Hard-to-Reach Energy Users
UsersTCP

Are the majority of energy users really hard to reach? Or are we not doing enough to support them?

Overview, lessons & challenges from HTR Task Phase 1

Dr. Sea Rotmann
(Task Leader & National Expert Aotearoa NZ)

![U UsersTCP | Hard-to-Reach Energy Users]

Talk Outline:

- HTR Task Overview
- Insights from field research pilots
- Learnings & Recommendations
- The Energy Quadrilemma
- Phase 2: Addressing energy injustice

HTR Task Overview: Phase 1

The HTR Task has evolved from 12 years of research

UsersTCP

| **IEADSM *Task 24*: Phase I** 2012-15 | ***Task 24*: Phase II** 2015-18 | **Users TCP *HTR Task*** 2019-23 | ***HTR Task:* Phase II** 2023-26 |

First global behaviour change research collaboration on behaviour change & DSM. Phase I (8 countries) created a theoretical helicopter overview of behavioural models & theories of change, and how to evaluate behaviour change programmes. We realised there was **no silver bullet**.

⇒ **Collective Impact Approach & socio-ecology**

Phase II of Task 24 (6 countries) focused on the human aspect of the energy sector, the energy users but also the "Behaviour Changers" who tried to engage them via awareness and/or behaviour change campaigns. We developed & tested a **multi-stakeholder facilitation framework**, and did field research pilots.

⇒ **Multi-stakeholder collaborations w/ end user engagement**

We studied, in-depth, who (HTR) energy users in the residential & non-residential sectors were and described their characteristics, estimated audience size in different sectors & how to better motivate & engage them in EE & DR interventions geared at **changing their energy-using behaviours**

⇒ **There are many underserved sub-types of HTR audiences**

We will **address causes for energy injustice** with a focus on **hidden energy users** as they are extremely underserved, barely engaged with current strategies & interventions, and often in dire, urgent need of support given the energy (poverty) crisis. Building **trusted relationships**, including with their community gatekeepers and navigators is an essential component.

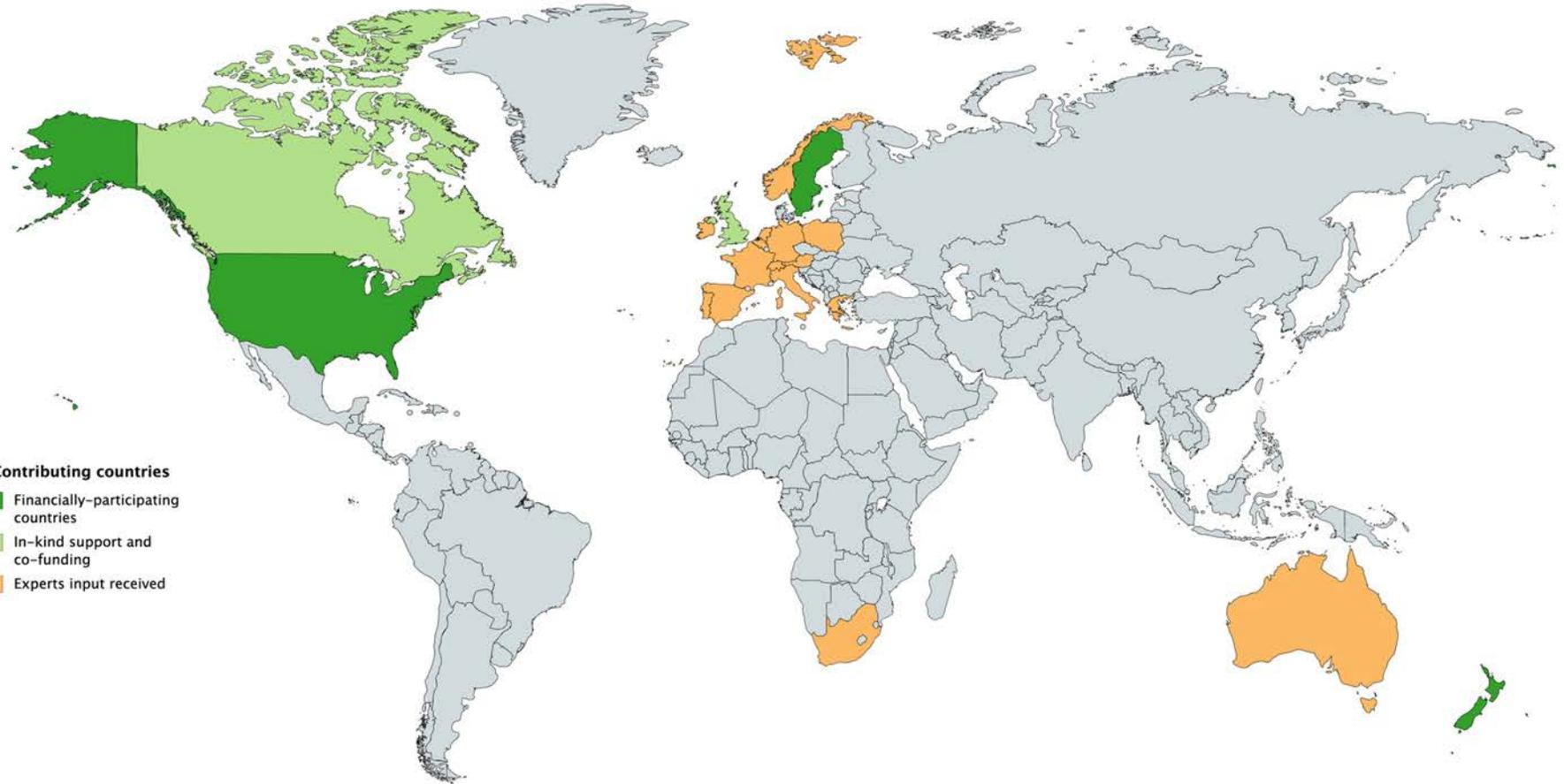Percent Mentions of HTR Audience Characteristics by Country*
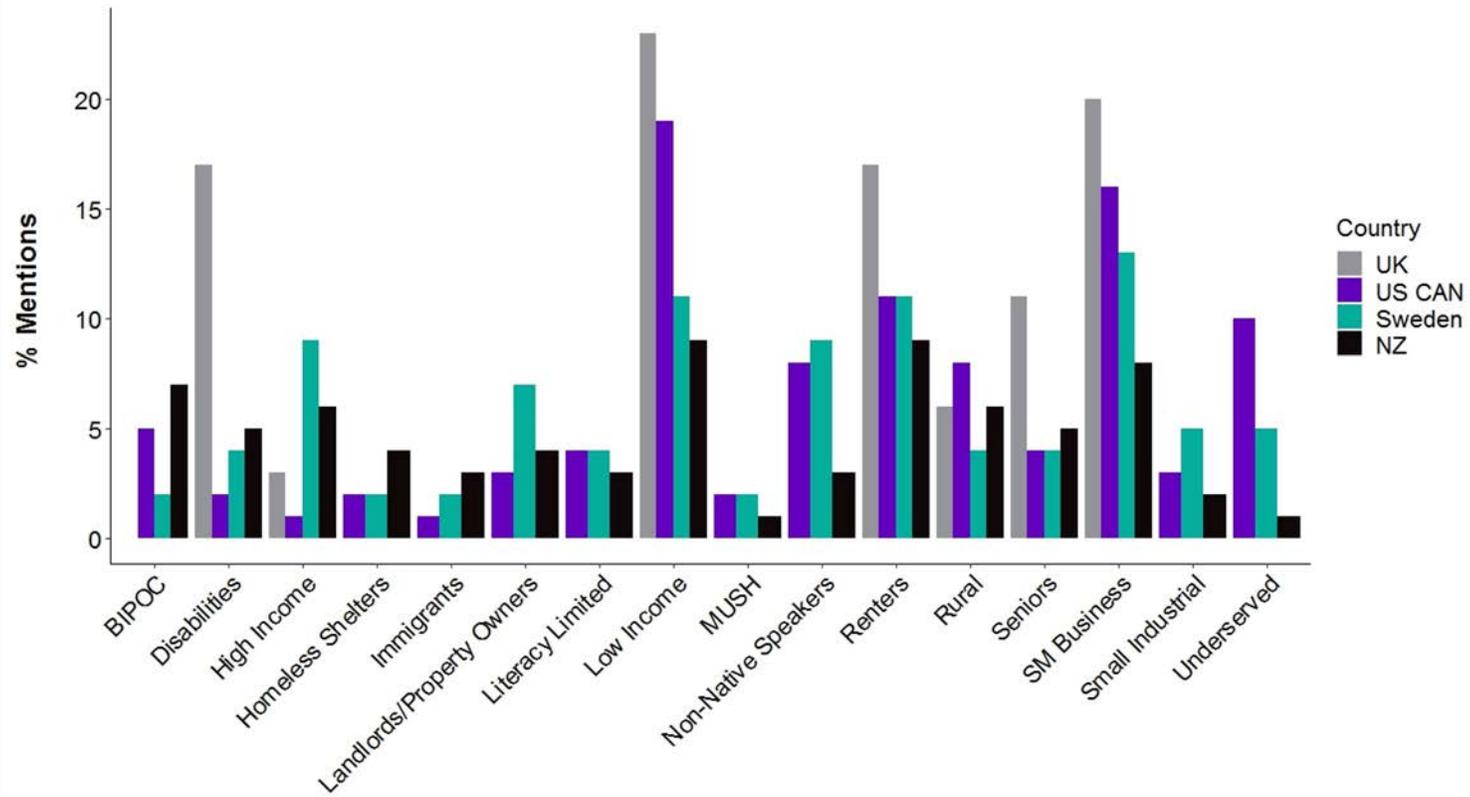
"In this Task, a hard-to-reach energy user is an energy user from the residential or commercial sectors who uses any type of energy or fuel, and who is typically either hard-to-reach physically, underserved, or hard to engage or motivate in behaviour change, energy efficiency & demand response interventions that are intended to serve our mutual needs."
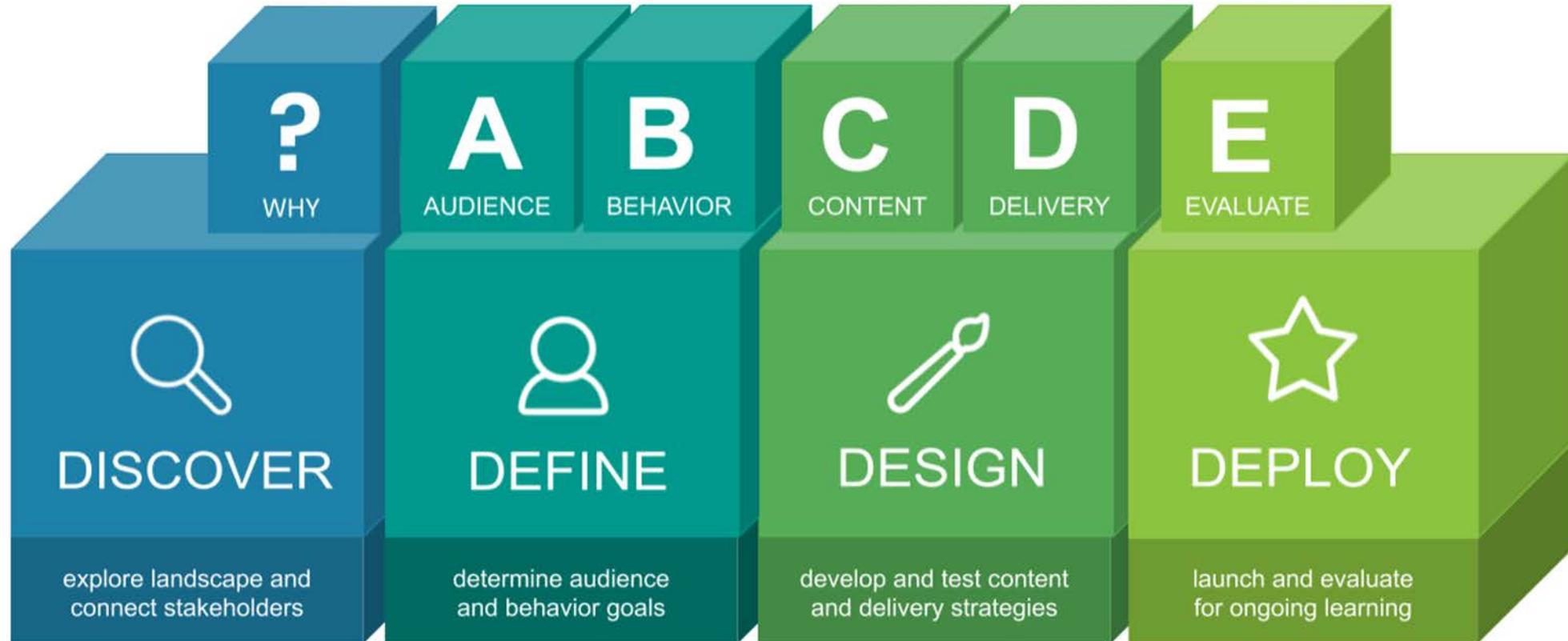
Our Participants & Partners

Karlin B., Forster H., Sheats J., Chapman D., and S. Rotmann (2021). *The Building Blocks of Behavior Change: A Scientific Approach to Optimizing Impact.* See Change Institute: Venice Beach. 11pp.

Year 1 - Stakeholder Analysis, HTR Characterisation, Definitions, Lit Review

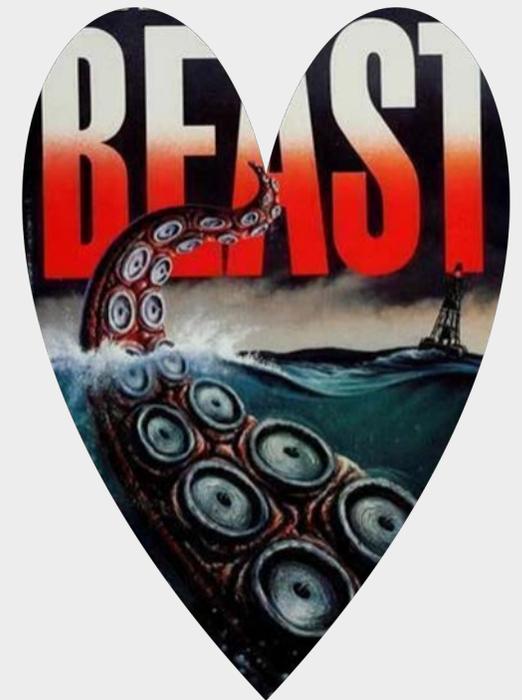
- <u>Webinar</u> on HTR Task for Users Academy (April 2020)

- First US national expert workshop

- Survey of 130 HTR experts around the world

- Interviews of 50 HTR experts in participating countries

- <u>HTR Characterisation</u> (Ashby et al, 2020a)

- <u>ACEEE Summer Study</u> paper on interview and survey results (Ashby et al, 2020b)

- <u>Literature Review</u> (Rotmann et al, 2020)

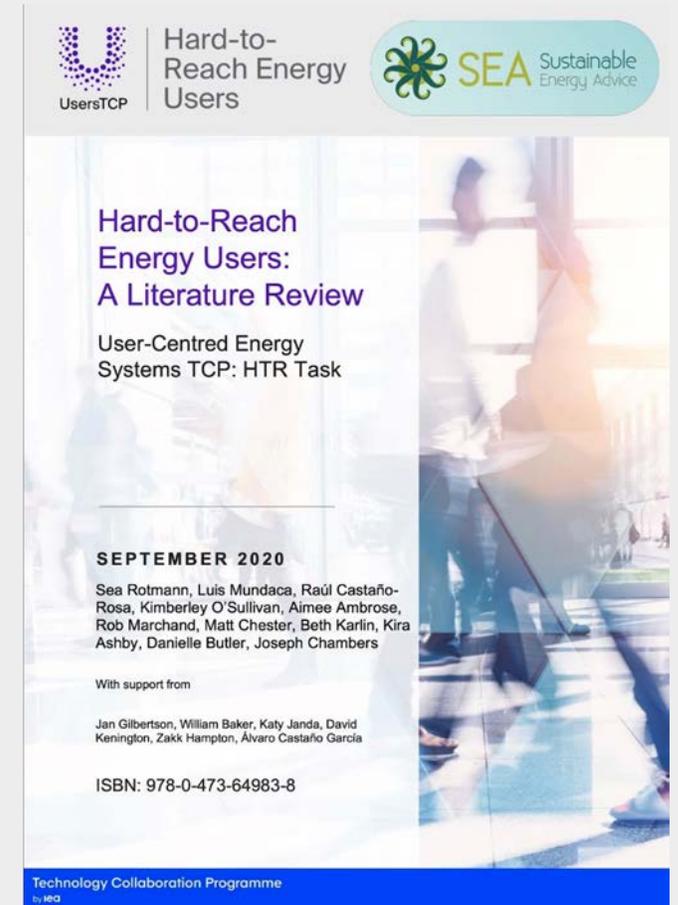- <u>"Cliff Notes"</u> of Lit Review (Ashby et al, 2021)
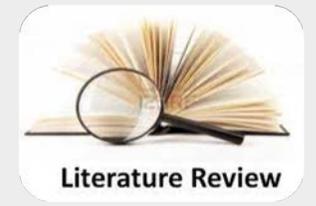
Rotmann, S., Mundaca, L., Castaño-Rosa, R., O'Sullivan, K., Ambrose, A., Marchand, R., Chester, M., Karlin, B., Butler, D. and K. Ashby (2020). *Hard-to-Reach Energy Users: A literature review.* SEA - Sustainable Energy Advice Ltd: 255pp.

A AUDIENCE

B BEHAVIOUR

DEFINE

determine audience & behaviour goals

Hard-to-Reach Energy Users: A Literature Review

User-Centred Energy Systems TCP: HTR Task

SEPTEMBER 2020

Sea Rotmann, Luis Mundaca, Raúl Castaño-Rosa, Kimberley O'Sullivan, Aimee Ambrose, Rob Marchand, Matt Chester, Beth Karlin, Kira Ashby, Danielle Butler, Joseph Chambers

With support from

Jan Gilbertson, William Baker, Katy Janda, David Kenington, Zakk Hampton, Álvaro Castaño García

ISBN: 978-0-473-64983-8

Technology Collaboration Programme
by IEA

- *Criticism*: HTR terminology & definitions

- *Focus of literature*: low-income households & renters

- *Biggest audience gaps*: SMEs, high-income, commercial, marginalised / hidden energy users

- *Audience size*: at least ⅔ of energy users!

- *Gap analysis*: Psychographics and needs analysis; energy behaviours often vague and not targeted; audience voice; non-energy impacts

Hard-to-Reach
Energy Users:
A Literature Review

User-Centred Energy
Systems TCP: HTR Task

SEPTEMBER 2020

Sea Rotmann, Luis Mundaca, Raúl Castaño-Rosa, Kimberley O'Sullivan, Aimee Ambrose, Rob Marchand, Matt Chester, Beth Karlin, Kira Ashby, Danielle Butler, Joseph Chambers

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Technology Collaboration Programme
by iea

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C CONTENT

D DELIVERY

DESIGN

develop & test content & delivery strategies
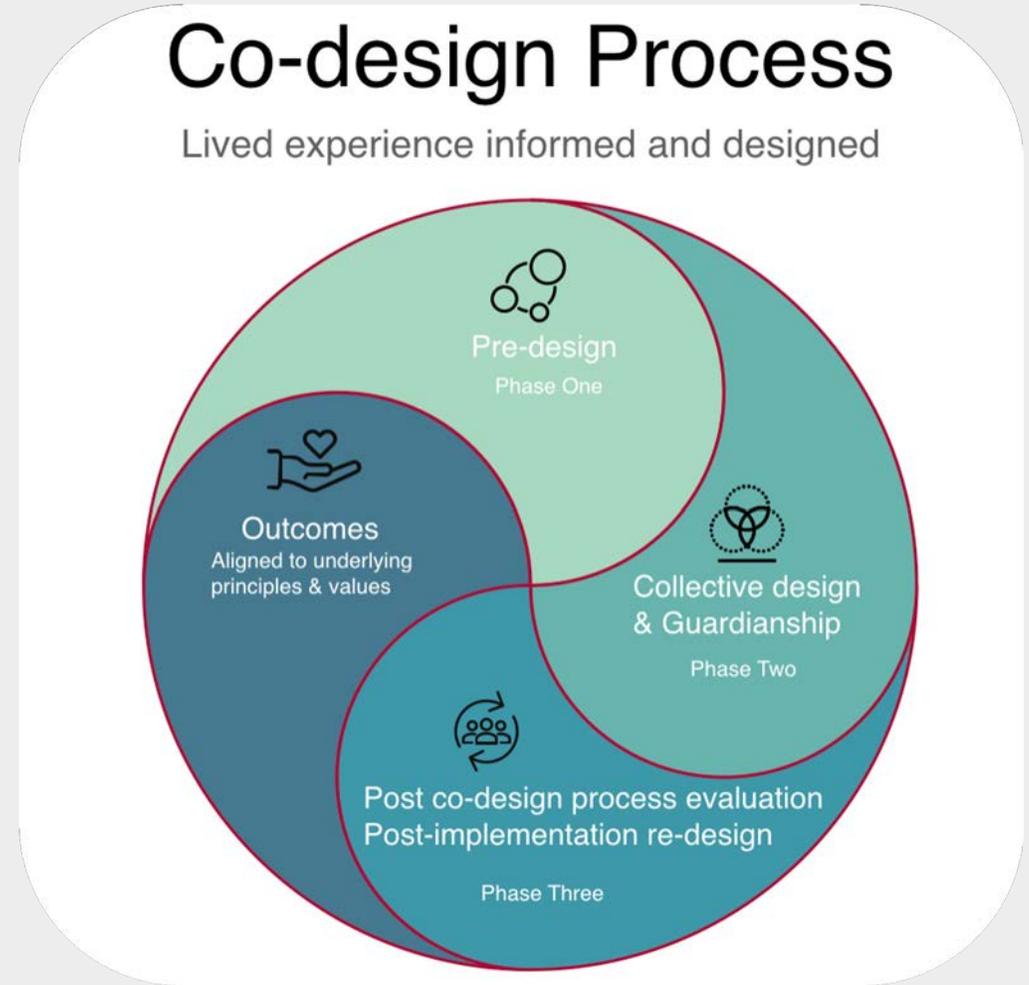
Case study analyses:

- Ashby, K. (2021). *Case Study Analysis – U.S. and Canada.*
- Butler, D. (2021). *Case Study Analysis – United Kingdom.*
- Feenstra, M. (2021). *Case Study Analysis - The Netherlands*
- Mundaca, L. (2021). *Case Study Analysis – Sweden.*
- Realini, A. & S. Maggiore (2021). *Case Study Analysis - Italy*
- Rotmann et al (2021). *Subtask 2: Case Study Analysis Methodology Template*
- Rotmann, S. (2021). *Case Study Analysis - Aotearoa New Zealand*
- Sequeira, M.M., Gouveia, J.P. and P. Palma (2021). *Case Study Analysis – Portugal.*

- Building Blocks of Behavior Change white paper on ST3 research methodology (Karlin et al, 2021)
- Process Matters: Assessing the use of behavioural science methods in applied behavioural programmes. (Karlin et al, 2022)
- Hard-to-Reach Energy Users: Lessons from the assessment of 19 programmes across 8 countries (Mundaca et al, *in press*)
- Review of 68 international Energy Hardship Programmes (Rotmann & Cheetham, 2022)

- Use **trusted Middle Actors / community navigators**

- **CO-DESIGN** interventions & pilots with them

- **Train them** to give energy advice

- **Face-to-face** & tailored in-home advice is best

- **Energy efficiency** isn't necessarily the main message

Co-design Process

Lived experience informed and designed

Pre-design
Phase One

Outcomes
Aligned to underlying principles & values

Collective design & Guardianship
Phase Two

Post co-design process evaluation
Post-implementation re-design
Phase Three

Year 3 & 4: Field research & pilots

E
EVALUATION

☆
DEPLOY
launch & evaluate for ongoing learning

Field Research:

- **Canada / U.S.** (Qualitative customer research):
  - MUSH
  - SMBs rates education
  - Dis/engaged & smart tech residential customers

Pilots:

  - Behaviour, Energy & Sustainability Training (BEST) Course for commercial energy managers & building operators (**Canada**)

- **Aotearoa New Zealand**:
  - *Home Energy Assessment Toolkit* (Whānau HEAT kits)
  - *Energy Hardship* research for industry

![UsersTCP logo] Hard-to-Reach Energy Users

Insights from field research pilots
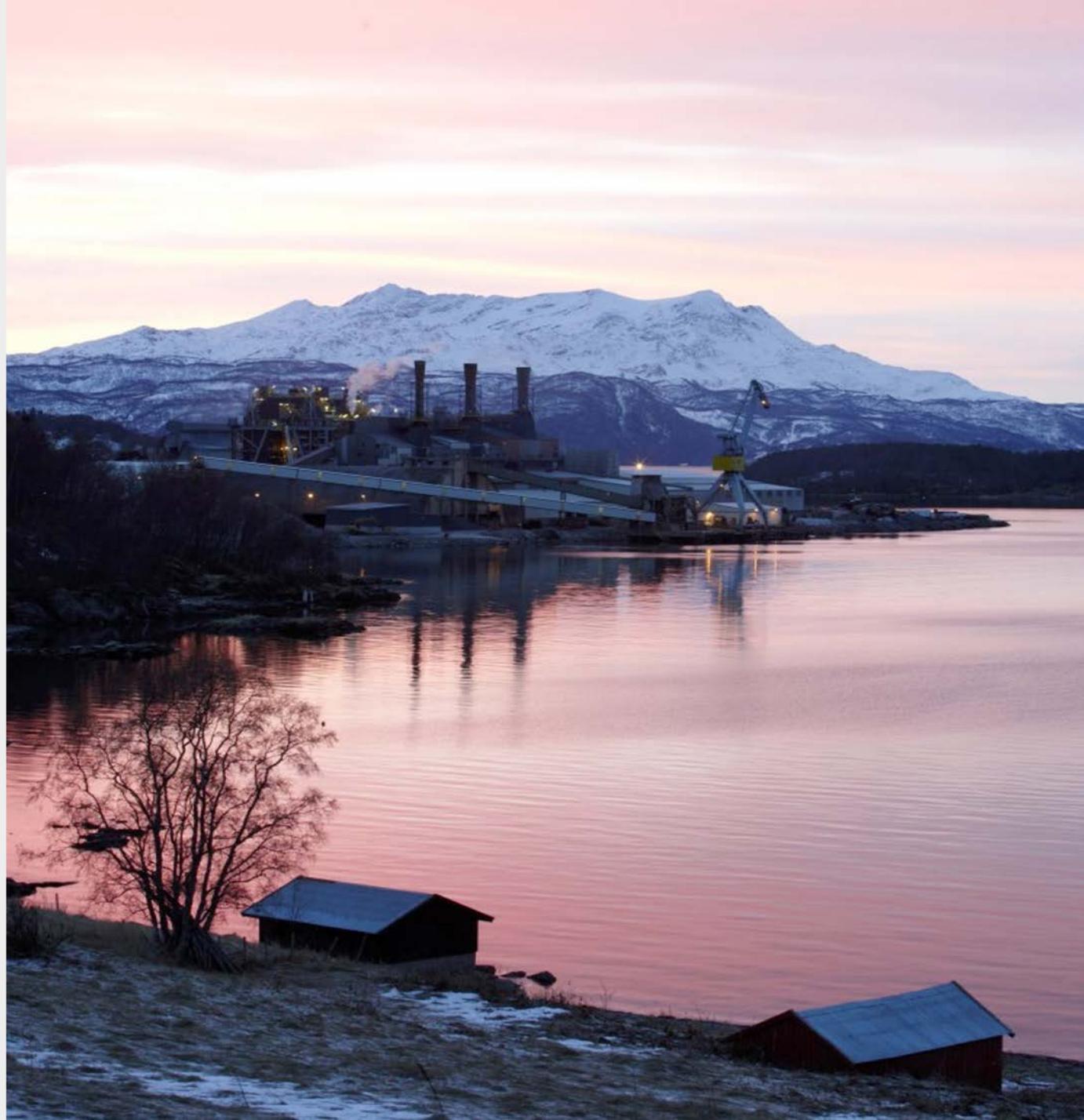
Non-res field pilot: BEST course

- IESO invited us to develop training for MUSH sector

- Co-developed BEST course aimed at Building Operators & Energy Managers

- Based on "Building Blocks" framework, also teaches it

- Nov 2019, oversubscribed, 38 attendees

"The content provided a huge volume of research which demonstrated the vast body of knowledge from which we can draw on to meet our specific and unique energy management objectives." BEST attendee

Rotmann, S. and B. Karlin (2020). Training commercial energy users in behavior change: A case study. https://doi.org/10.47568/3CP104

Residential field pilot: Industry-funded
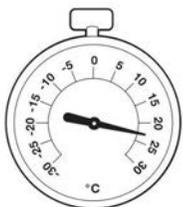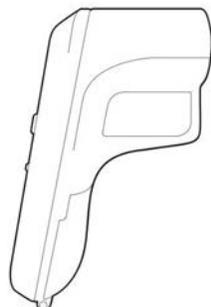
- Two largest **NZ gentailers** funded this research

- Followed our **Building Blocks** co-design process

- **3 community *Hui*** [workshops] with >100 Indigenous and minority community voices

- Decided to focus on most marginalised whānau living in **hidden hardship**

- Collected **stats and data** (qual & quant incl empathy interviews with frontline staff and hidden energy users, survey of community providers)

⇒ **Came up with over 70 actions** many of which are going to be implemented over time by industry!

"There has been real consistency in what we've been hearing over these past hui, and this has started building the foundation of trust needed to do this mahi [work]."
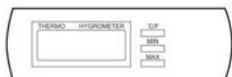
Irish HEAT kit analysis:
Rotmann, 2018a; Rotmann & Chapman, 2018; SEAI, 2018

Aotearoa HEAT kit analysis:
Rotmann, 2018b

Cross-Country Comparison of HEAT kits:
Rotmann, 2018 a & 2018 c

2021 - 2024: *Support for Energy Education in Communities* **(SEEC) Fund**

Example of HEAT kit contents in Ireland (Source: Codema.ie)
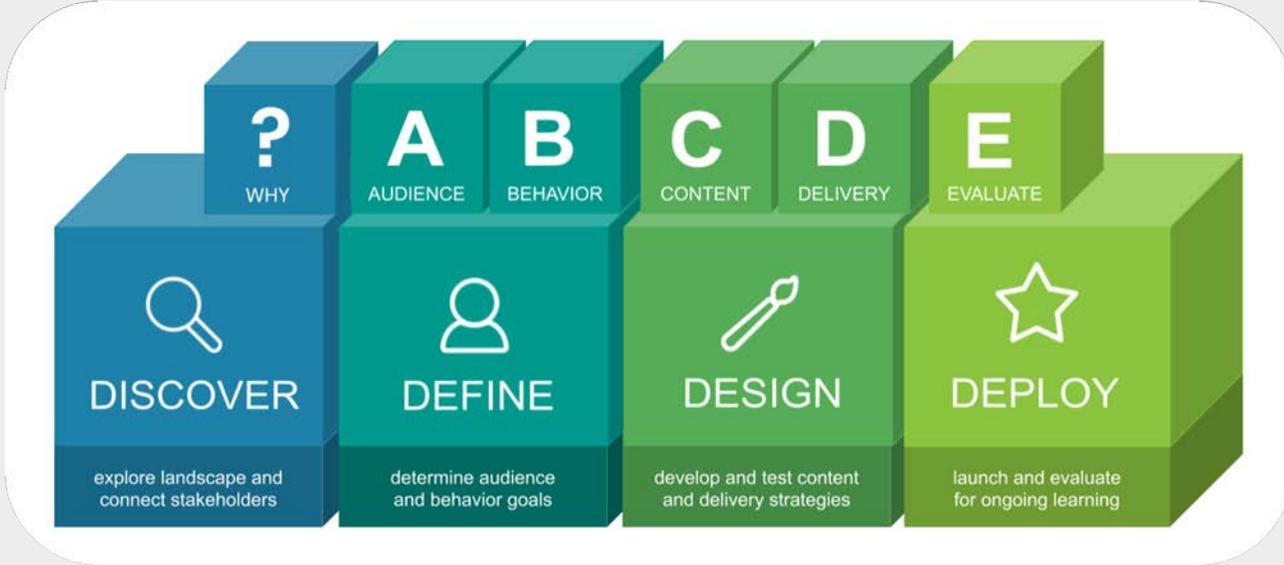
DEFINE: Audiences & Behaviours

Sustainability Trust Home Energy Performance Advisor at work

1. ***Healthy housing*** for those HTR *whānau* [families] in energy hardship was main objective

2. ***Behaviours targeted:***

- Fixing leaks & draughts
- Energy billing / switching advice
- Low or no-cost energy saving advice
- Non-energy related advice (e.g. mould, overcrowding)
- Education & Habit formation ⇒ **3 Energy "Buckets"**

Whānau HEAT Kits
Home Energy Assessment Tools

Instruction Manual

How to use your HEAT kit

Infrared Thermometer

Description
This measures the temperatures of different surfaces in your house. It will help you identify:
- Cold spots in your house - areas of poor insulation or air leaks (floor, walls, ceilings, windows, doors, etc)
- Cold / hot spots around fridge and freezer – air leaks from a broken seal, and if there is enough ventilation at the back of your fridge & freezer
- Any hot spots around your hot water cylinder – is it well insulated?

Self-Assess your Home

Cold spots – walls
Take several measurements of your internal wall temperature. The results should be about the same, or within a couple of degrees. If a measurement is very different, it means that the insulation is not there, not enough, or it is damaged.

In the same room, take a measurement on the inside of an external wall (green star in the image below), and another measurement of an internal wall (red star). This will help you to understand how well your walls are insulated (the closer the two measurements are, the better).

How to use it
To measure surface temperature with the infrared thermometer follow these steps:
1. Press the trigger to turn on the **infrared thermometer**.
2. Aim at the surface you want to check. You should not be more than 700 millimeters away from the surface.
3. Press & hold the trigger until temperature stays the same.
4. Read the temperature.
5. Record the reading in the relevant activity sheet:
   a. **Day 3** - Hot water cylinder
   b. **Day 6** - Fridge/freezer seals & appliance
   c. **Day 7** - Walls, floors and ceilings
6. The thermometer turns off by itself.

Note:
- Do not adjust the settings.
- To read the temperature, only press the trigger.
- Make sure to do the measurements when there is a big temperature difference between the outside & inside, like on a cold day.

Warning:
- The thermometer cannot be used to measure a person's temperature.
- **Do not point the thermometer at a person as serious eye damage may occur!**

Page - 8   Tools - Infrared thermometer

Get in touch
Email drsearotmann@gmail.com or call 0212 469 438

Get trained
Select some staff to do the HPA training

Identify whānau in need
Identify 5-15 whānau to participate in the pilot

Visit their whare
Visit them (with Sea) and drop off the HEAT kit

Play with the kits for 2 weeks
Whānau do daily 5-min activities, games & quizzes

Return the kit & get koha & prizes
Sea will pick up the HEAT kit & ask a few questions

Day 4
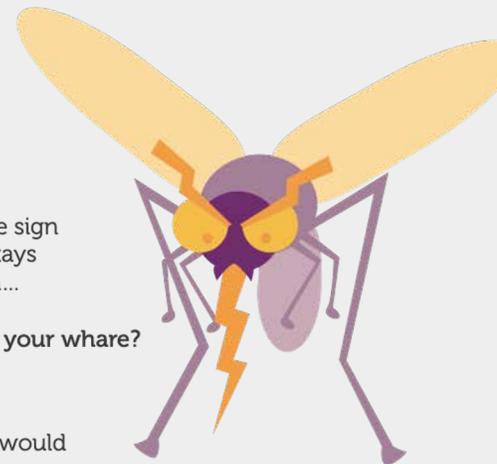
Bonus activities

Answer this quiz question:

If I use timers or turn off some appliances at the wall, I can save money to heat my house.

☐ True

☐ False

Play this game:

Hunt the Energy Namu!

Some energy namu (like sandflies) give off a telltale sign that they are power suckers, like a little light that stays blinking or on, or they may feel warm to the touch...

How can you know if you've got Energy Namu in your whare?
- Wait until it's dark outside
- Grab a flashlight & turn off all the lights
- Turn off everything in the house the way you would normally at night

How to catch an Energy Namu?
- Sneak through each room and investigate each item plugged into a power board or wall outlet
- Look for lights, listen for humming, and touch possible power-sucking appliances to see if they are warm
- *Write down each Namu found on your Namu hunter's notes sheet and make a mark for each Namu you see* (for example, make two marks if you have two lighted alarm clocks in your house)

How to swat Energy Namu?
- Turn appliances **all the way off** when you're done with them. Sometimes, that means unplugging them (especially smaller appliances like toasters & mobile phone chargers)
- You can also use a power strip for all your computer equipment, for example, and plug all other appliances like your printer or game box into it. When you are done using the computer, turn off the power strip to turn everything all the way off
- You can also use the **appliance timer** to set some big Energy Namu like the heater or dehumidifier to turn off & on at certain times

1. *Recruit whānau* (in different ways via community middle actors)

2. *Drop off HEAT kit, do interview*
   - Energy behaviours
   - Energy knowledge
   - Motivations
   - Attitudes
   - Appliances

3. *Whānau do daily activities for 2 weeks*

4. *Pick up HEAT kit, exit interview*

5. *Prizes*

6. *Call after 4 months*

⇒ **100% success rate!**

DEPLOY (Evaluate success)

- **100%** completion rate
- **100%** participants received $500 tailored prize package
- **92%** said they'd recommend the kit
- **85%** reported significant improvements
- **90%** said their bills were lower
- **70%** said by >$50 per month!*
- **85%** are still thinking about energy efficiency
- **65%** said other household members are too
- Average bedroom temperatures rose **2.3C**
- Average humidity in bedrooms dropped **3%**

* And that was in summer!

⇒ Now being scaled up across Aotearoa and maybe internationally!
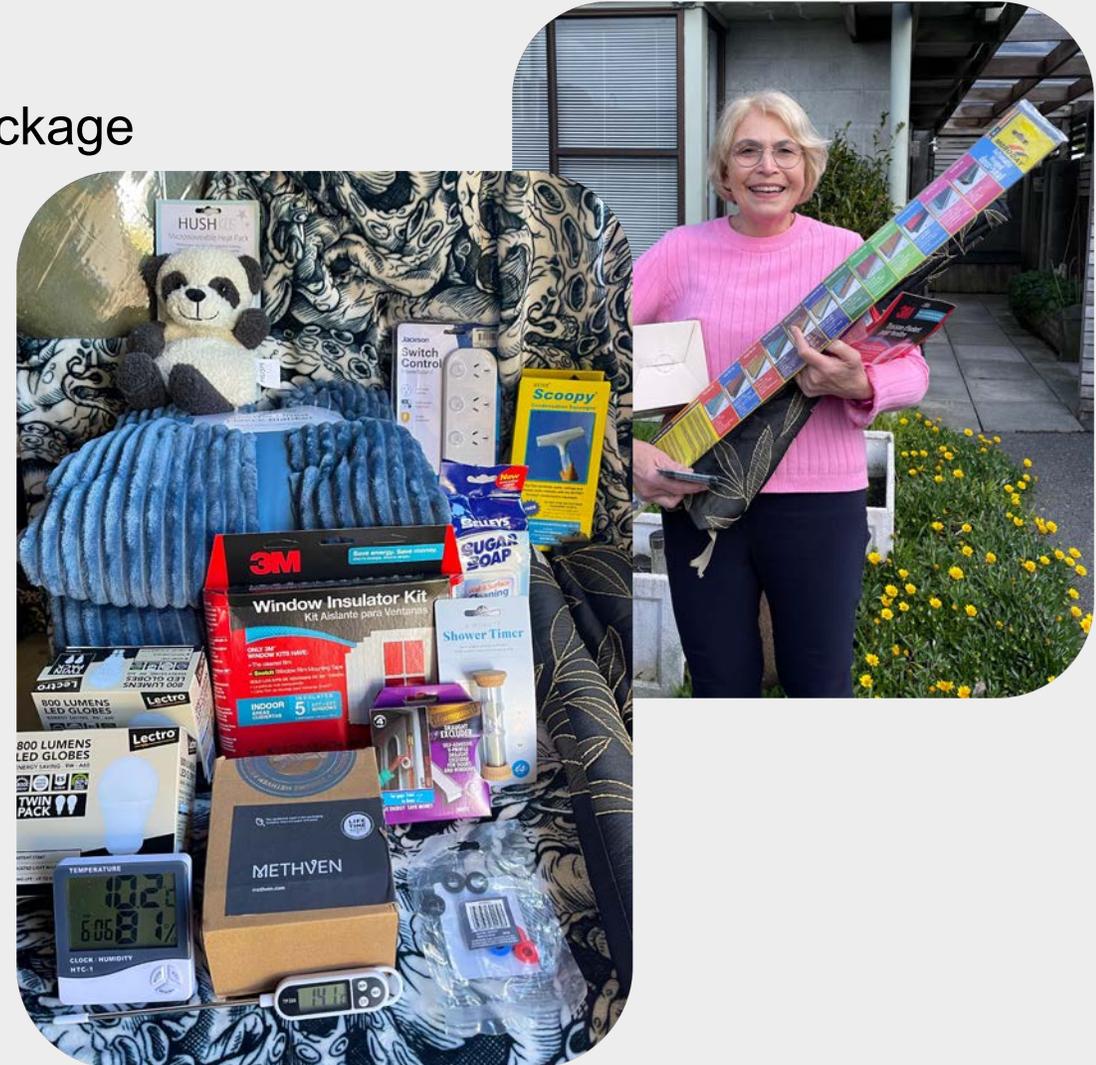
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Learnings & Recommendations from Phase 1

Are they really hard-to-reach?

- **Identifying & recruiting** HTR energy users is extremely hard (res & non-res)

  - Non-residential (SMEs / MUSH): **Industry** needs to do more to target them better

  - Residential: Community MAs were also often very **hard-to-reach & mistrustful**

- **Lack of TRUST** & **low energy literacy** are the biggest barriers all around

- Current engagement approaches (e.g. massive campaigns) **don't work for the HTR**

- It's not about awareness or willingness with them, **it's about survival**

- **We have failed them**, and we need to do much, MUCH better to combat the energy crisis and have a truly JUST transition

Hard-to-Reach Energy Users
UsersTCP

Co-design is:

Working with the community as active participants in the design process, to create shared value

Organisation   Community

https://digital-health.blog/2019/05/20/the-importance-of-co-design-to-improve-clinical-systems/

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https://ssir.org/articles/entry/the_bias_of

B.K. Sovacool et al. / Energy Research & Social Science 6 (2015) 95–99

Other; 13,4%
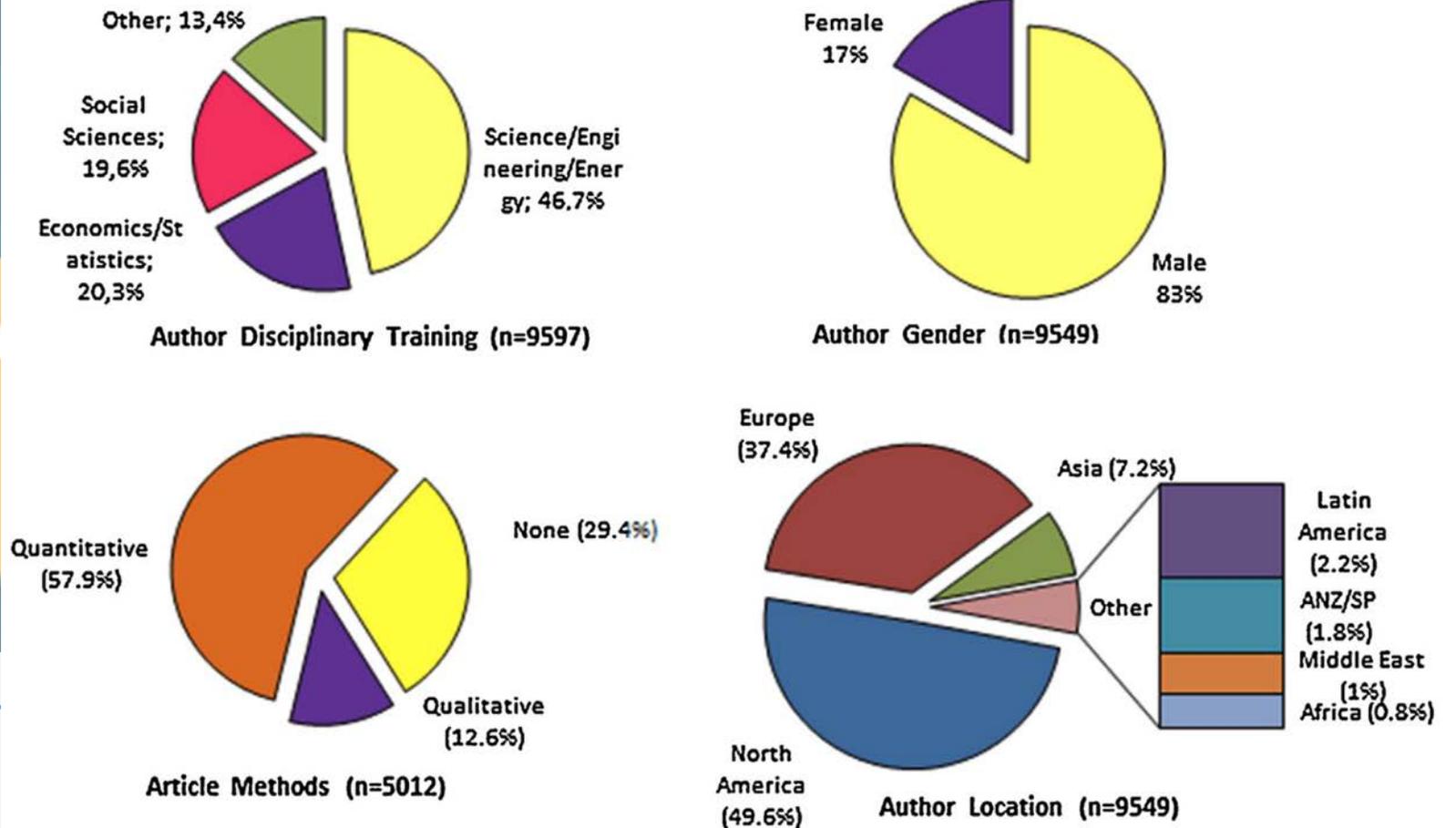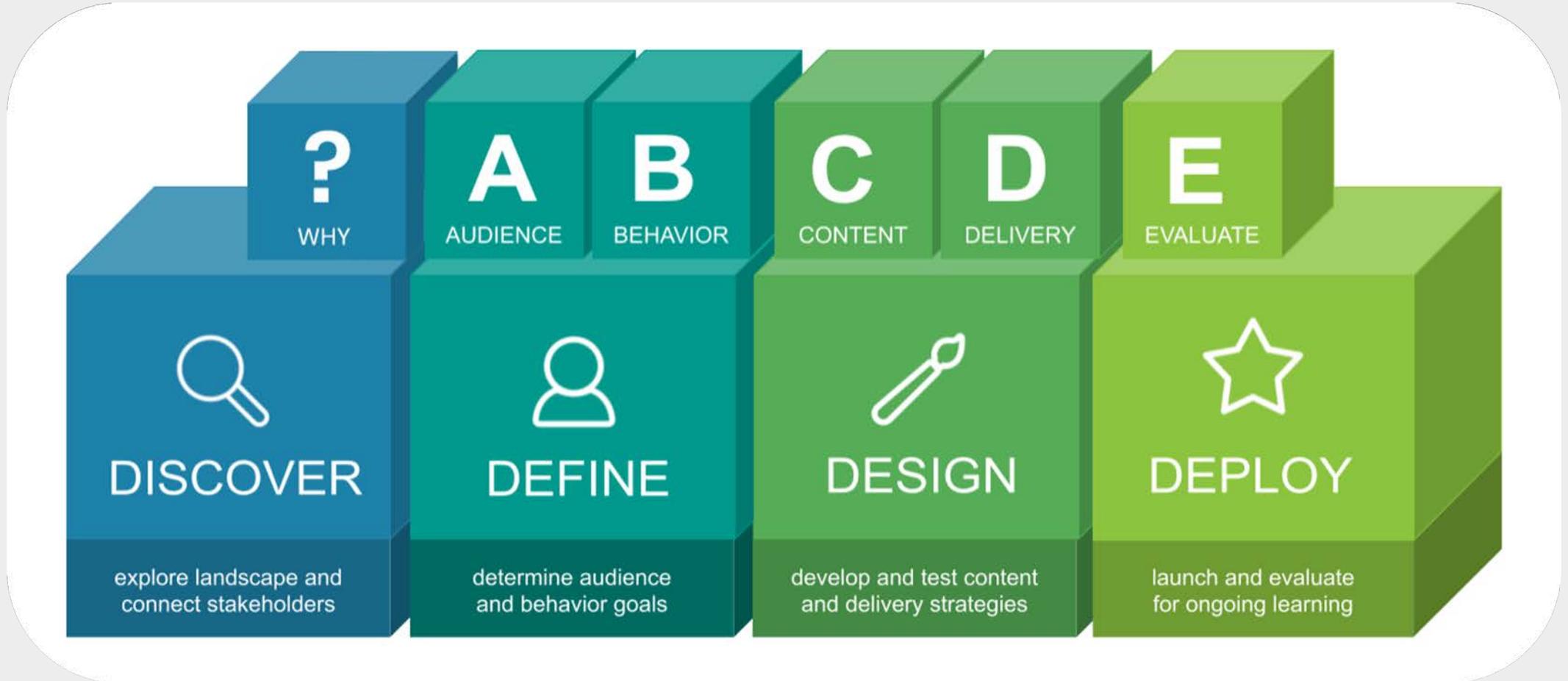Social Sciences; 19,6%
Economics/Statistics; 20,3%
Science/Engineering/Energy; 46.7%

Author Disciplinary Training (n=9597)

Female 17%
Male 83%

Author Gender (n=9549)

Quantitative (57.9%)
None (29.4%)
Qualitative (12.6%)

Article Methods (n=5012)

Europe (37.4%)
Asia (7.2%)
Other
Latin America (2.2%)
ANZ/SP (1.8%)
Middle East (1%)
Africa (0.8%)
North America (49.6%)

Author Location (n=9549)

Fig. 2. Disciplinary, gender, methodological, and geographic trends in energy studies research, 1999–2013.

Hard-to-Reach Energy Users

UsersTCP

Karlin et al (2021). *The Building Blocks of Behavior Change: A Scientific Approach to Optimizing Impact.*

seechange
INSTITUTE

HOWEVER:

The best way to solve any problem is to remove its cause.
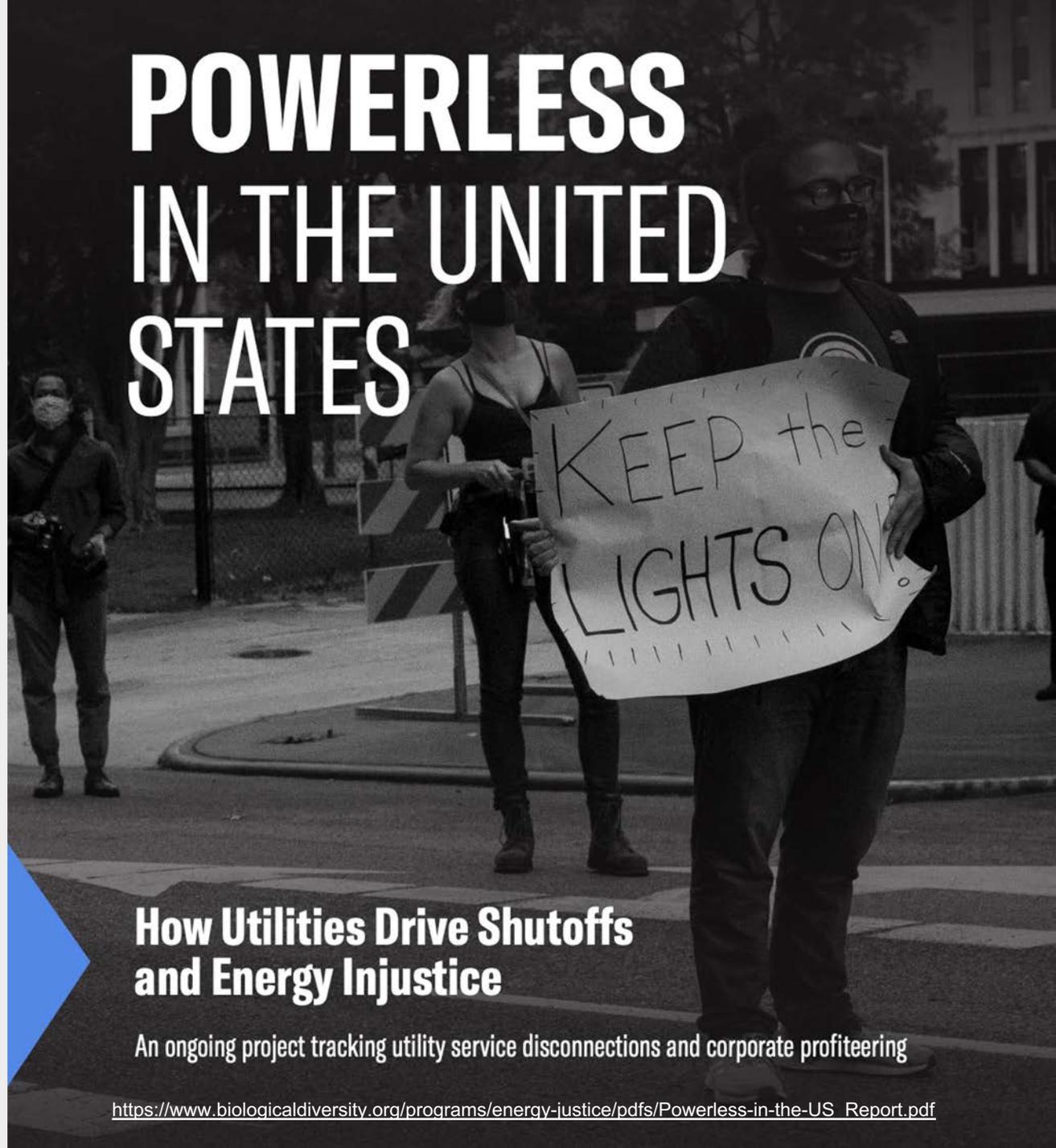
Martin Luther King Jr.

Hard-to-Reach Energy Users
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The Energy Quadrilemma, OR:

Can there really be a *just* energy transition?

POWERLESS IN THE UNITED STATES

How Utilities Drive Shutoffs and Energy Injustice

An ongoing project tracking utility service disconnections and corporate profiteering

https://www.biologicaldiversity.org/programs/energy-justice/pdfs/Powerless-in-the-US_Report.pdf

What is (Energy) Justice?

The Energy Trilemma

"In terms of policy formulation, society has become too influenced by economists and this applies in particular to the energy sector."
Heffron et al (2018)

Or is it a Quadrilemma?

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Environmental Justice / Climate & Ecosystem Collapse
Decarbonisation
Electrification

Energy Security / Access / Resilience
Supply Side
Fossil Fuels
Subsidies

Energy Affordability / Hardship / Inequity
Regulation
Consumer Guidelines
Rates & plans

Energy Justice
Democracy
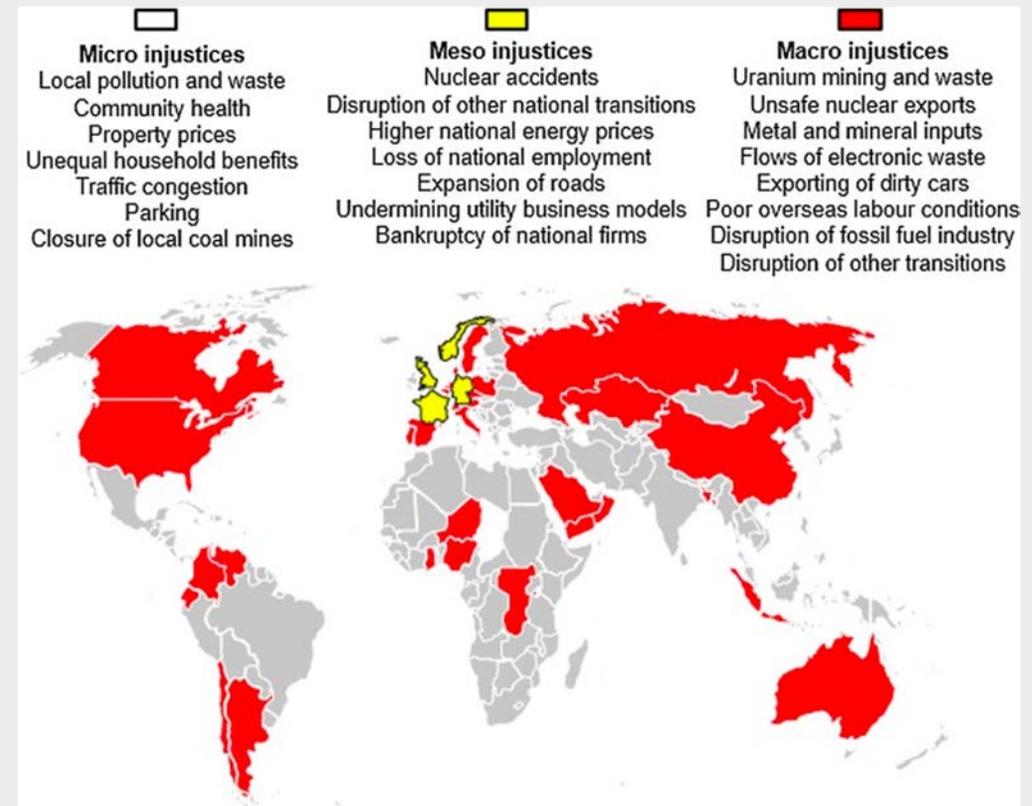**Social acceptability**
Energy wellbeing & health
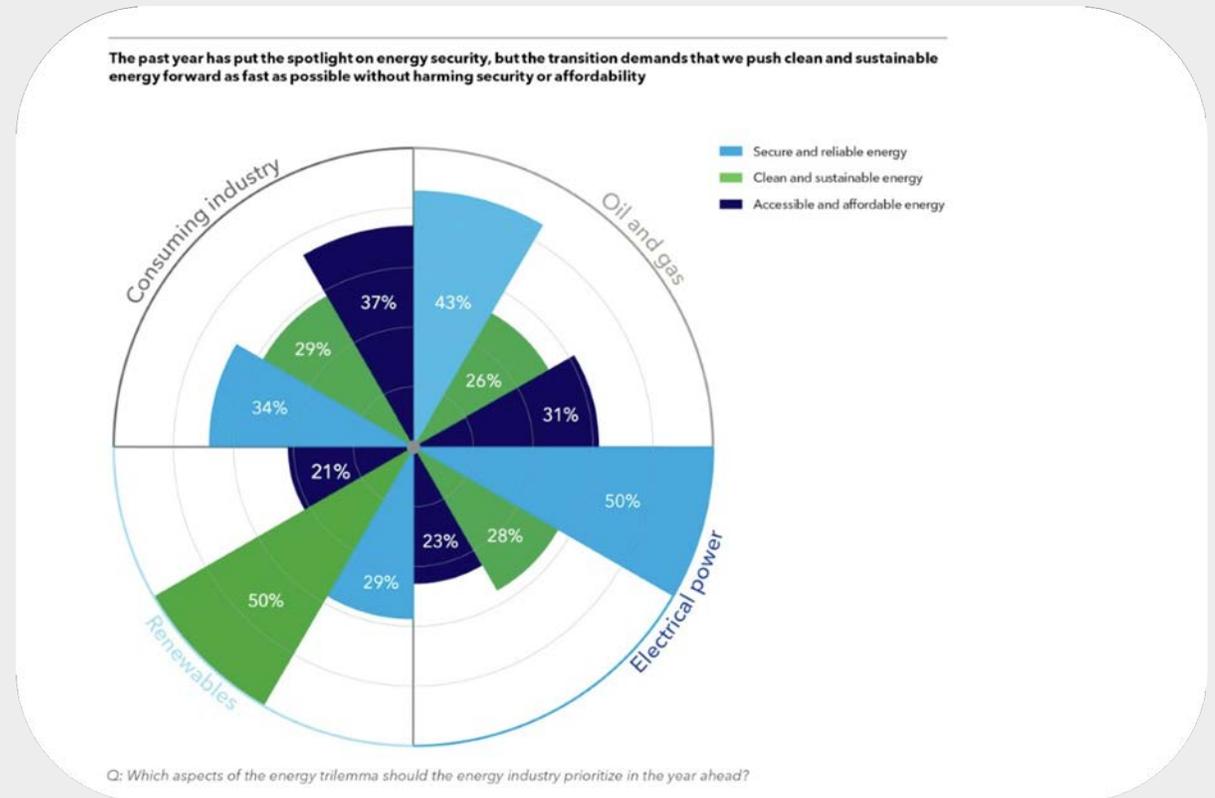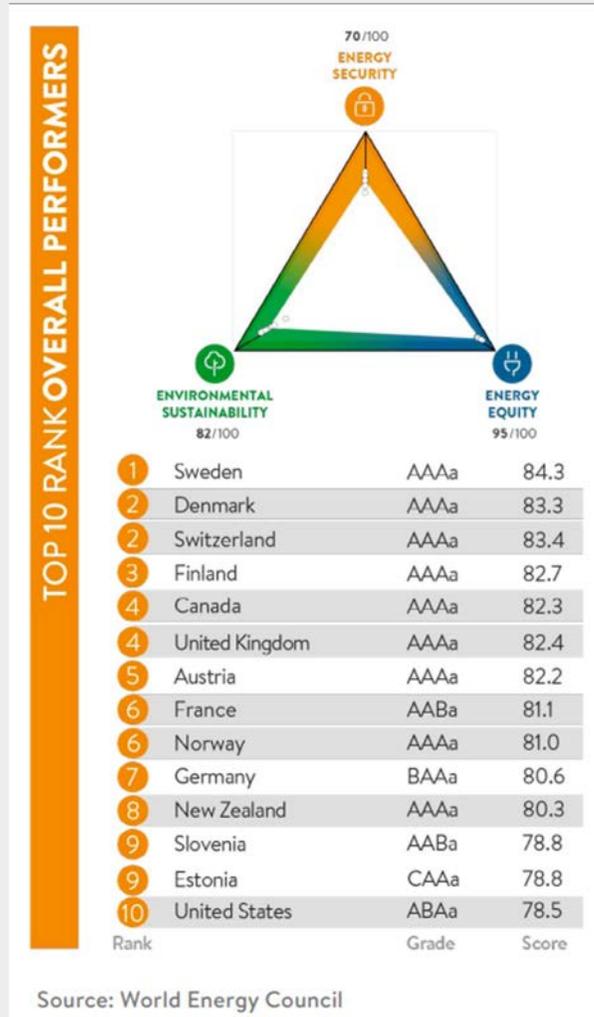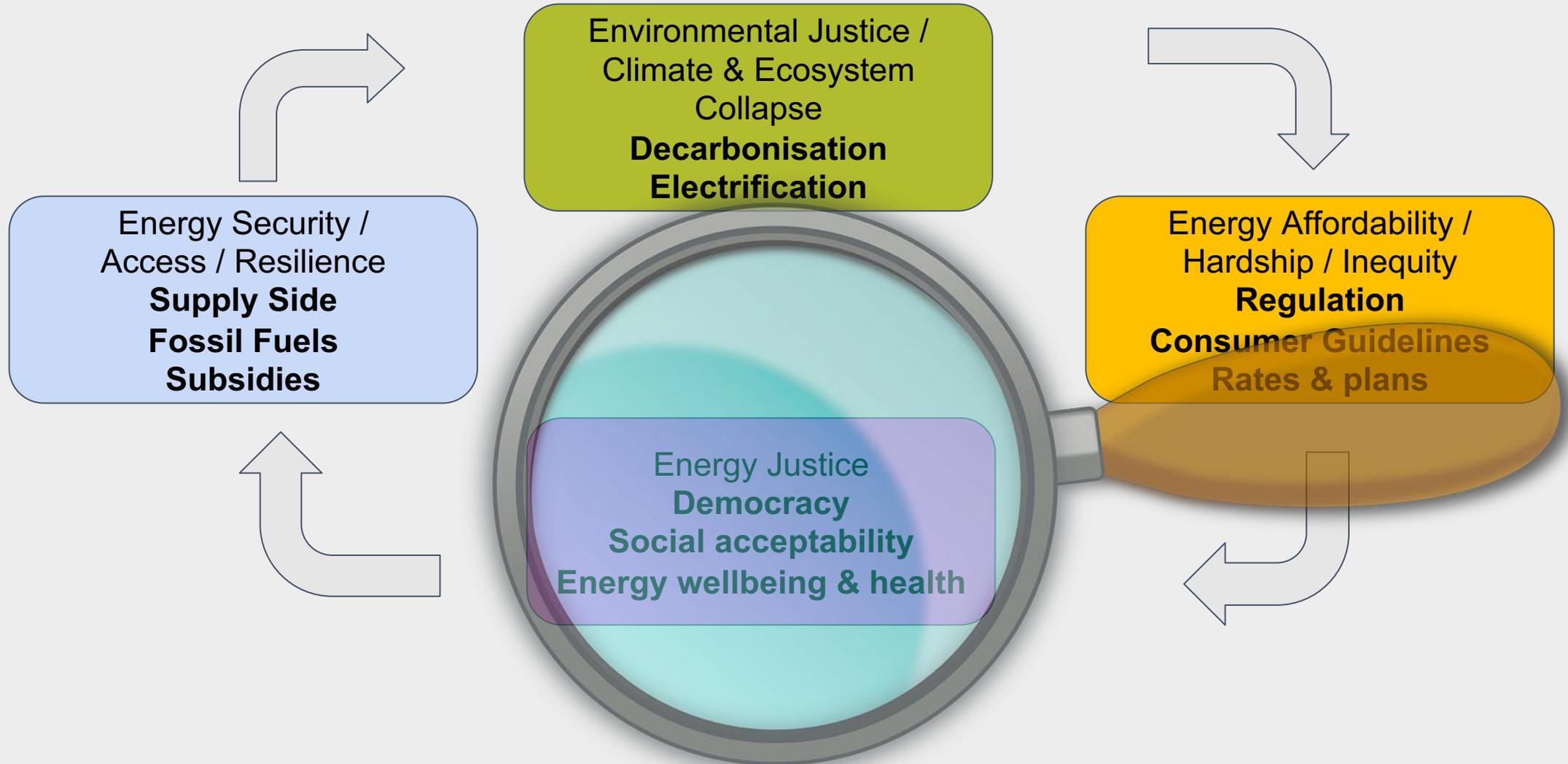
Why focus on Energy Injustice?

- Neoclassical economics thinking reigns in the energy sector
- Fossil fuel subsidies, not accounting for externalities
- Climate crisis is '*the greatest energy-related externality of all time*' (Stern, 2008; ICPAC, 2020)
- Energy as market commodity instead of a universal human right and basic public good
- Colonisation / Eurocentric*

"The clean energy transition is for and about people. Our Roadmap shows that the enormous challenge of rapidly transitioning to a net zero energy system is also a huge opportunity for our economies. The transition must be fair and inclusive, leaving nobody behind."

Fatih Birol, IEA Net Zero Emissions Roadmap (2021)

Micro injustices
Local pollution and waste
Community health
Property prices
Unequal household benefits
Traffic congestion
Parking
Closure of local coal mines

Meso injustices
Nuclear accidents
Disruption of other national transitions
Higher national energy prices
Loss of national employment
Expansion of roads
Undermining utility business models
Bankruptcy of national firms

Macro injustices
Uranium mining and waste
Unsafe nuclear exports
Metal and mineral inputs
Flows of electronic waste
Exporting of dirty cars
Poor overseas labour conditions
Disruption of fossil fuel industry
Disruption of other transitions

*E.g. Sovacool et al (2023)

Is a "just" energy transition possible?
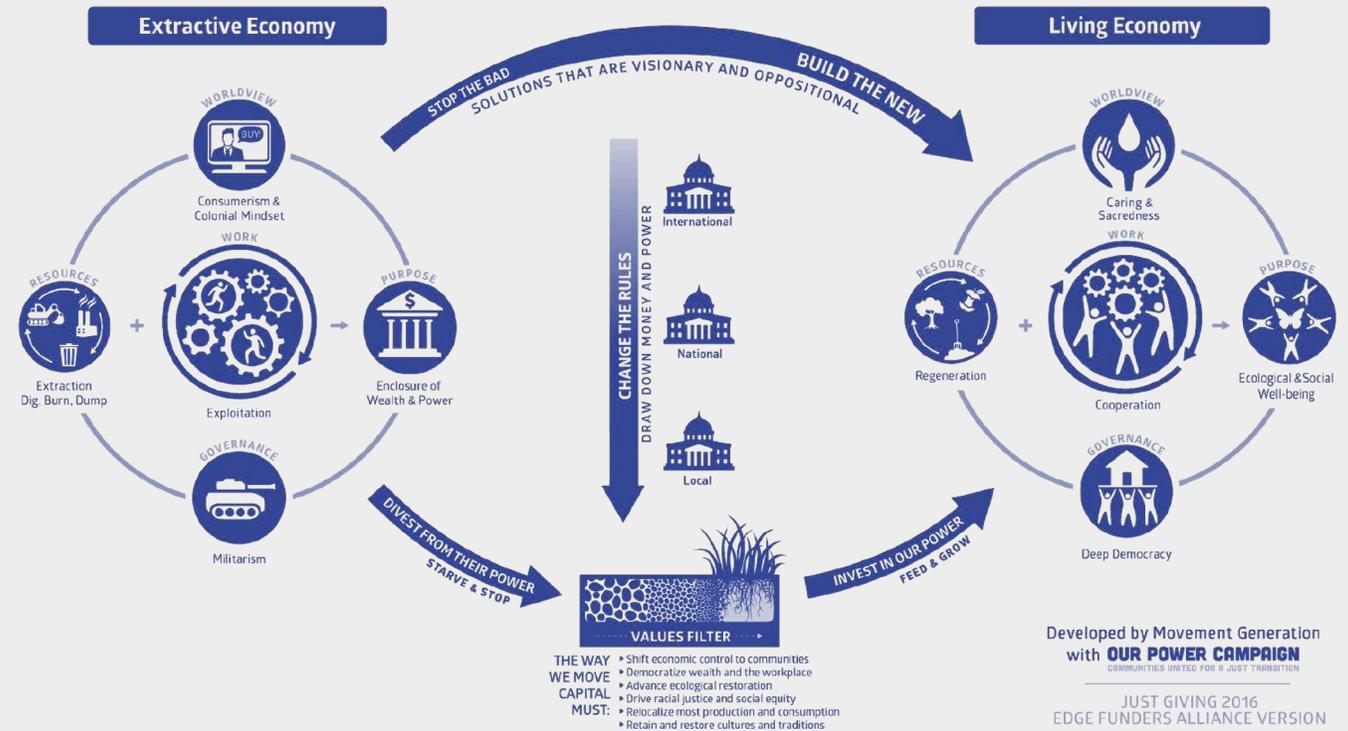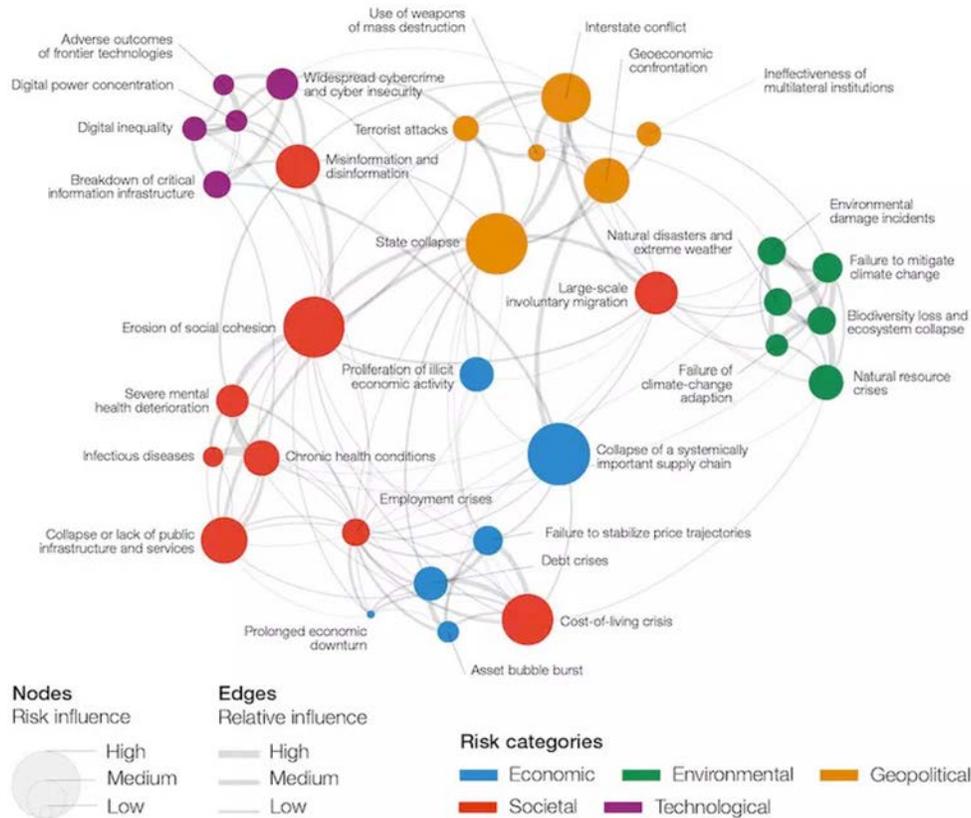
What are we going to do about this?

HTR Task Phase 2: Addressing Energy Injustice

The global perma/polycrisis that's unfolding

Global Risks Report 2023

Global risks landscape: an interconnections map

WORLD ECONOMIC FORUM

Source: World Economic Forum, Global Risks Perception Survey 2022-2023

Polycrisis = the simultaneous occurrence of several catastrophic events

Permacrisis = an extended period of instability and insecurity, especially one resulting from a series of catastrophic events

The global energy (injustice) crisis

The New Gas Normal

European natural gas benchmark prices have fallen 85% from their peak set last year, but they are still double their 2010-2020 average level
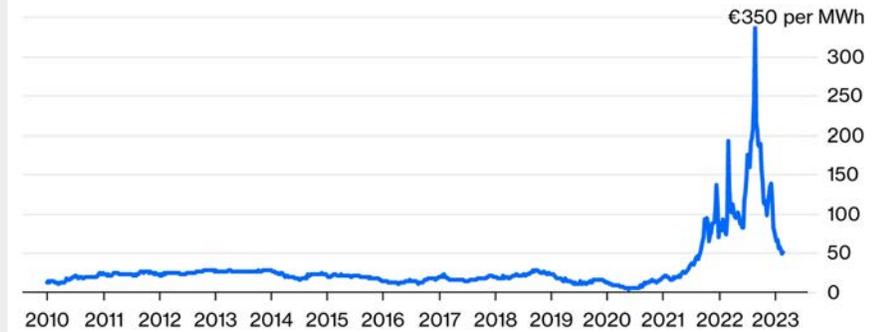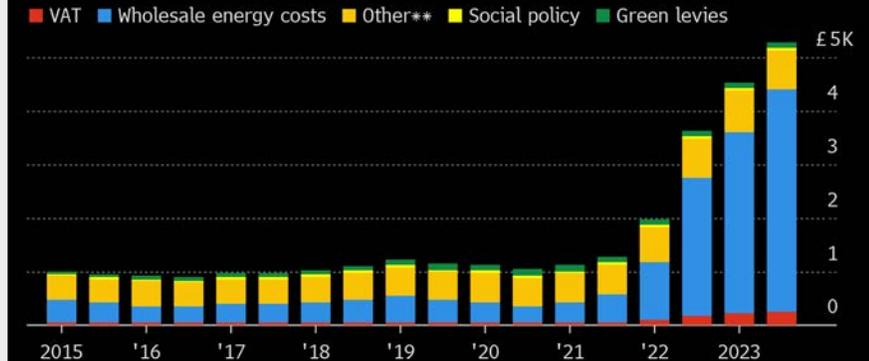
Sources: ICE Ltd and Bloomberg

Household Bills

Wholesale energy costs explain 96% of jump from mid-2021 to 2Q 2023*

■ VAT ■ Wholesale energy costs ■ Other** ■ Social policy ■ Green levies

Source: Carbon Brief
*Numbers for Oct. 2022 and 2023 are estimates. **Other costs include network charges, operating costs, profits and the cost of supplier failure.

Bloomberg

Energy injustice is everywhere

Three international presentations from our hui in Wellington in March:

1. The dire situation in the UK
2. Fuel poverty interventions to deal with the crisis in Portugal
3. The impact of temperature extremes & COVID-19 on remote Indigenous populations in Australia

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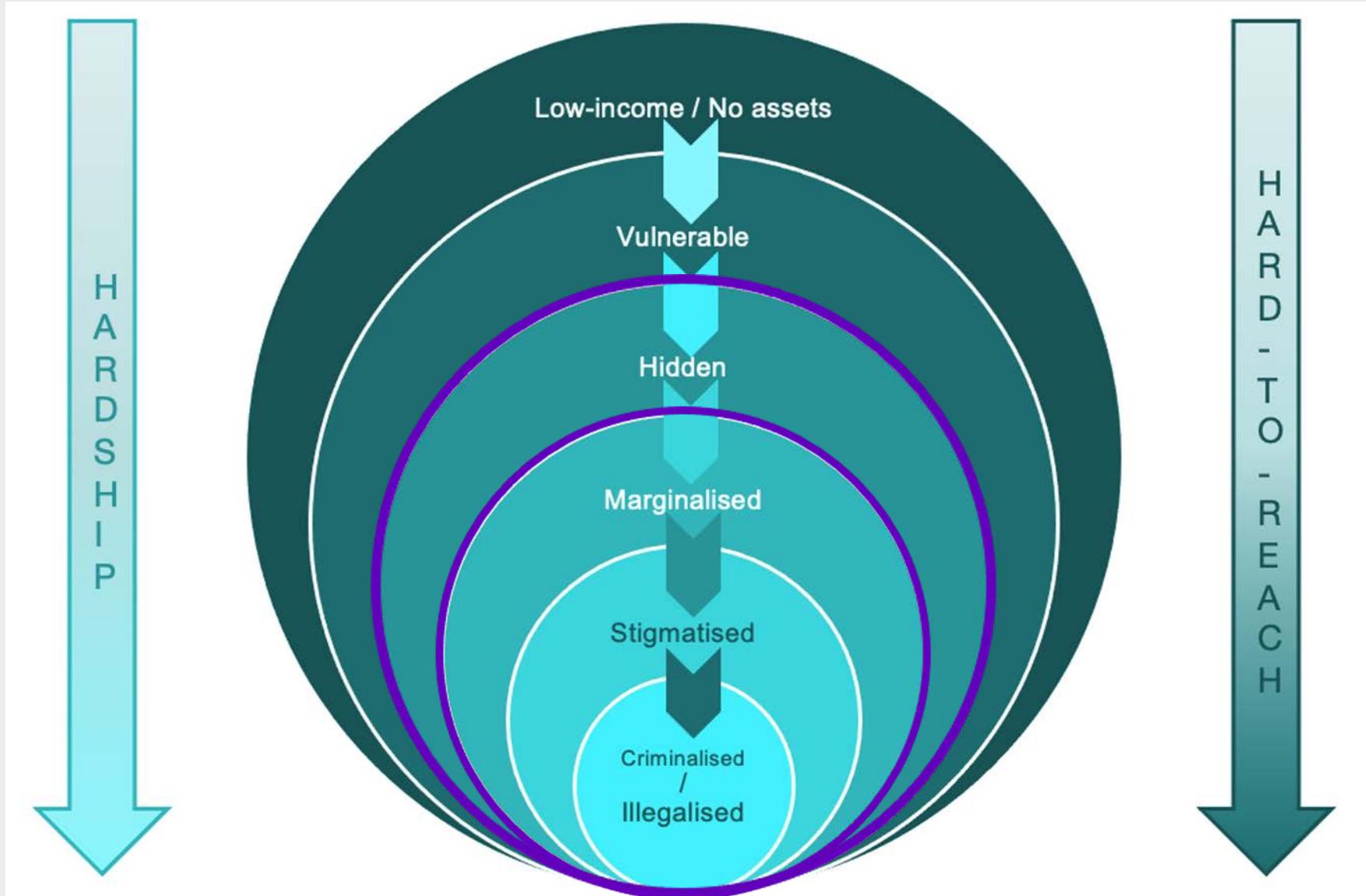UsersTCP

- **Terminology matters** - When we go beyond simple income-related definitions, we're not reaching the majority of energy users. Are they really HTR or are we not trying hard enough?
  ⇒ Broaden our definitions & eligibility criteria as well as audience (sub)segmentation

- **Embrace complexity -** Different audiences = different barriers, motivations, needs, strategies & solutions
  ⇒ Spend more resources deeply understanding sub-segments of priority audiences

- **Look at the hidden segments** - Why are they hidden? Are we not "seeing" them or do they want to remain hidden on purpose, and if so, why?
  ⇒ Understand their lived experience and complex range of issues they're dealing with. Figure out where EE / DR / BC can help and with what by emphatically listening before reflexively fixing

- **For whom aren't they hidden?** Which community and frontline providers and gatekeepers, as well as service providers are known and trusted by them?
  ⇒ What do we need to do to create trusted relationships with those community navigators without further burdening them? Provide training and energy education where necessary, respect their time

- **"Decolonise" our thinking and approaches** - Do we know how marginalised communities want to be engaged with?
  ⇒ Understand which subgroups need what cultural approaches, messengers and strategies

Research Questions:

1. How is the current energy (injustice) crisis unfolding in different countries?

   ⇒ Who is addressing it, who is affected by it, how are we addressing it, what are unintended consequences?

2. Who are HTR energy users who remain hidden from interventions aimed at addressing the energy crisis and/or are living in hidden hardship in each of our participating countries?

   ⇒ Demographics & psychographics? Barriers & needs? Lived experience, stories & traditional knowledge?

3. Who are the Navigators / Gatekeepers who have trusted relationships with those energy users?

   ⇒ Where are they? What are their main barriers? What do they need to be part of addressing energy injustice?

4. How can we improve our methodologies and approaches to engagement with those Navigators to achieve better outcomes for hidden energy users?

   ⇒ Who can we engage? How (well) do our research processes apply here? Use of storytelling and narratives? Does following and including traditional ecological knowledge improve our research / objectives?

5. What are the cultural / country differences and similarities when engaging energy users in hidden hardship in the field?

   ⇒ Are there overarching guidelines we can follow? Country similarities / differences? What metrics to best measure progress with which target audiences? How can we measure soft benefits? Gain cultural acceptance?

Thank you very much for your attention!

Any questions? Want to join?

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Check out our research here: https://userstcp.org/task/hard-to-reach-energy-users/

UsersTCP and the International Energy Agency (IEA)

- The **International Energy Agency (IEA)** is an intergovernmental organisation that works to shape a secure and sustainable future for all, through a focus on all fuels and all technologies, and analysis and policy advice to governments and industry around the world.

- To facilitate global cooperation on energy technology, the IEA created the **Technology Collaboration Programme (TCP)**. Today, the **UsersTCP** is one of 38 TCPs each focused on a different topic. Together, they connect thousands of experts across government, academia and industry in 55 countries dedicated to advancing energy technology research and application.

- The UsersTCP is **functionally and legally autonomous** from the IEA. Views and findings of the UsersTCP do not necessarily reflect those of the IEA.