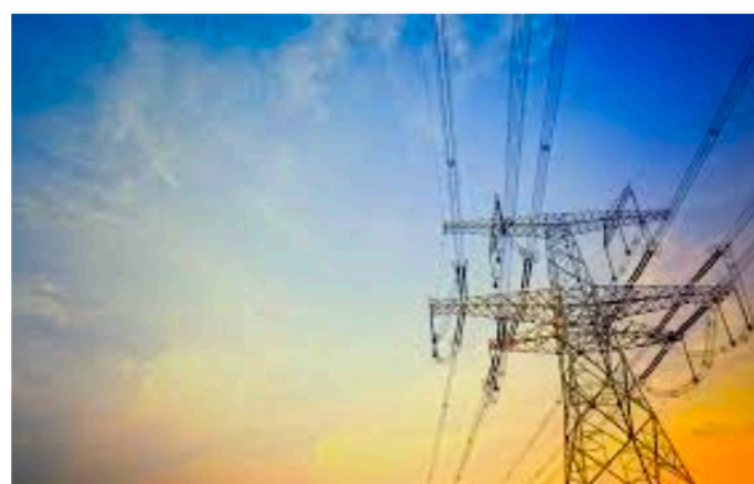
The Energy That Wasn't There | Office ...
mcgill.ca



Global Energy Review 2021 – Analysis - ...
iea.org



Dentons - Energy
dentons.com

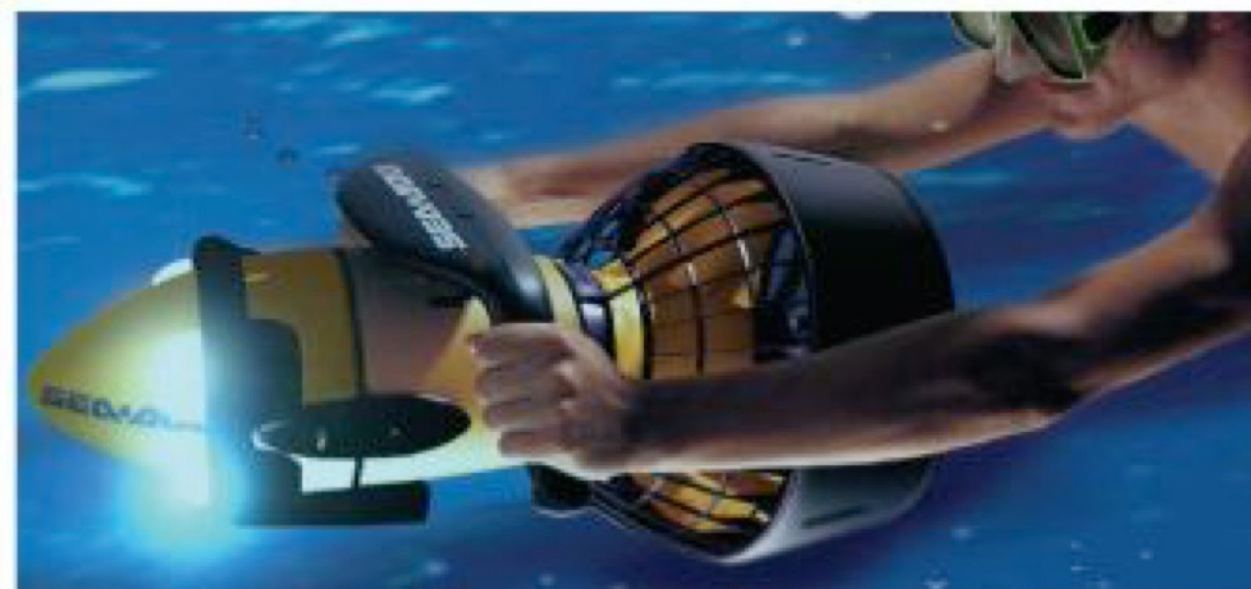
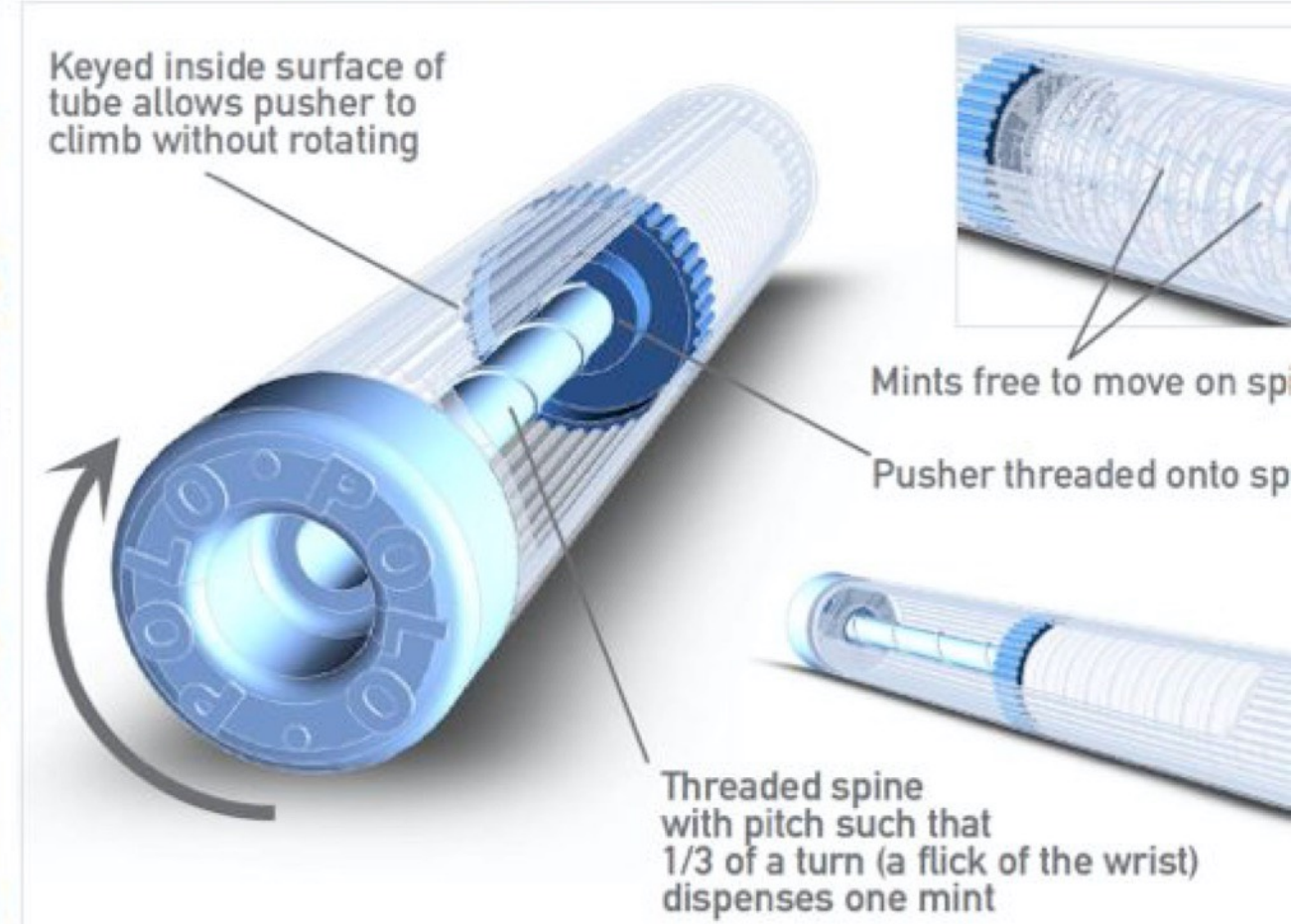
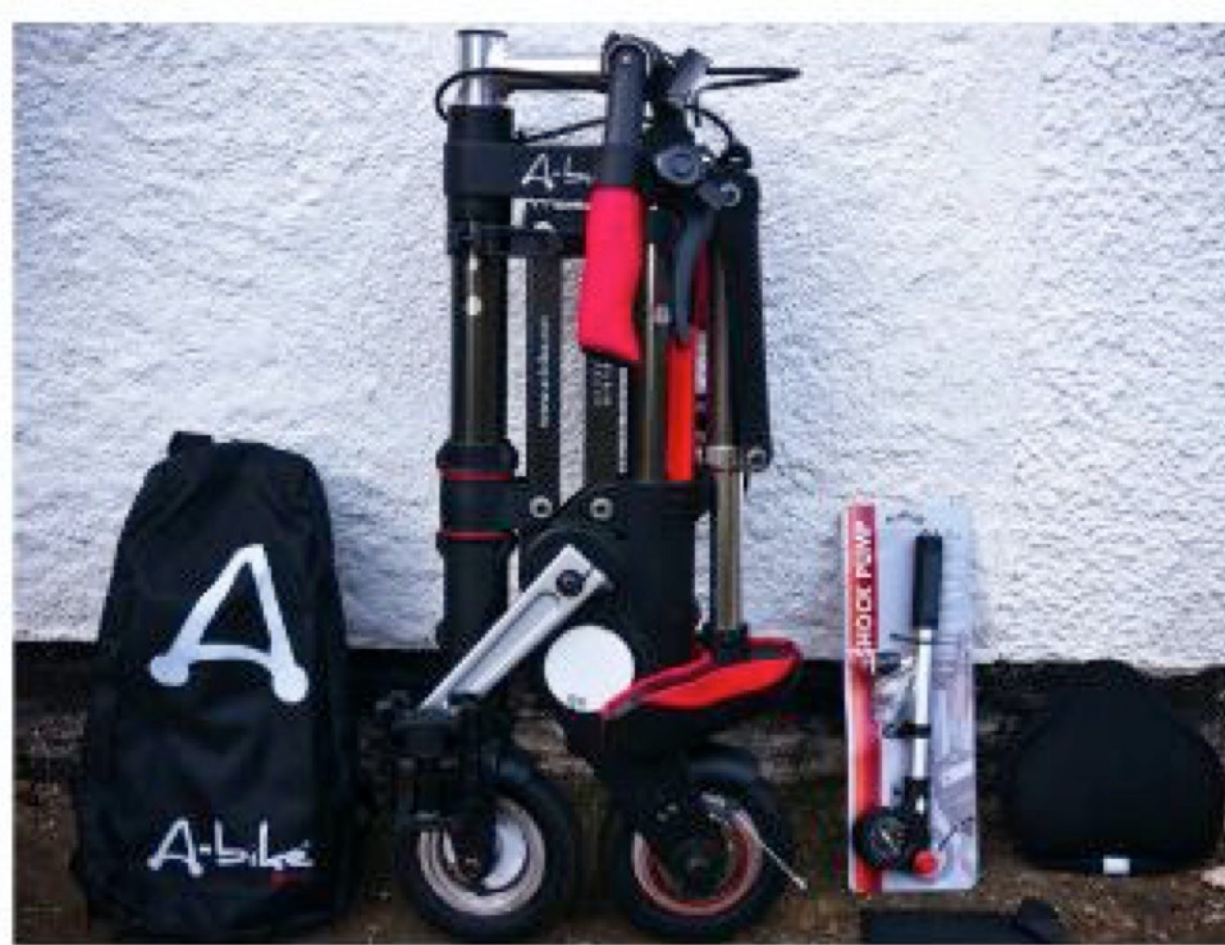


**Get imaginaries
out of people's
heads and into a
shared space**

making

imaginaries

tangible



DAN LOCKTON || REBEL WITHOUT APPLAUSE | LIGHTWEIGHT TRANSPORT DESIGN | GRAFSPRAY



Welcome : About this site

Send an example (or picture) or add a comment

Increasingly, many products are being designed with features that intentionally **restrict** the way the user can behave, or **enforce** certain modes of behaviour. The same intentions are also evident in the design of many systems and environments.



How products increasingly control and restrict your behaviour

HOME

[Architectures of Control Blog](#)
[Welcome: About this site](#)

INTRODUCTION

[What are architectures of control in design?](#)

THE RANGE OF ARCHITECTURES OF CONTROL

[The built environment](#)

[The digital environment](#)

Design for behaviour change

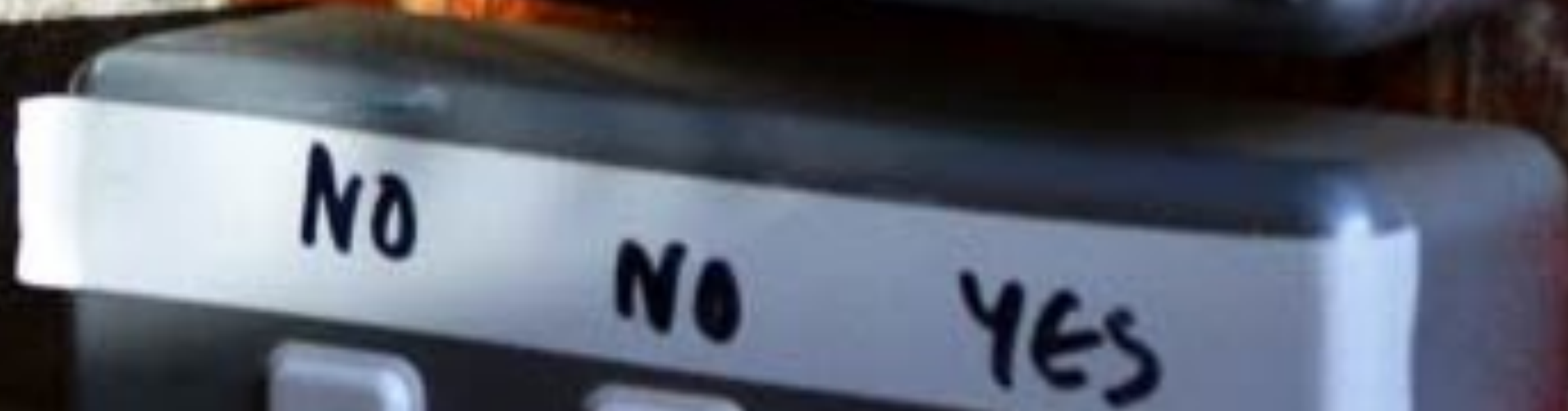
Persuasive technology

Design for sustainable behaviour

U
RIJDT
km
h







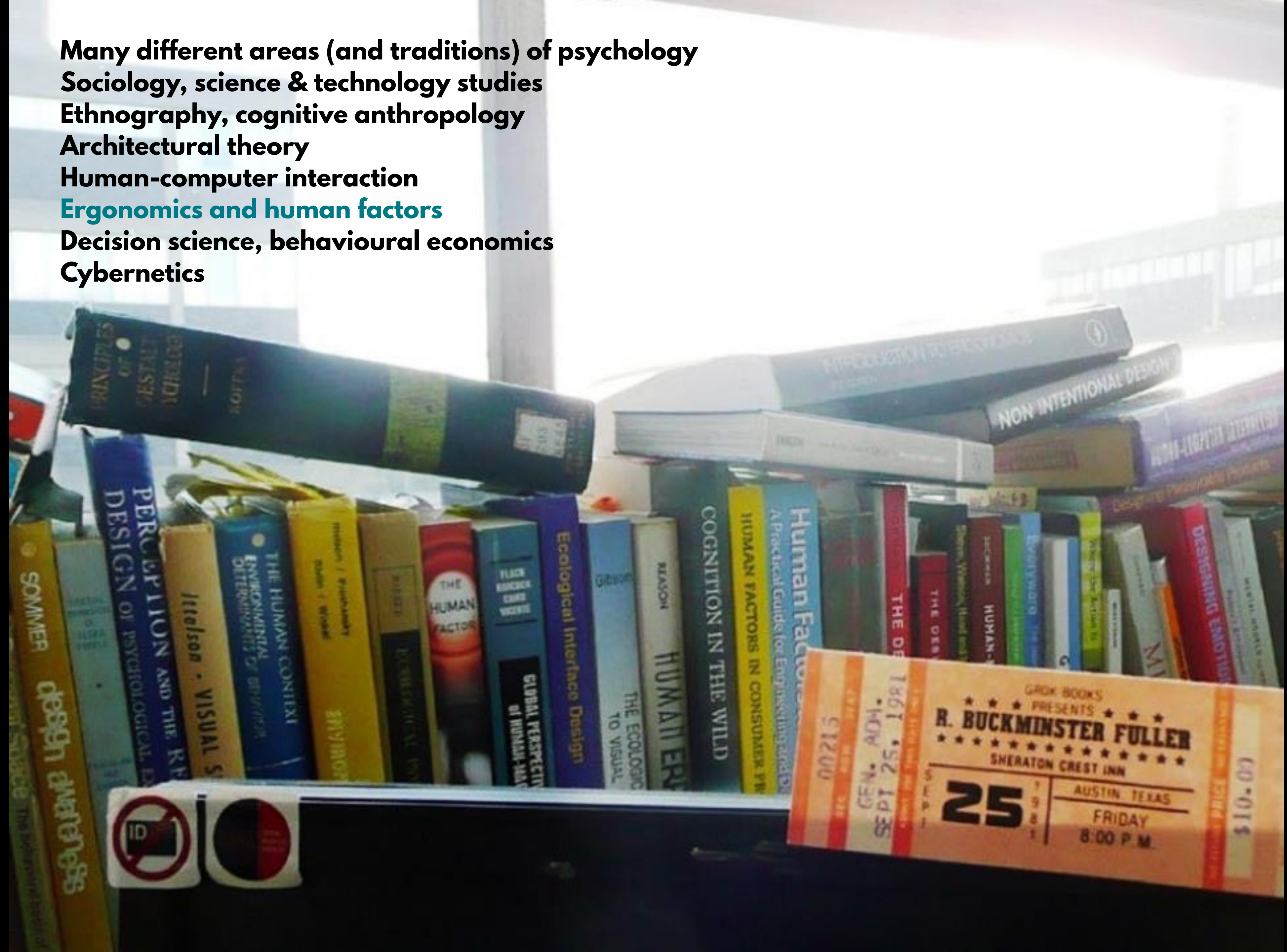
**‘We design our world,
while our world acts back
on us and designs us’**

Anne-Marie Willis, ‘Ontological Designing’, 2006

**Every piece of technology
'encodes a hypothesis
about human behavior'**

Adam Greenfield, Against the Smart City, 2013

Many different areas (and traditions) of psychology
Sociology, science & technology studies
Ethnography, cognitive anthropology
Architectural theory
Human-computer interaction
Ergonomics and human factors
Decision science, behavioural economics
Cybernetics



PRINCIPLES OF VISUAL DESIGN

SOMMER design awareness

PERCEPTION AND THE PSYCHOLOGICAL DESIGN OF PSYCHOLOGICAL DESIGN

THE HUMAN CONTEXT ENVIRONMENTAL DETERMINANTS OF BEHAVIOR

ENVIRONMENTAL PSYCHOLOGY

THE HUMAN FACTOR

Ecological Interface Design

REASON HUMANITY THE ECOLOGIC TO VISUAL

COGNITION IN THE WILD

Human Factors A Practical Guide for Engineering and Design

HUMAN FACTORS IN CONSUMER PSYCHOLOGY

THE DEBATE

HUMAN-COMPUTER INTERACTION

DESIGNING EMOTIONS



00215
GEN. ADM. SEPT 25, 1981
GROK BOOKS PRESENTS
R. BUCKMINSTER FULLER
SHERATON CREST INN
AUSTIN, TEXAS
FRIDAY
8:00 P.M.
25
\$10.00

Design for sustainable behaviour

The *Design with Intent* toolkit has been widely adopted by educators, researchers, designers and businesses worldwide.

Philips, Autodesk, Sony, Ubisoft, IDEO, and the BBC are among the organisations who have used the toolkit, or bought copies. It offers a critical-but-generative approach to **using design to influence people's behaviour**, with a particular focus on more sustainable behaviour.

(Along with other approaches to behaviour change, the toolkit was also used in *Creating Sustainable Innovation through Design for Behaviour Change*, a UK + Netherlands collaboration working with SMEs.)



Dan Lockton



Design with Intent toolkit

A cross-disciplinary design pattern library for behaviour change with products, services and environments; developed through workshops with industry and academia



Dan Lockton, David Harrison, Neville Stanton. 2010. The Design with Intent Method: a design tool for influencing user behaviour. *Applied Ergonomics* 41(3), 382-392. <http://doi.org/10.1016/j.apergo.2009.09.001>

Puesto

¿Puedes utilizar los elementos del entorno para crear un espacio que facilite una actividad?



En una esquina muy transitada se adaptó el espacio colocando un tendedero para que los periódicos fueran visibles y un cartel naranja en un árbol para dar a conocer lo que se vende.



Jednoduchost

Jak jednoduše můžeš složit prvky dohromady, abys uživateli ulehčil jeho záměry?



Ekotlačítka dovolují uživateli uvést počítač do nízkoeenergetického stavu pouze jedním kliknutím, je tak mnohem jednodušší ušetřit energii



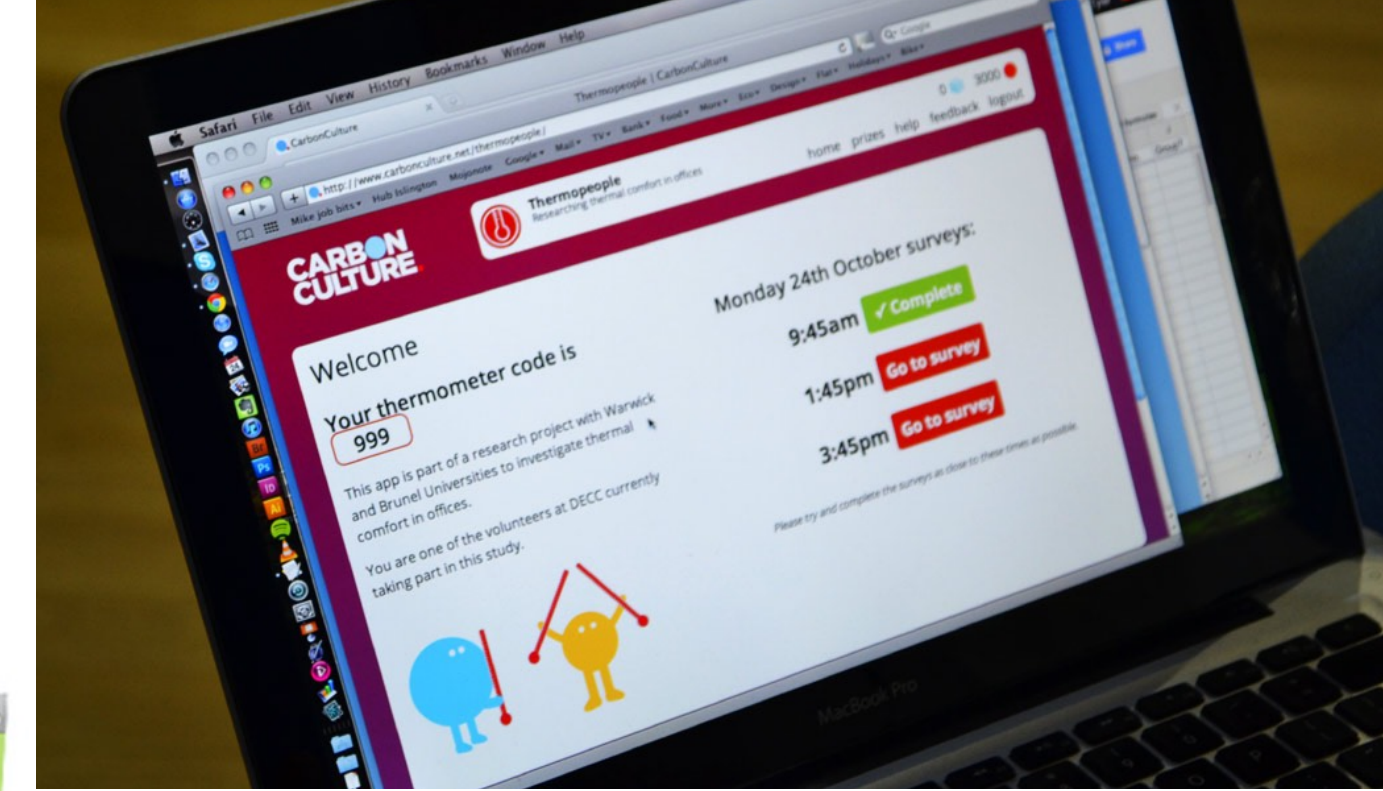
energy use

EMPOWER / CarbonCulture

Industry + academia + public sector (inc 10 Downing St)

- Applying design research methods to **reducing carbon impact of workplaces**
- Engaging staff with **energy use data and behaviour** through a digital platform

UK



10 Downing Street home about feedback login Powered by CARBON CULTURE.

About this building

The Downing Street complex is a four storey Grade-I and II listed brick built Georgian terraced townhouse. It is a home to the Prime Minister and his family, and a busy office and workplace for the PM and his support staff. In 1732 the first-ever PM Robert Walpole refused to accept the house as a personal gift from King George II. Instead he insisted it be used by future First Lords of the Treasury. In 1735 the architect William Kent connected No.10 Downing Street to a larger house at the rear of the property (erected in 1677) facing Horse Guards Parade. 100% of PMO's electricity supply is on a green tariff, generated from renewable sources.

Our energy use

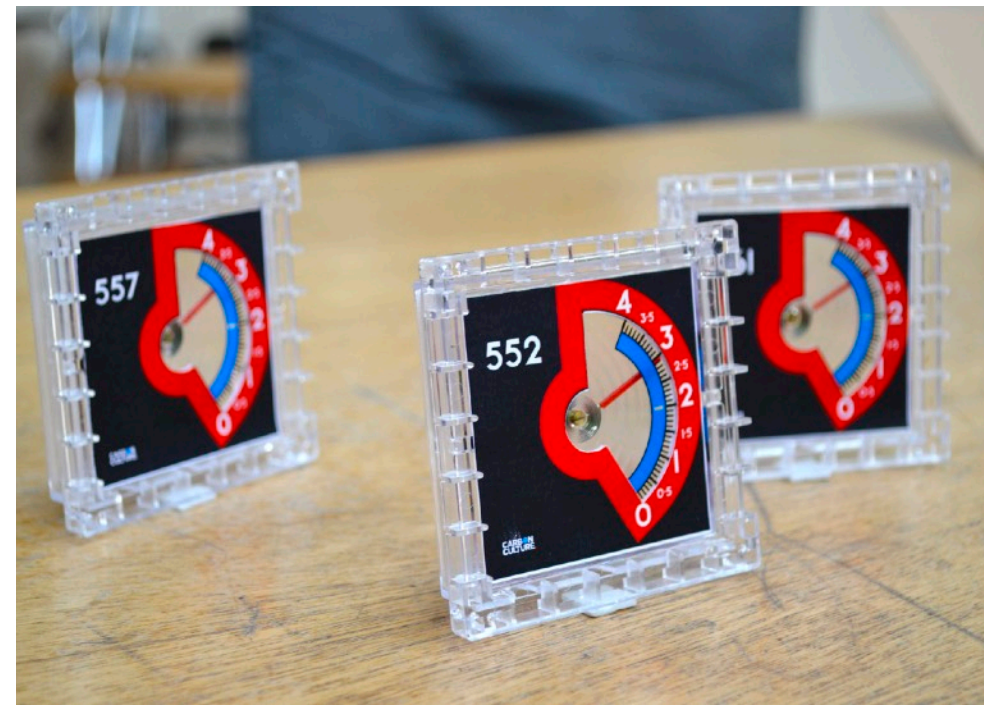
From midnight on 28 Feb to 22:48 on 5 Mar, 10 Downing Street has used:

15991 kWh Energy use 15990kWh in Electricity 1kWh in Gas Average 95kWh per hour	£1386.16 Energy cost £1386.13 from Electricity £0.03 from Gas Average £8.25 per hour	8389kg Carbon impact 8388kg for Electricity 0kg for Gas Average 49kg CO ₂ per hour
--	---	--

10 Downing Street

This graph allows everyone to access a range of data from our offices at no.10. It's generated in real-time from data taken every 5 seconds from the on-site meters.

24 hours Week Month Total Electricity Gas



Dan Lockton

Dan Lockton, Luke Nicholson, Rebecca Cain, and David Harrison. 2014. Persuasive technology for sustainable workplaces. *Interactions* 21(1), 58-61. <https://doi.org/10.1145/2544170>



**contextual factors
often outweigh
individual
intentions**

SusLabNWE

Academia + social housing organisations + non-profits

- Living Lab studies on **sustainability and energy use**
- Understanding people's domestic energy use behaviour through combining **quantitative** sensor data with **qualitative** design insights

Netherlands, Sweden, Germany, UK

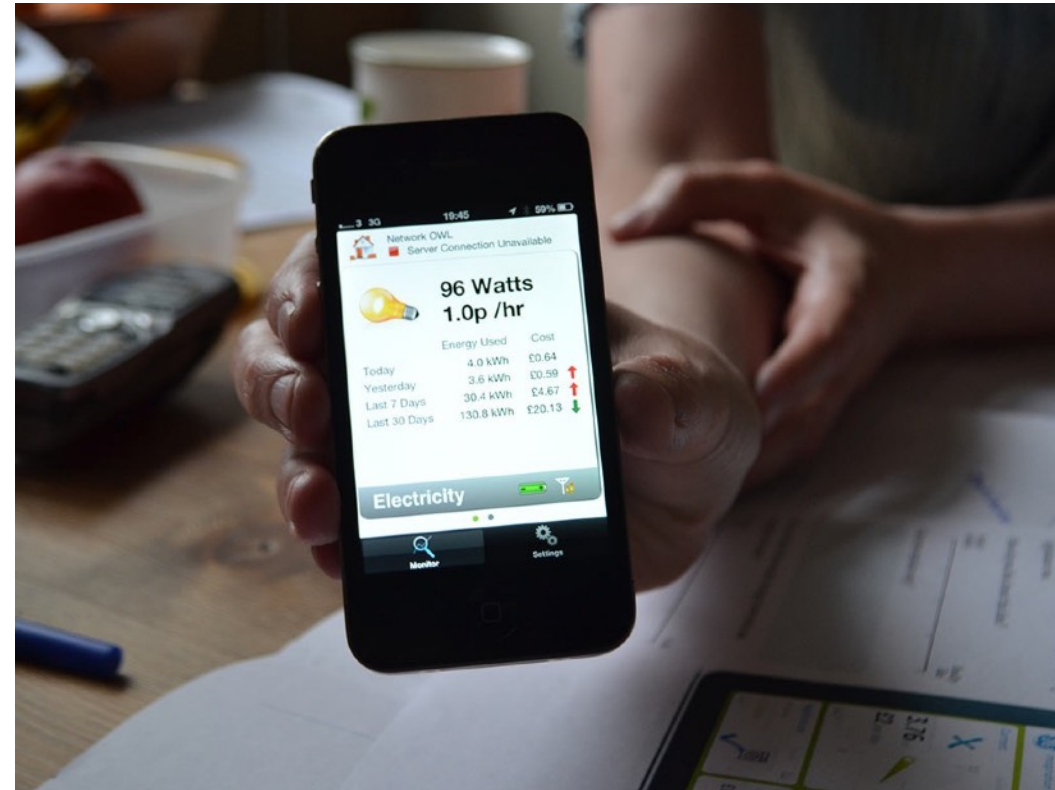
Home About Partners & Team Research News

The 11 partners in SusLabNWE

Locations
Research for SusLab is carried out in: Rotterdam, London, Goteborg and Nordrhein-Westfalen

Partner log-in

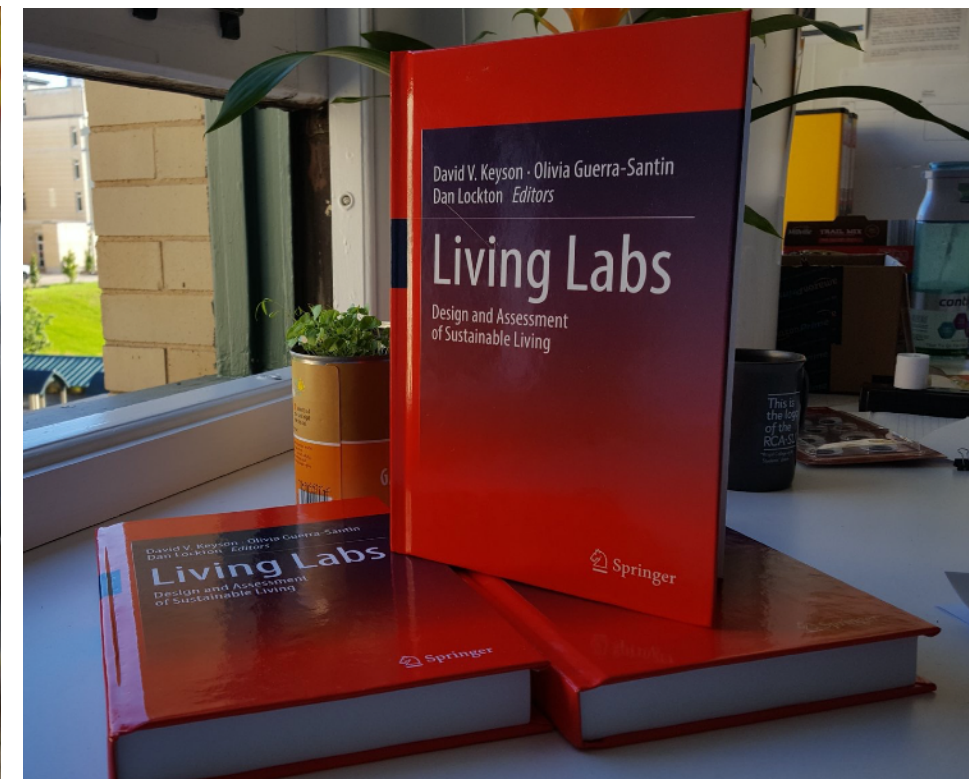
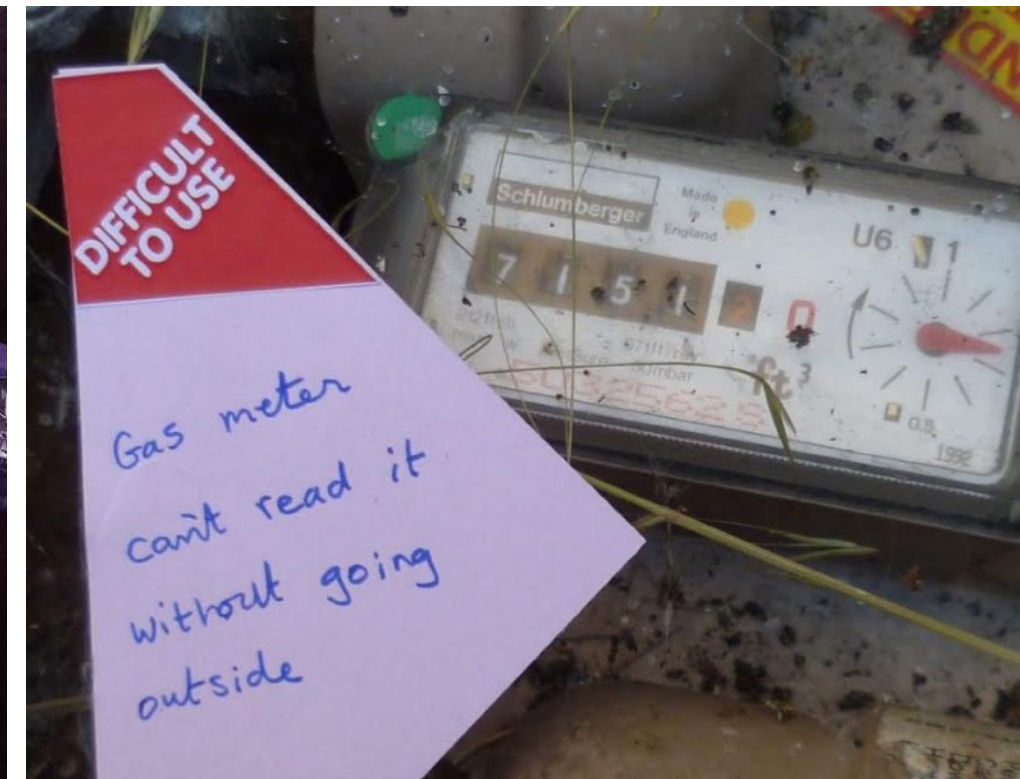
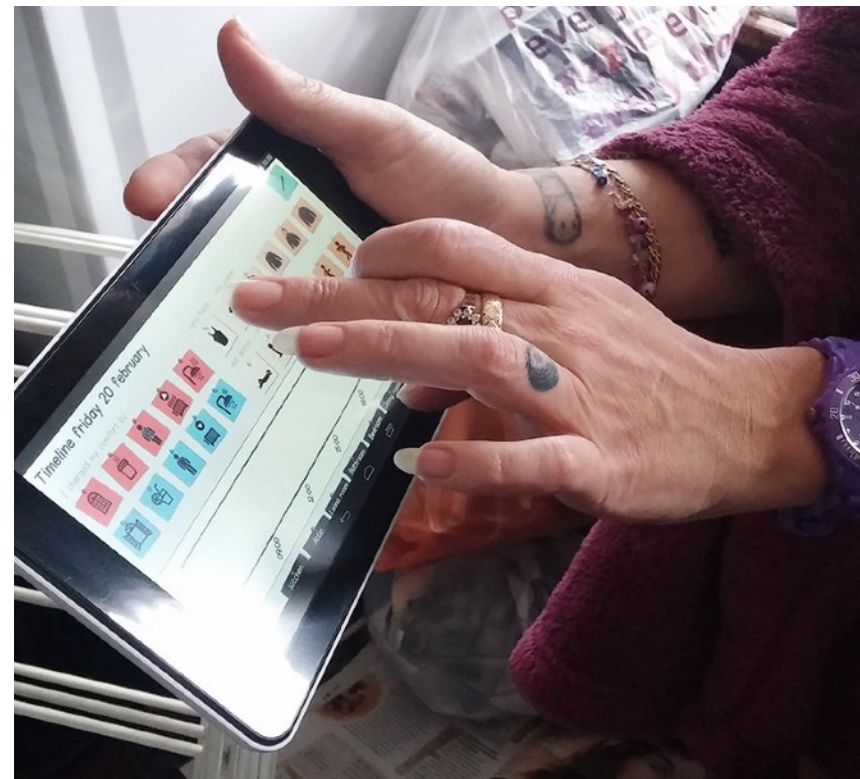
Partners: Johanneberg Science Park, Chalmers TH, Institute for Sustainability, CityPorts Academy, TU Delft, Woonbron, Hochschule Ruhr-West, Wuppertal Institute, InnovationCity Ruhr, Royal College of Art, Imperial College London, Nordrhein-Westfalen.



Investing in Opportunities

This project has received European Regional Development Funding through INTERREG V B.

INTERREG V B



A photograph of a cluttered utility area, possibly under a sink. On the left is a wooden cabinet door. To its right is a green-painted wall. In the center, a white digital scale sits on a wooden shelf. In front of it is a white bottle with a yellow label that says "ECOLAB Lime-A-Sorb". To the right of the scale are several other bottles, including a large clear plastic jug and a smaller white jug with a red cap. A black mat is on the floor in the foreground. A semi-transparent dark grey box with white text is overlaid on the right side of the image.

Energy's 'invisibility' is a key issue in people's understanding

**mental models
and mental
imagery**

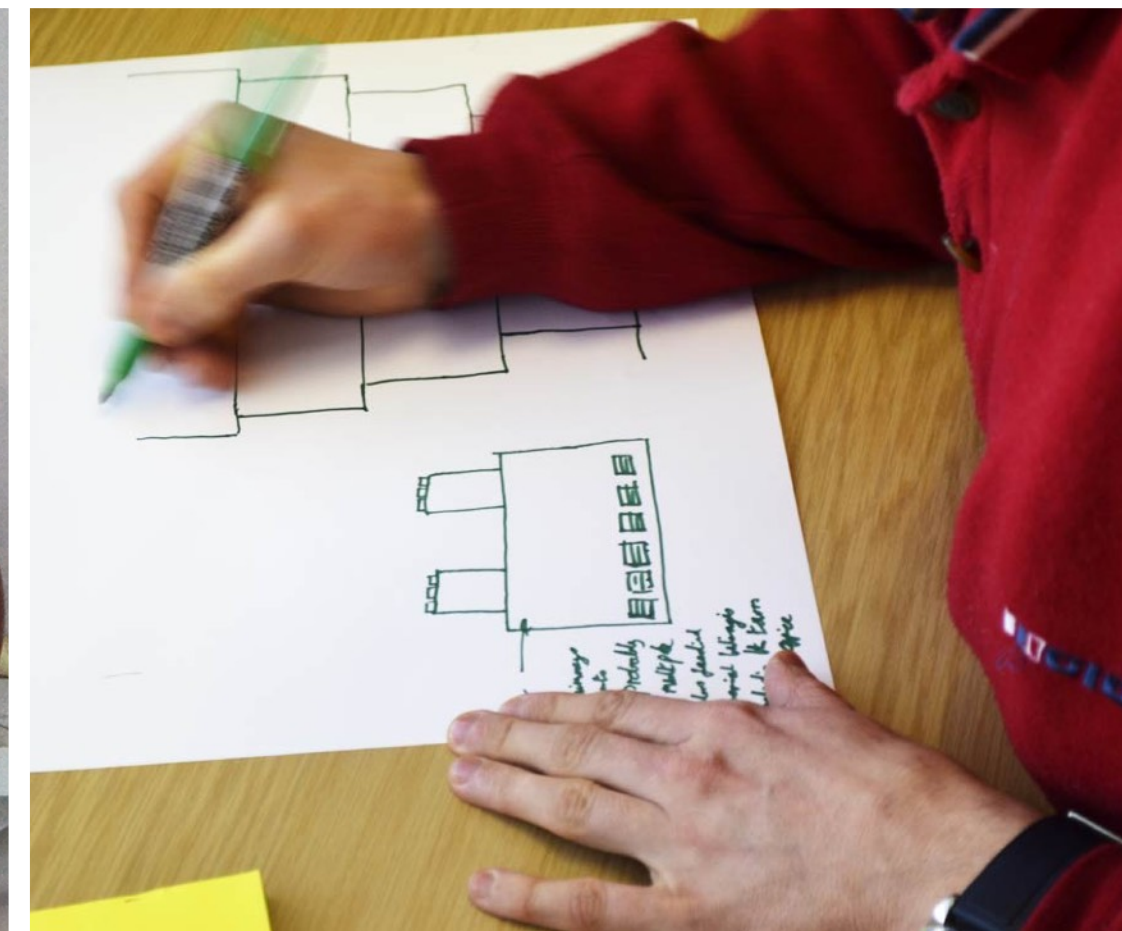
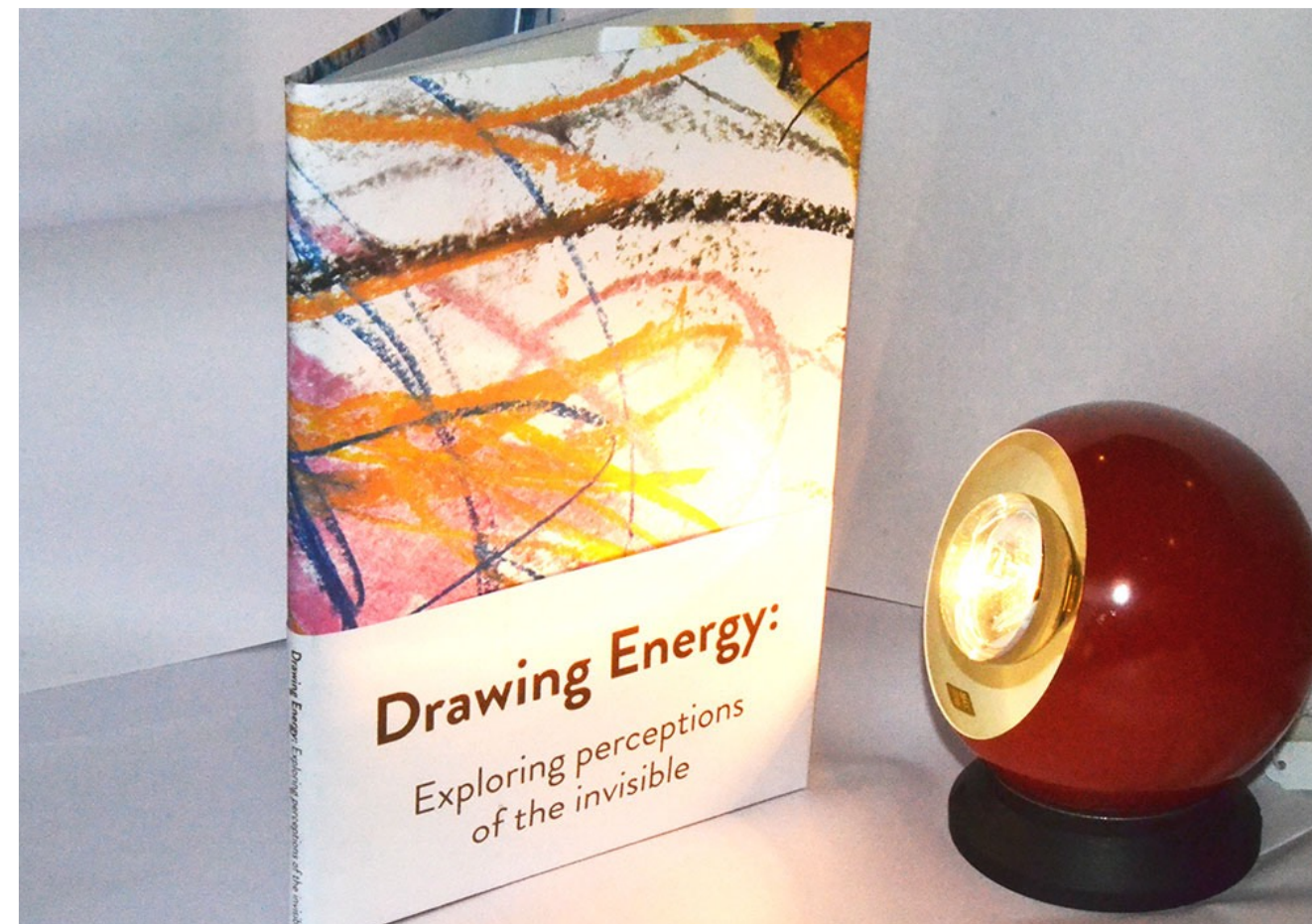
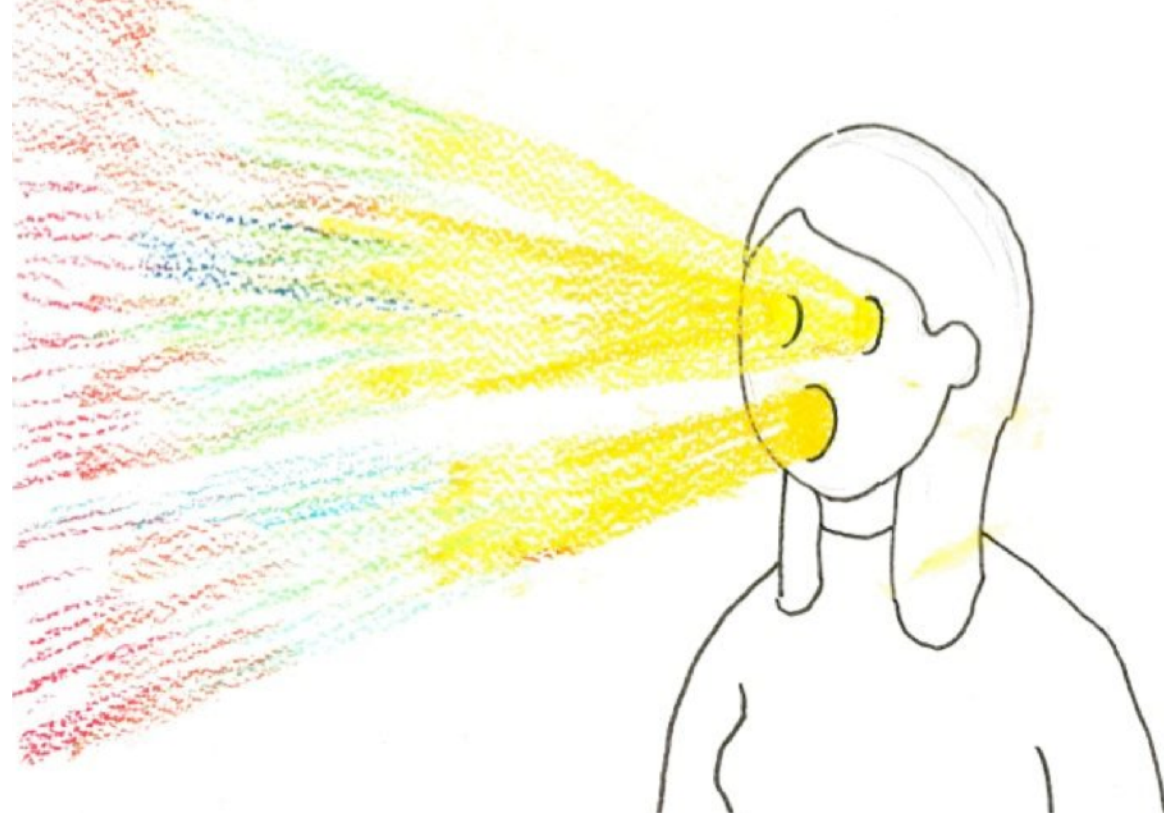


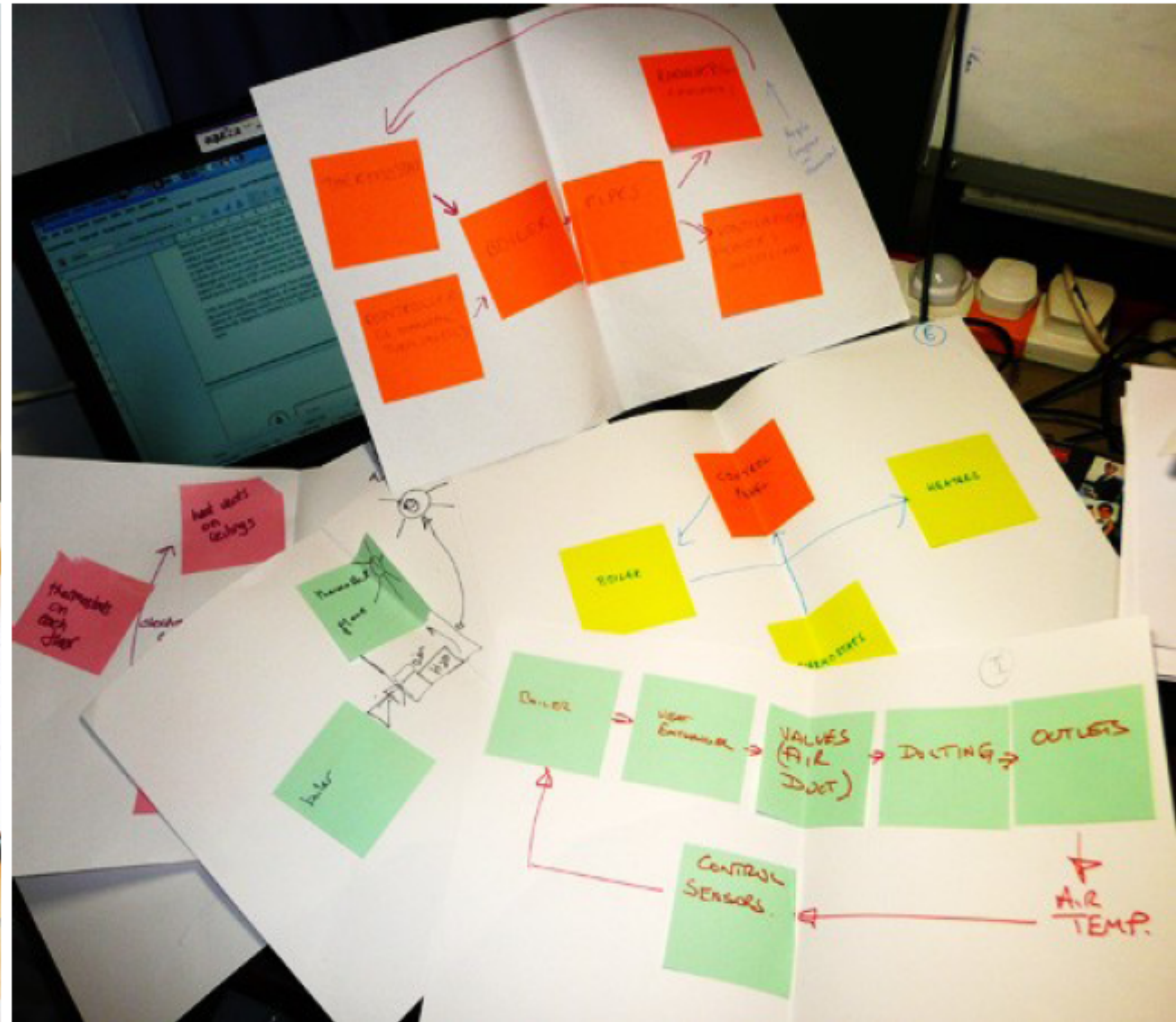
Public understanding of energy

Using **participatory drawing methods** to explore public understanding of energy

- Events at V&A Digital Design Weekend, a major creative technology festival, and at UK Art Science Prize: 180 participants from multiple age groups
- Metaphors, mental models, and associations explored, with design implications considered

UK





Mental model diagrams of the HVAC system

Participants generally seemed happy to produce diagrams using Post-It notes, although some saw



New York

POWER

Customer

Customer

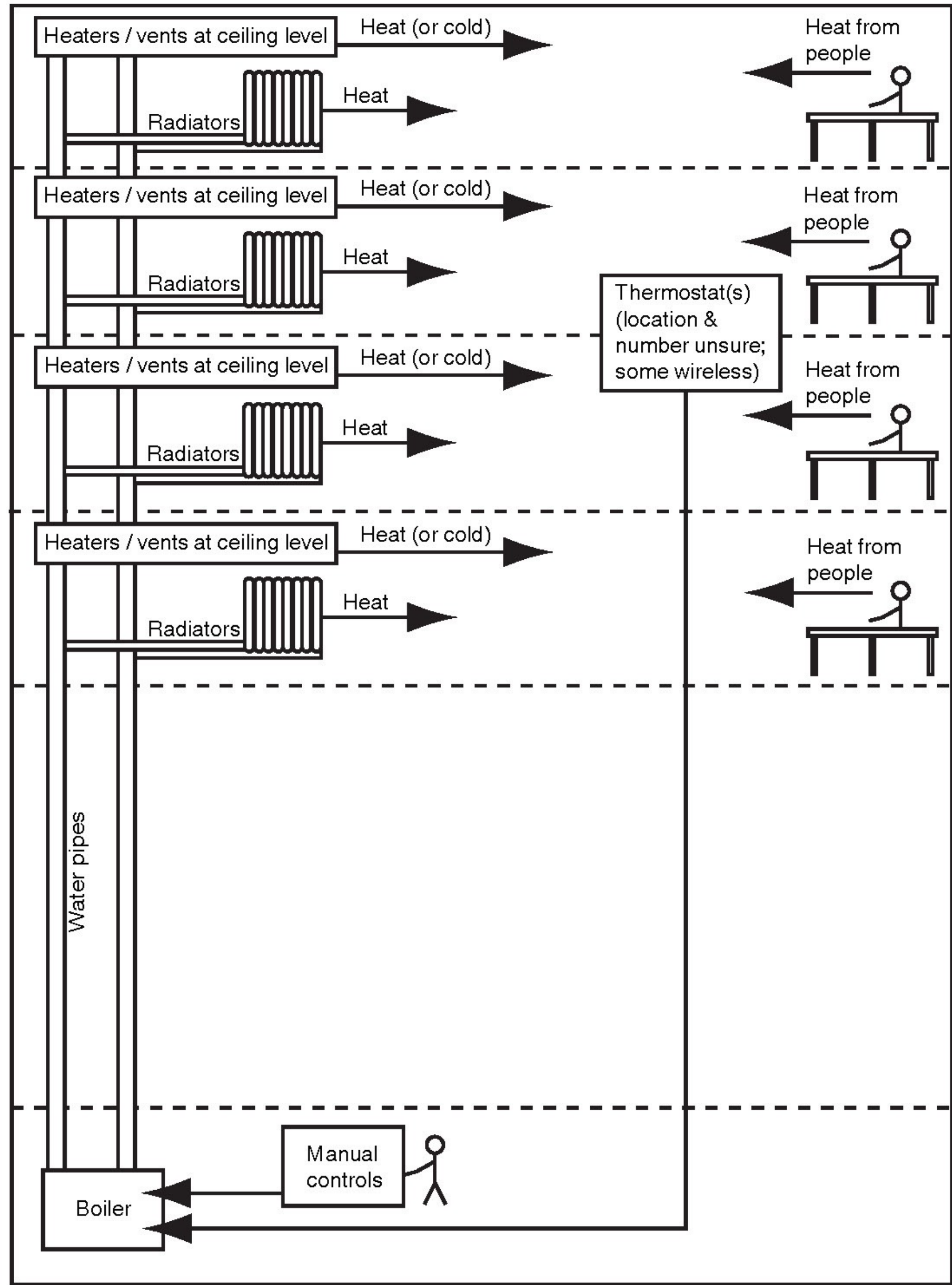
www.networkflow.com



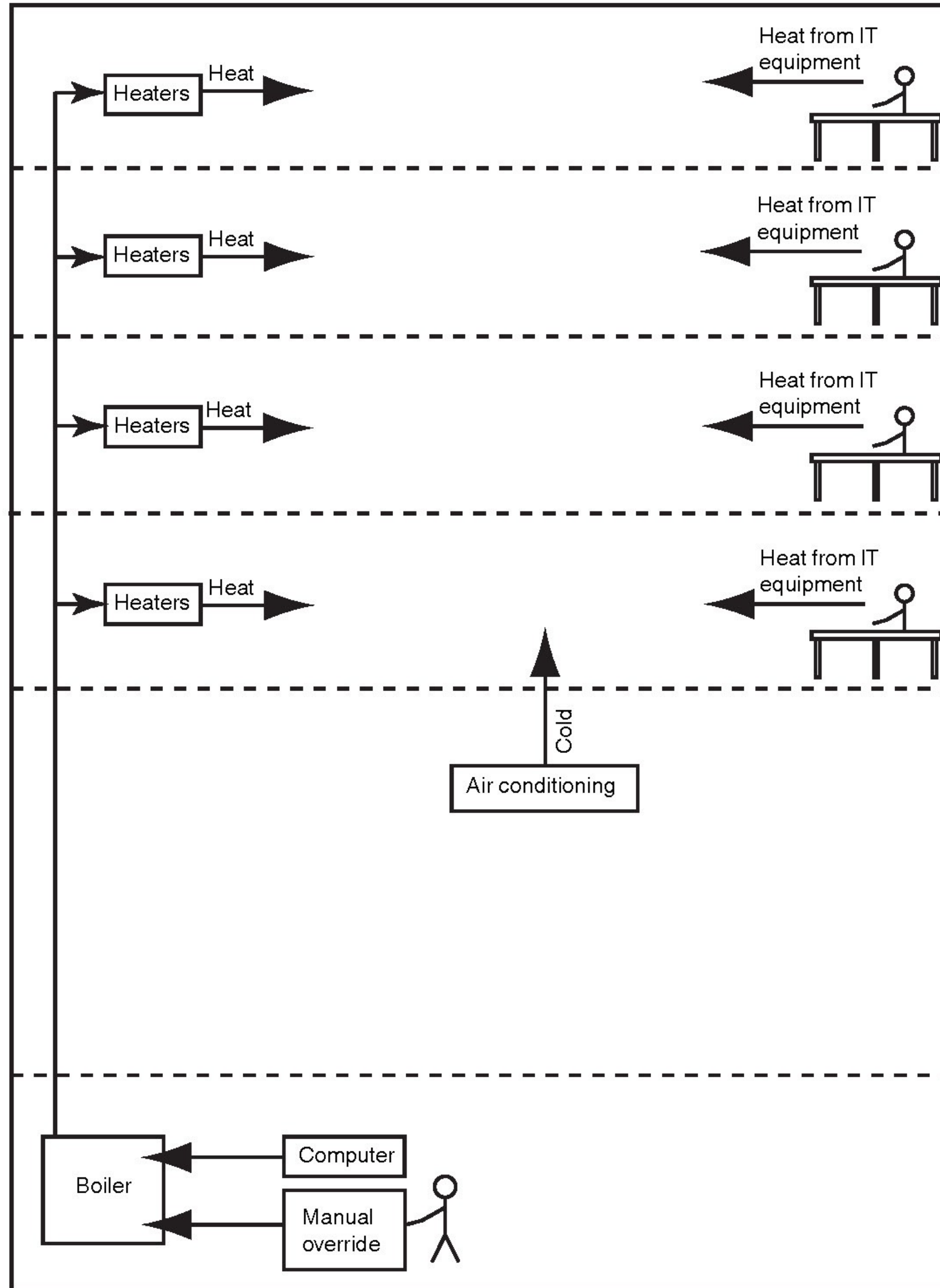
always
into
probably
multiple
has funded
social savings
with the team
office

ALPACA

B



H



**using design methods to
understand
how people
understand**



**using design methods to
help people
understand
in new ways**



New interfaces for electricity data

Using **data sonification** and **cymatic** (vibration) displays to explore new ways to understand electricity use data, and for public engagement

- Powerchord uses birdsong or other 'sound sets' to give **real-time** sonification of power from multiple appliances
- Electric Acoustic uses ambient sound and a vibration display to display **patterns in energy use** for a building over time

USA and UK

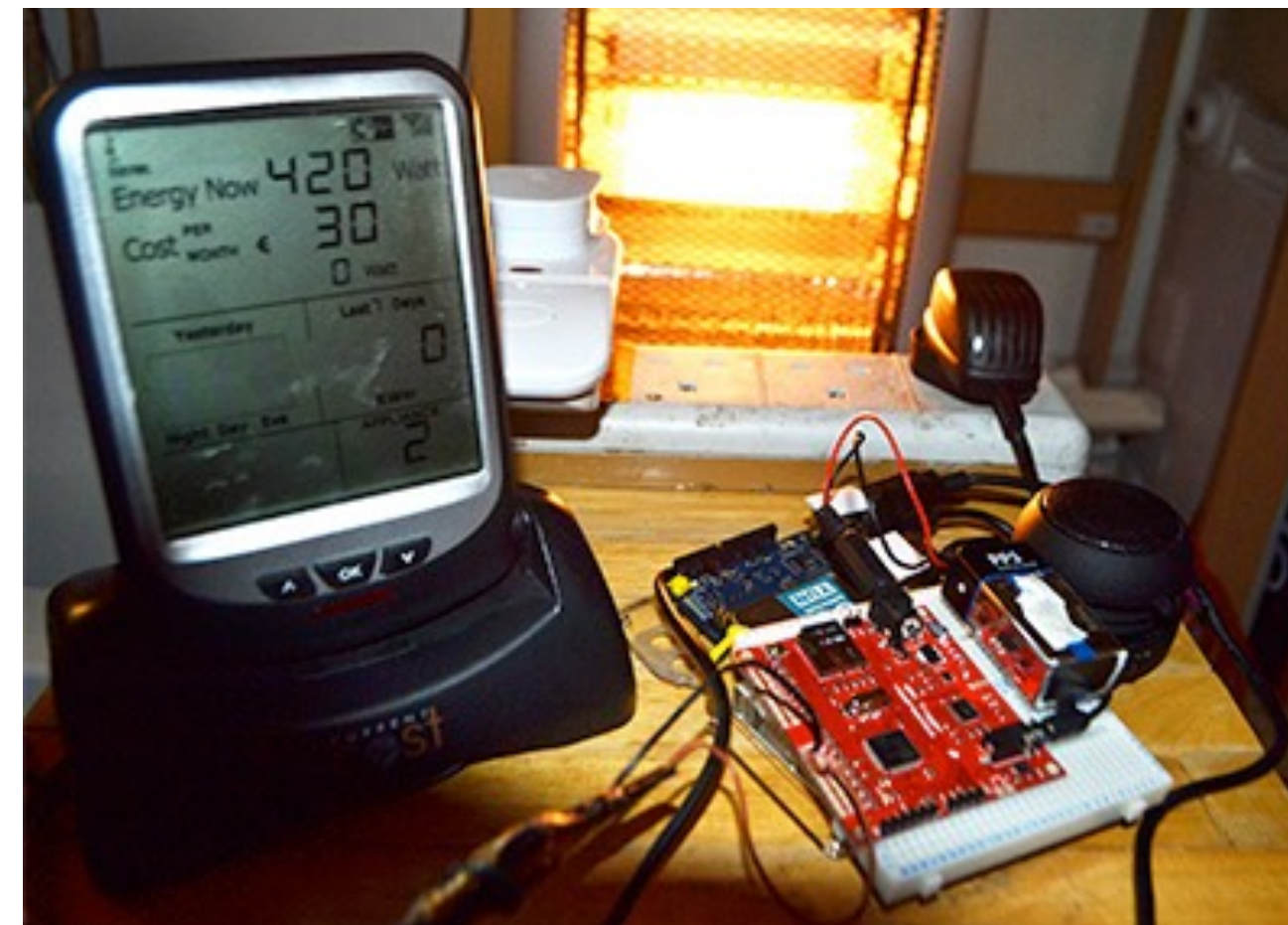
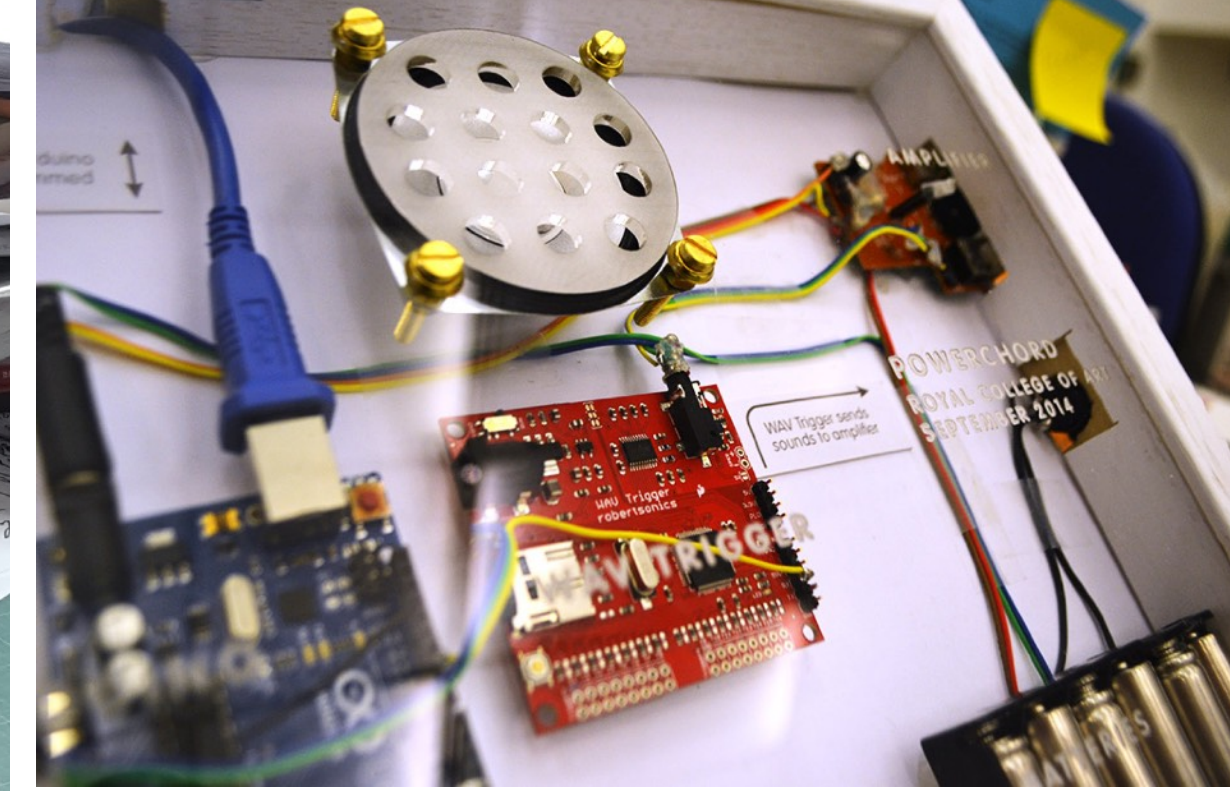
Carnegie Mellon University


Royal College of Art
Postgraduate Art and Design

imaginaries lab

V&A

Maker Faire



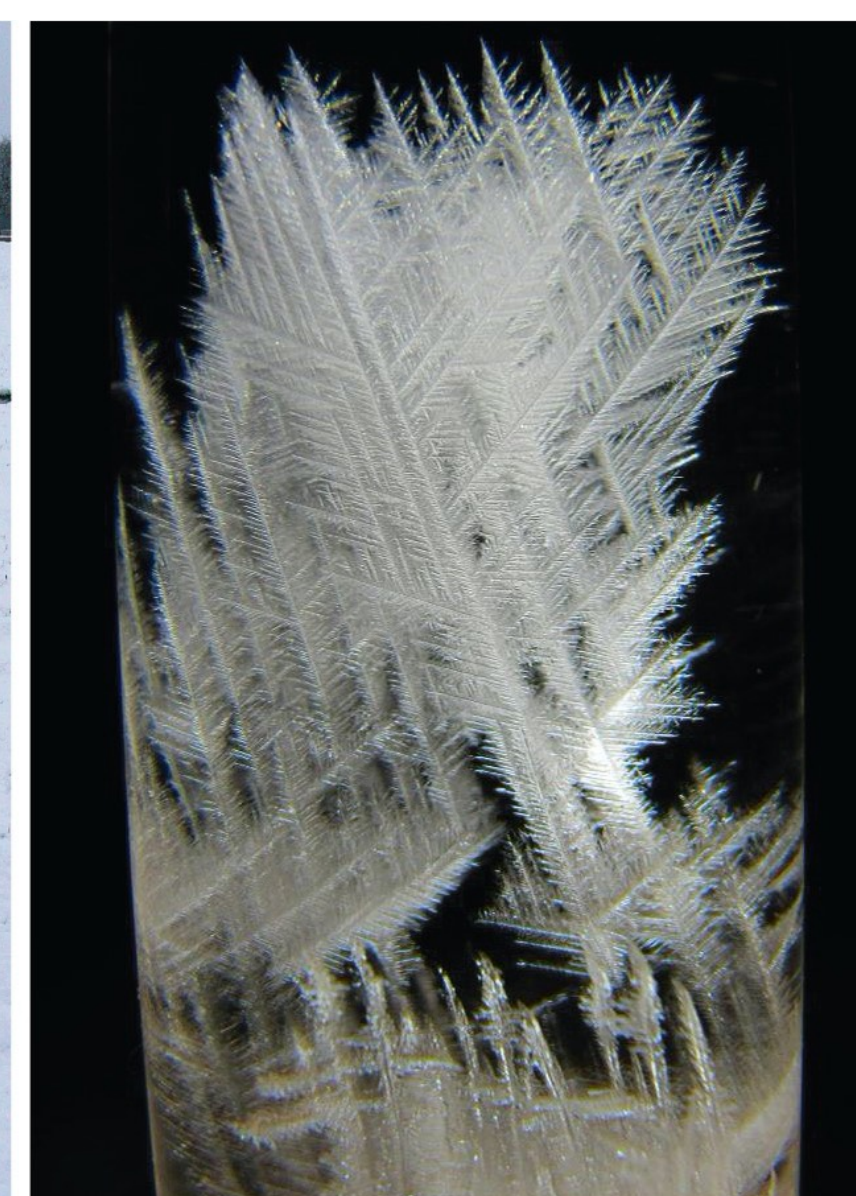
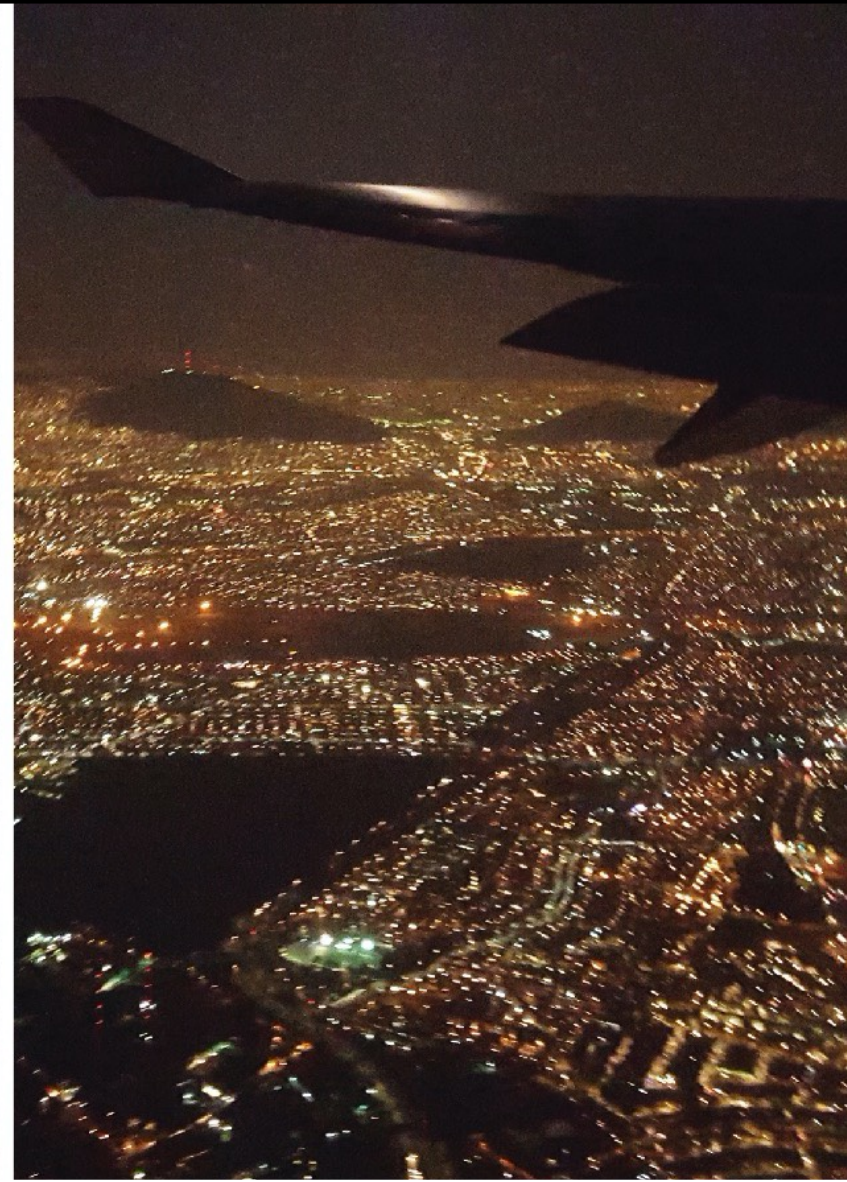
Dan Lockton, Gray Crawford, Devika Singh, Shengzhi Wu. 2019. Electric Acoustic: Exploring Energy Through Sonic & Vibration Displays. *CHI EA '19*, ACM. <https://doi.org/10.1145/3290607.3313014>

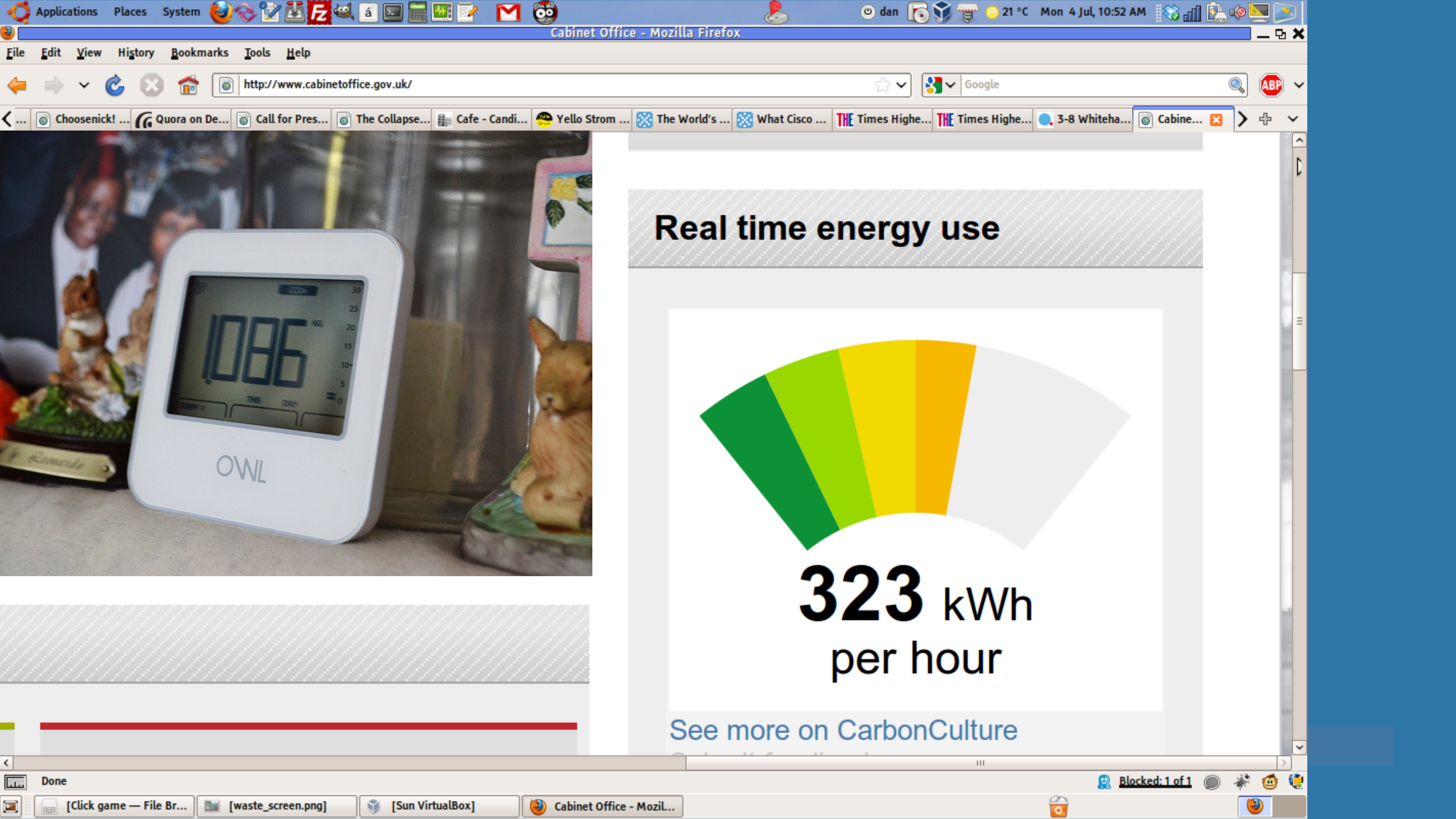
Dan Lockton, Flora Bowden, Clare Brass, Rama Gheerawo. 2014. Powerchord: Towards ambient appliance-level electricity use feedback through real-time sonification. *UCAmI 2014*. https://doi.org/10.1007/978-3-319-13102-3_10

Dan Lockton

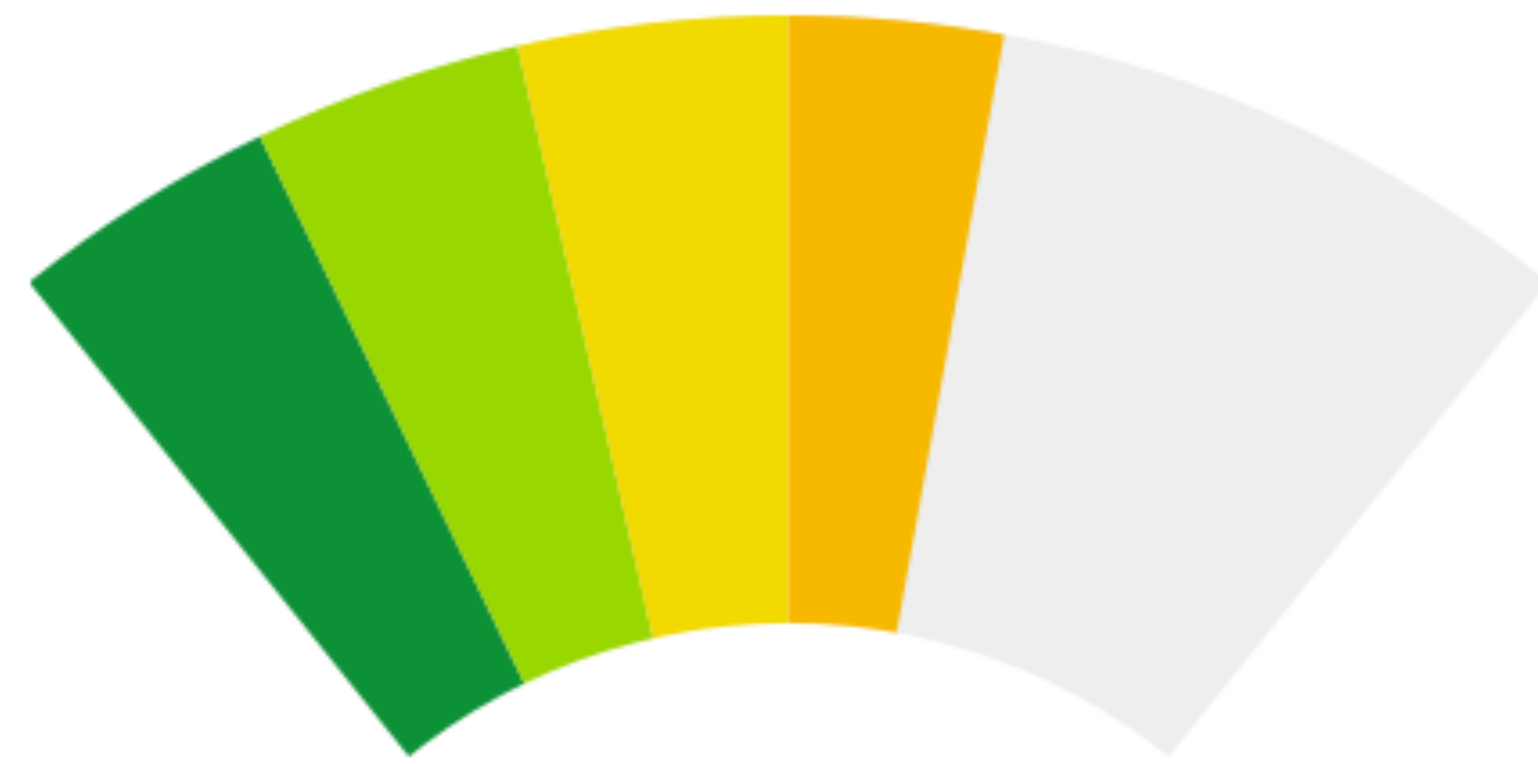
TU/e

Can we create displays and interfaces (natural or artificial?) that emphasise—or make use of—qualities in the data?





Real time energy use



323 kWh
per hour

[See more on CarbonCulture](#)

using design methods to
help people
imagine new
ways of living



Climate futures and transition design

- Student projects and exhibition (as part of the Plurality University Network's **More Tomorrows Festival**) exploring **design fiction** around different future **climate pathways**, based on scenarios from the shared socioeconomic pathways used in the IPCC's modelling of mitigation and adaptation
- Part of the emerging field of **transition design** in which these kinds of design fiction and **experiential futures** are employed

US



Dan Lockton



Dan Lockton, Megan Urban, Lea Albaugh, et al. 2019. *Climate Pathways: Projects from the Imaginaries Lab*. Pittsburgh: Imaginaries Lab. <http://imaginari.es/climate.pdf>

Dan Lockton and Stuart Candy. 2018. *A Vocabulary for Visions in Designing for Transitions*. DRS 2018. <https://doi.org/10.21606/drs.2018.558>



imagining futures

→ experiencing

futures



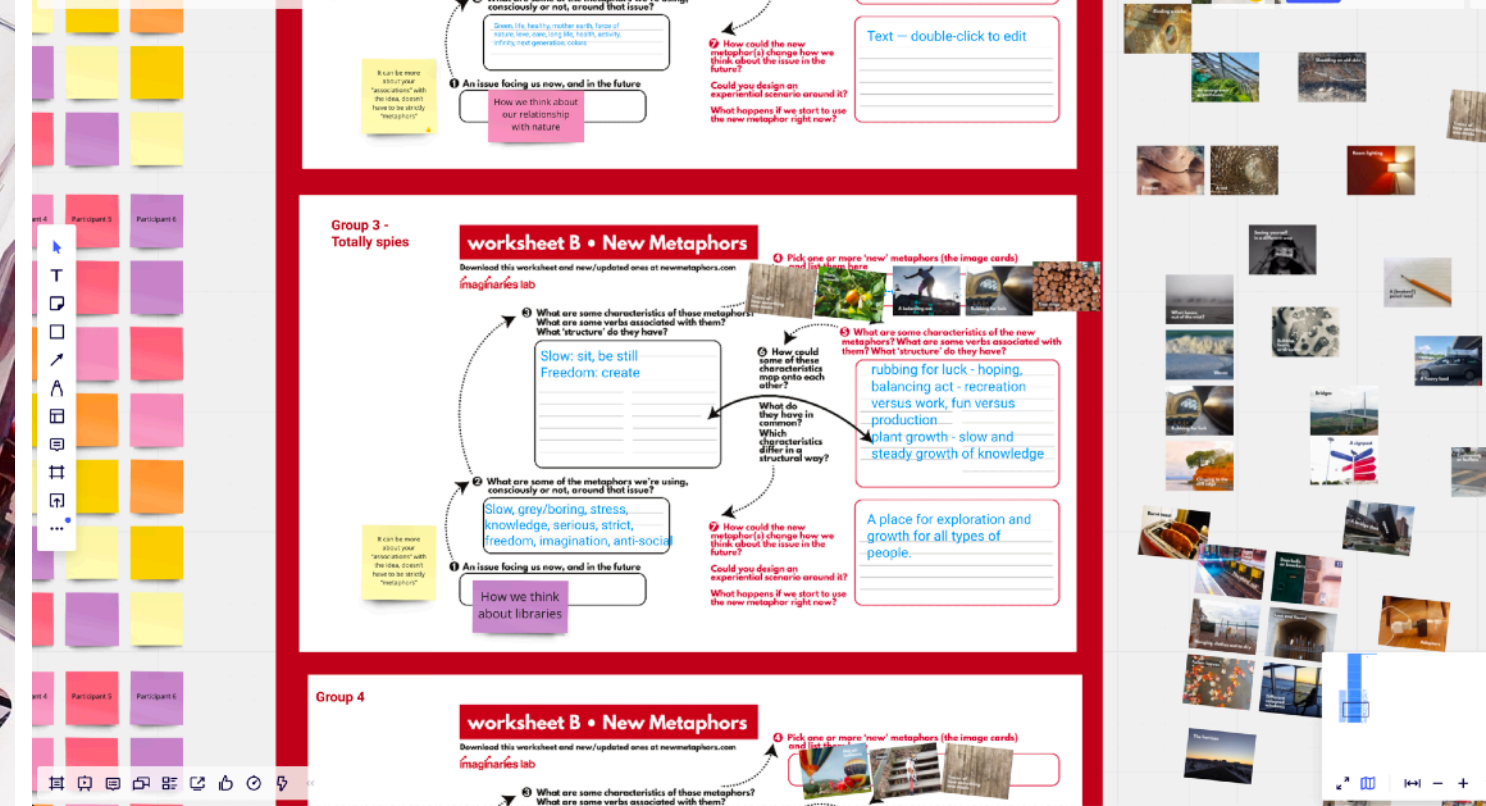
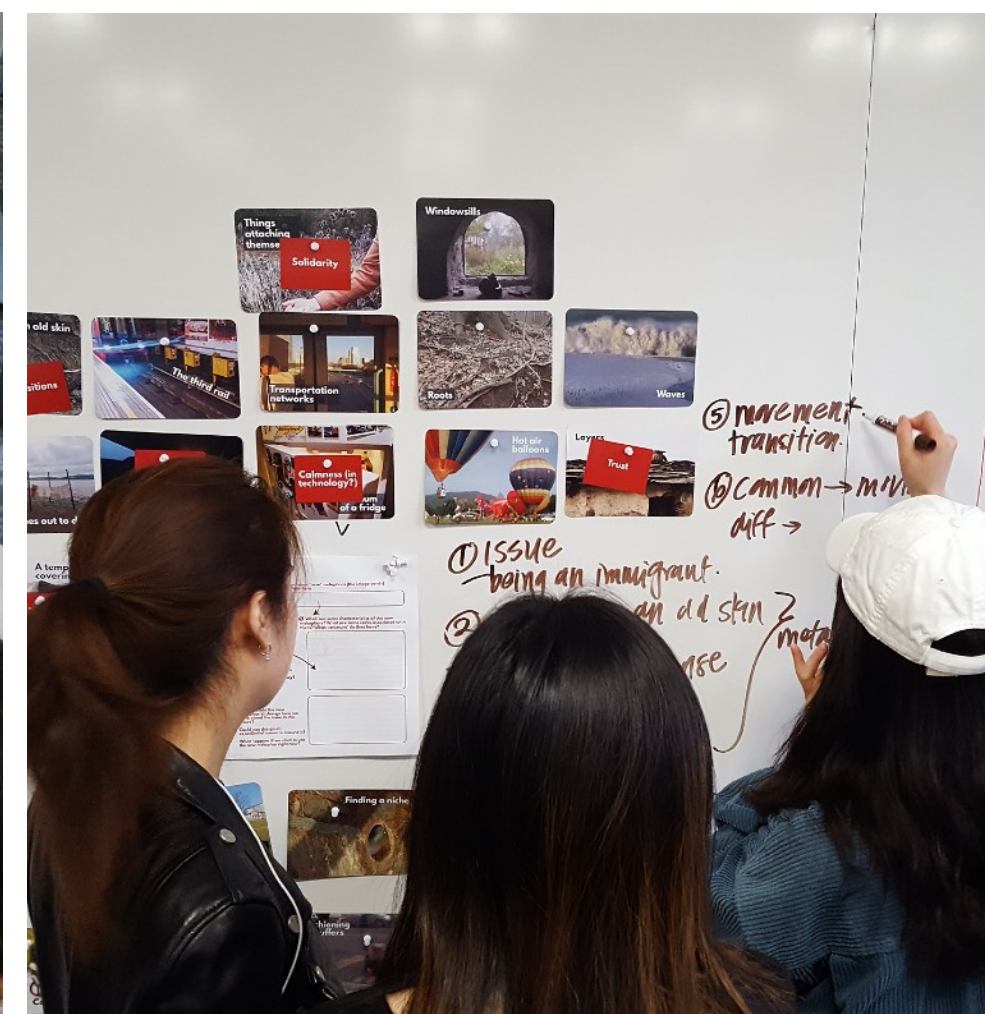
Participatory futuring and public imagination

- Developing methods and running workshops (in person and online) with partners focused on methods for **community reimagining**
- One application of the *New Metaphors* method is reframing issues relevant to the climate crisis and more sustainable and socially just futures

US, Finland, France, Chile, Portugal, UK



Dan Lockton

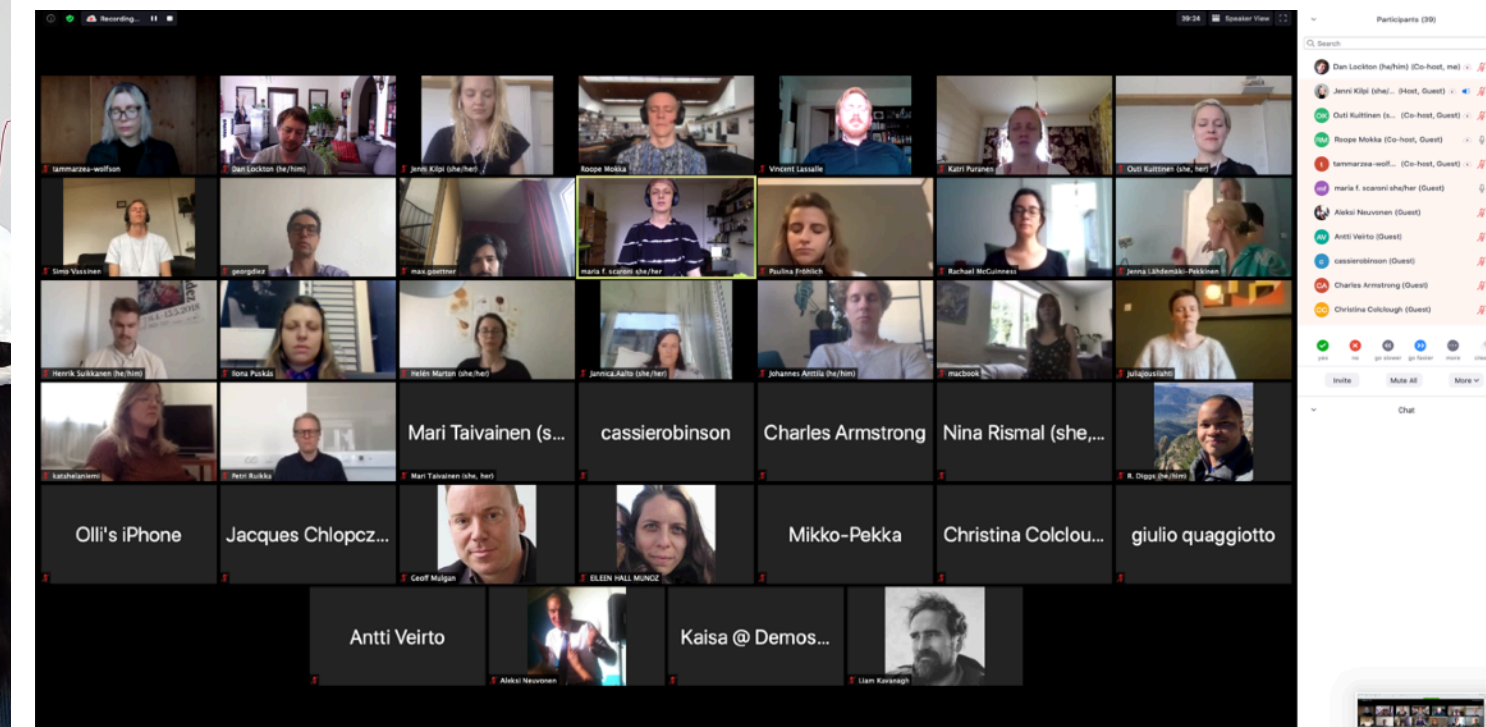
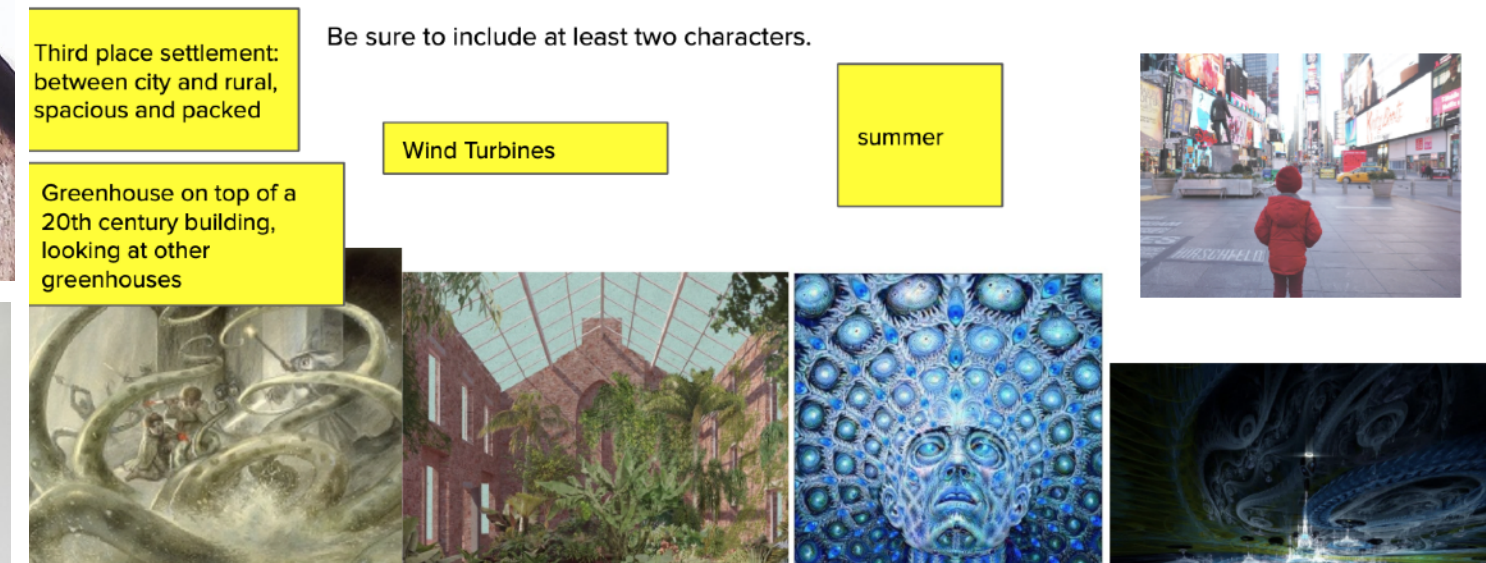


Thinking through Screenwriting Workshop with The Imaginaries Lab
Whole Assembly Zoom meeting: [here](#) * Mural agenda and [map](#)

Cycle Four: Crafting a Scene for Reimagining The City drawing inspiration

To begin crafting a scene spend the next 15 minutes as a team building inspiration.

- 1) Review and choose elements from the previous 3 slides you'd like to carry forward by copy and past



Dan Lockton, Devika Singh, Saloni Sabnis, Michelle Chou, Sarah Foley, Alejandro Pantoja. 2019. *New Metaphors: A Workshop Method for Generating Ideas and Reframing Problems in Design and Beyond*. *ACM Creativity & Cognition* 2019. <http://doi.org/10.1145/3325480.3326570>



**making
imaginaries
tangible**

**personal
development
& futuring**

Carnegie Mellon
Design

Delanie Ricketts and Dan Lockton
(2019). Mental Landscapes:
externalizing mental models through
metaphors. Interactions 26, 2





making
imaginaries
tangible

inter-
disciplinarity

IIT Institute of Design

SYSTEMIC
DESIGN

Dan Lockton, Lisa Brawley, Manuela Aguirre Ulloa, Matt Prindible, Laura Forlano, Karianne Rygh, John Fass, Katie Herzog, Bettina Nissen (2019). *Tangible Thinking: Materializing how we imagine and understand interdisciplinary systems, experiences, and relationships*. RSD 8, Chicago, October 2019

Dan Lockton, Laura Forlano, John Fass, Lisa Brawley (2020). *Thinking with Things: Landscapes, Connections and Performances as Modes of Building Shared Understanding*. *IEEE Computer Graphics & Applications*, forthcoming



making
imaginaries
tangible

mental health



Michal Luria, Ulu Mills, Jen Brown, Dan Lockton, et al. (forthcoming).
Materialising Mental Health: Design Approaches for Creative Engagement with Intangible Experience. In: Deborah Lupton and Deana Leahy (eds.), Creative Approaches to Health Education. London: Routledge.



- **socio-technical transitions where experiencing new ways of living could help build new public imagination around futures**
- **energy technologies where new mental models or metaphors are needed for effective use, e.g.**

**heat batteries
local grids
district heating**

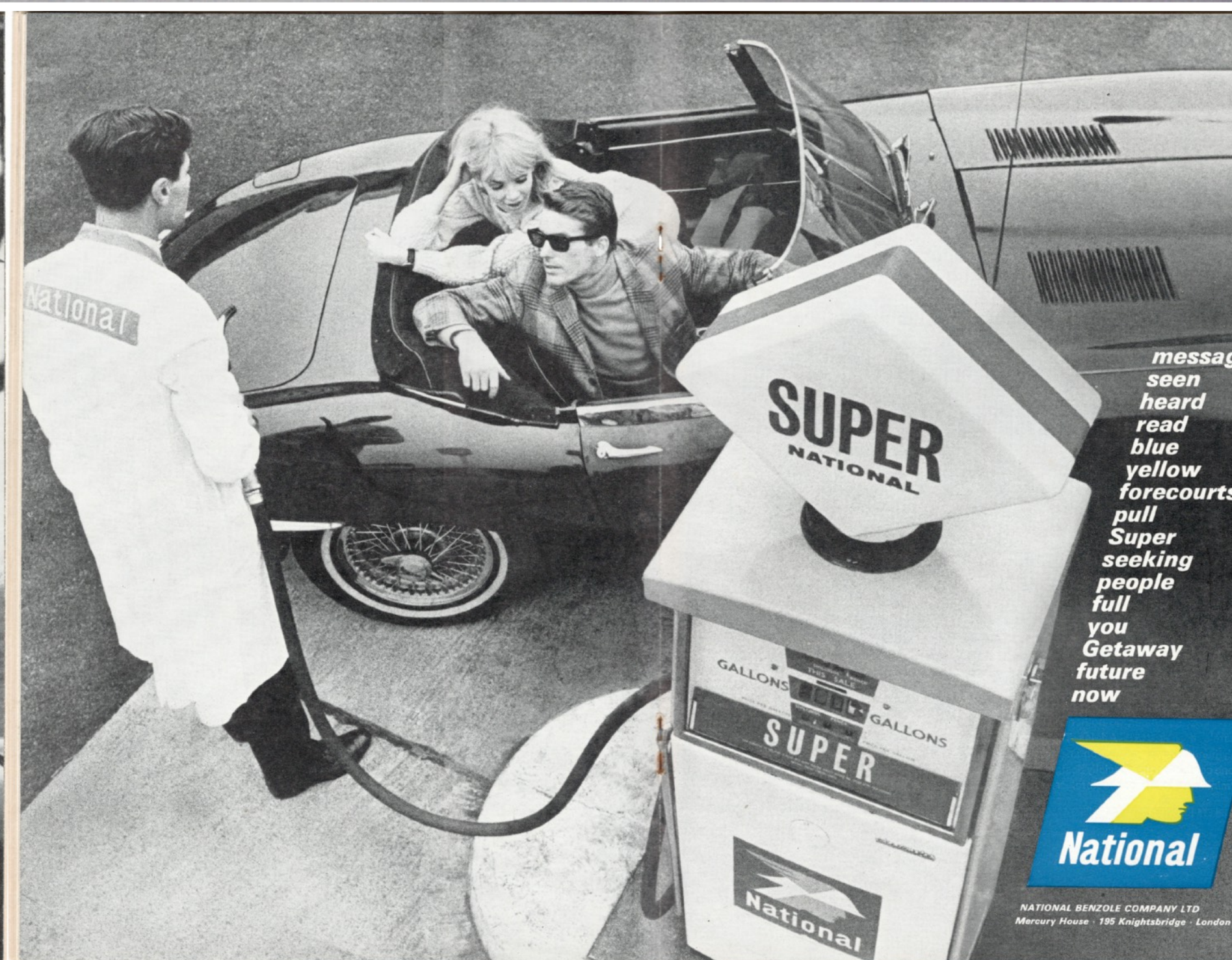
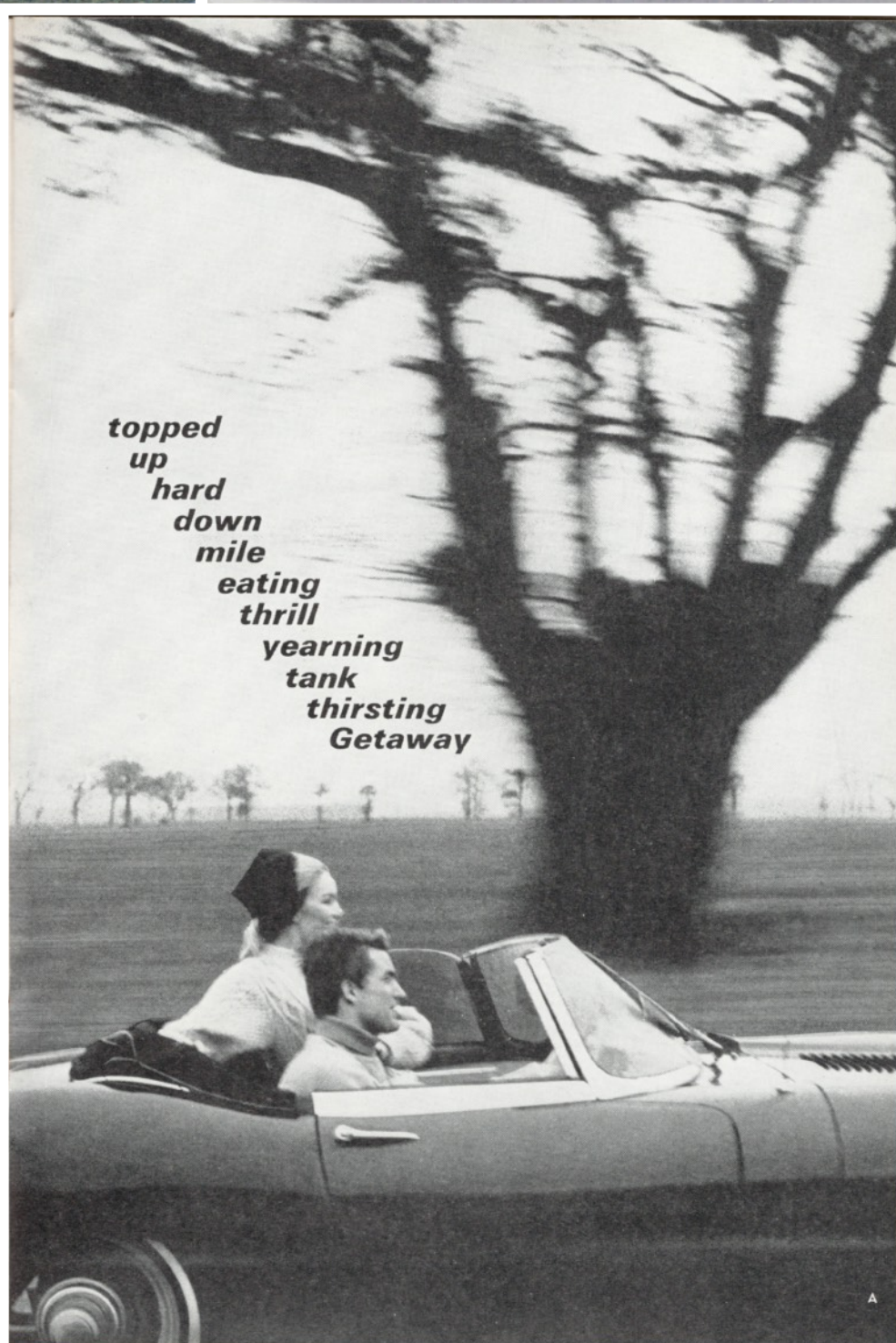


**how energy transitions
have been experienced
previously (culturally)**





<https://www.flickr.com/photos/danlockton>



NATIONAL BENZOLE COMPANY LTD
Mercury House · 195 Knightsbridge · London

**- research collaborations:
where could these
approaches be useful?**

**- project briefs for Industrial
Design students**



Dan Lockton
Future Everyday,
Industrial Design
d.j.g.lockton@tue.nl

<http://imaginari.es>
twitter: @imaginari_es

Thank you!