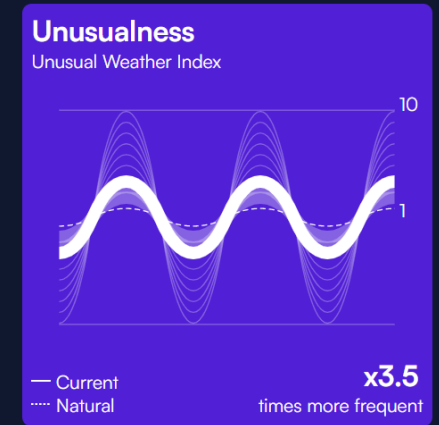
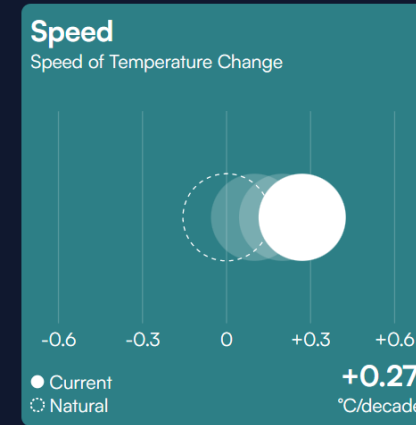
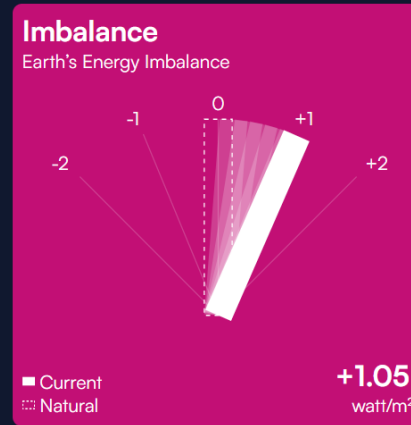


Climate Change in Numbers

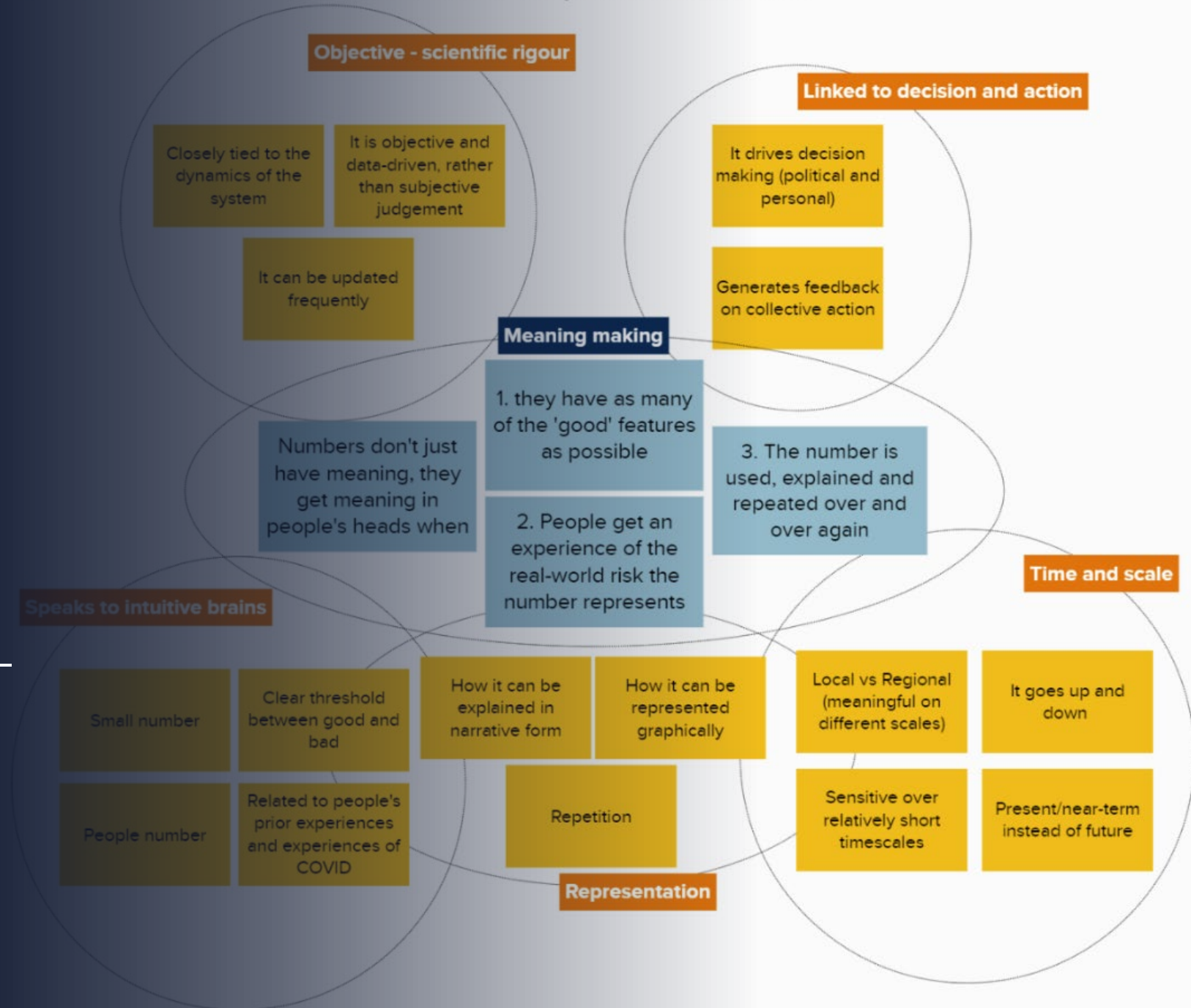
We're currently trapping **1.05 watt/m² of energy**.
This causes temperatures to rise by **0.27 °C per decade**
and makes unusual weather events happen **3.5 times more often**.



How the COVID R-number helped us to redefine what a climate change metric can be, can do, and how it can be created

Kickoff Workshop — July 2021

What made the R number a useful and popular metric to communicate COVID risk?



Coronavirus in the UK

R number range

0.7-0.9



Features that made the R number a useful representation of risk

- closely linked to the dynamics of the system
- small numbers - easy to parse and remember
- non-arbitrary threshold between 'good' and 'bad'
- it showed what is the situation *right now*

R_t number

0.50-0.75

0.75-1.00

1.00-1.25

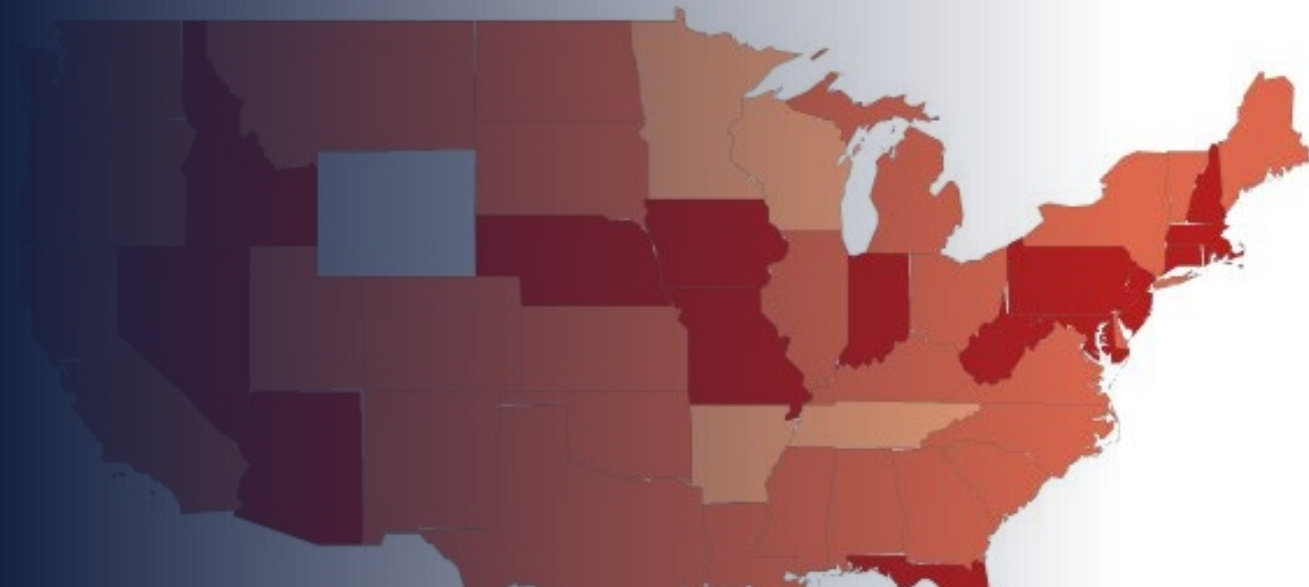
1.25-1.50

1.50-2.00

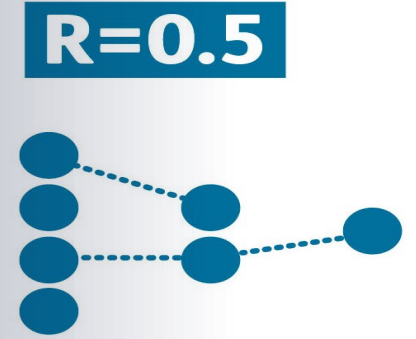
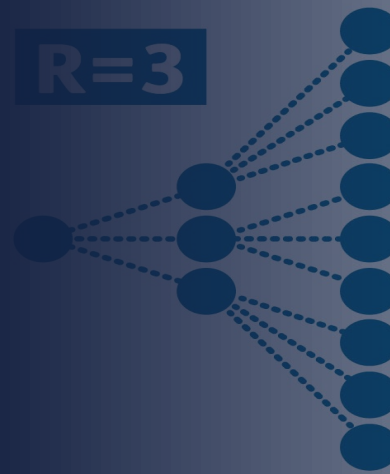
2.00-5.00

Insufficient new cases

25 March 2020



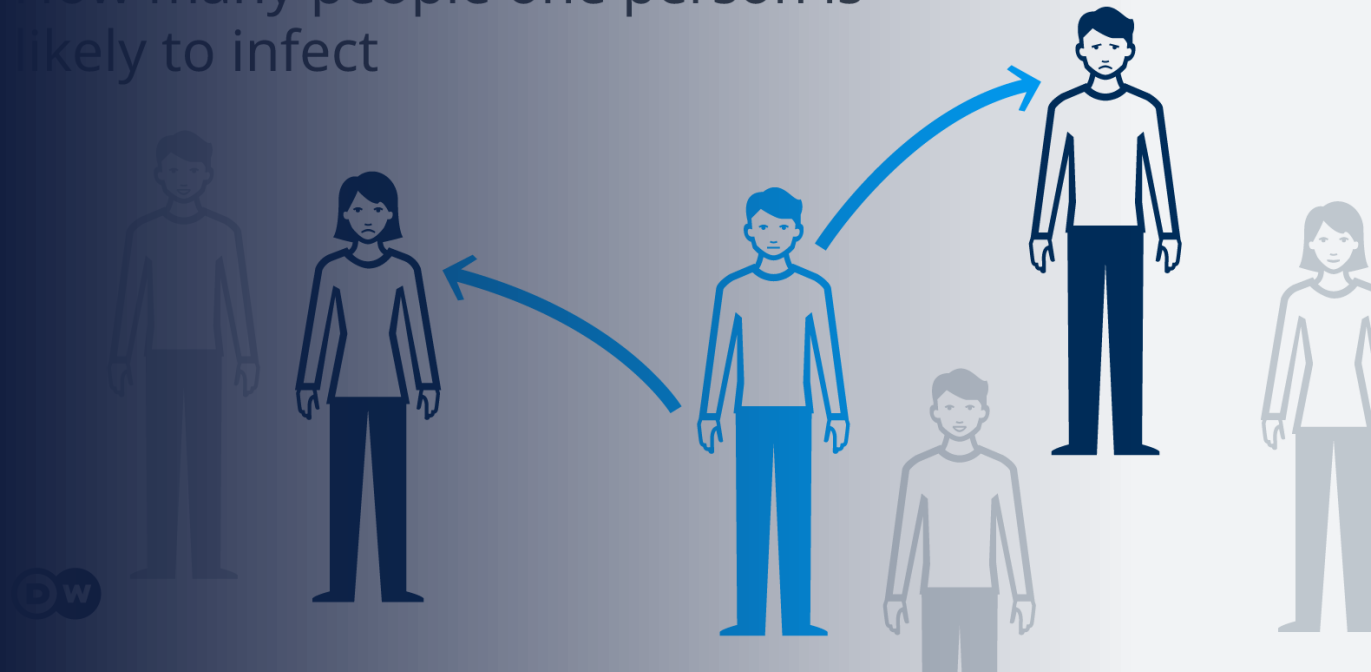
The R number acquired meaning over time



- it was repeated over and over again
- it was explained in story and graphical form
- it could be linked to people's own experiences

Basic reproduction number

How many people one person is likely to infect



What if we applied these ideas to climate change?

What if we developed a structured and iterative design process, starting from communication needs rather than data availability?



Three candidate metrics

Selected from a list of metric ideas harvested in the kick-off meeting

Climate Change in Numbers



Imbalance ▾
+1.05 watt/m²



Speed ▾
+0.27 °C/decade

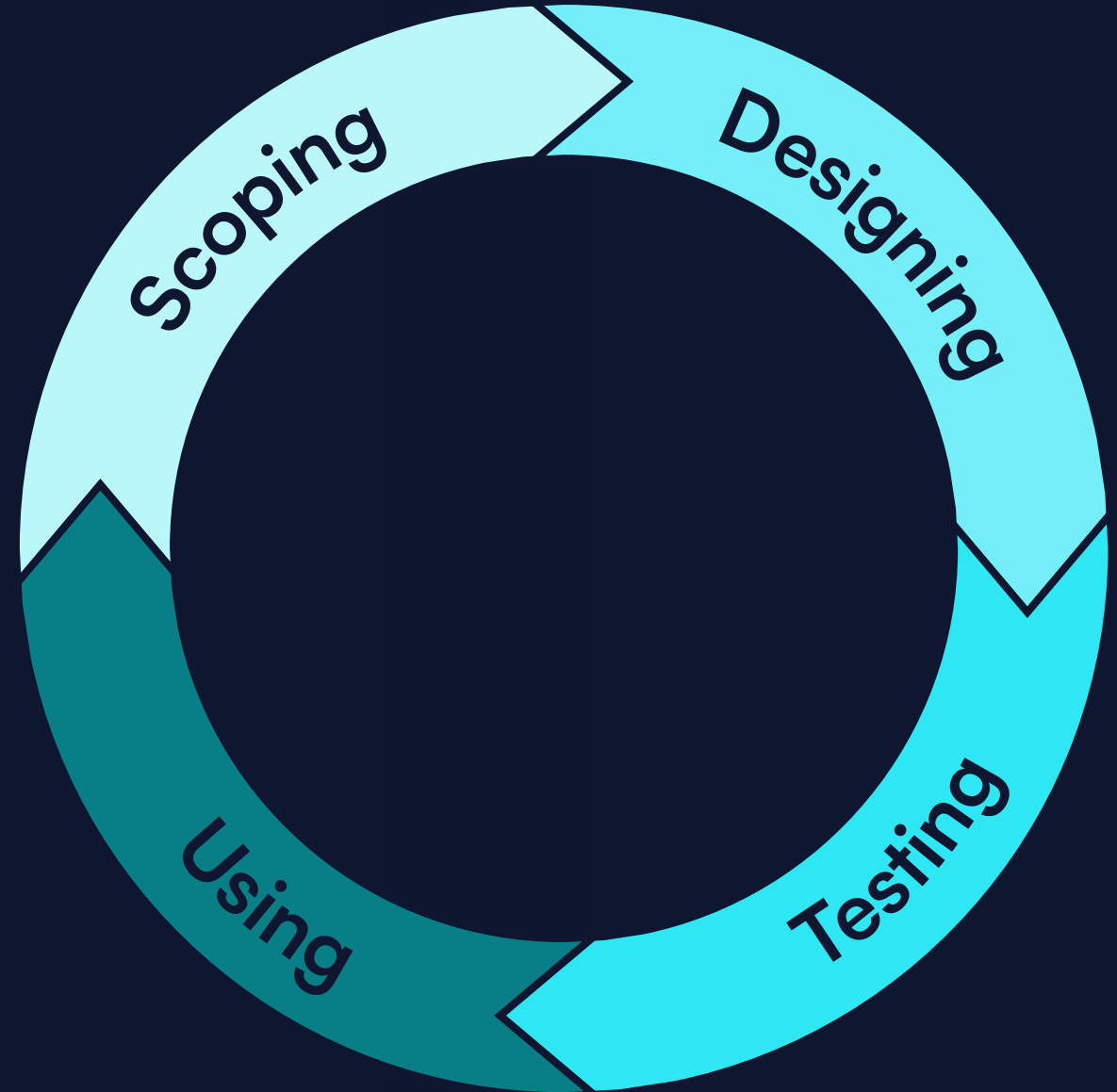


Unusualness ▾
x3.5 times more frequent



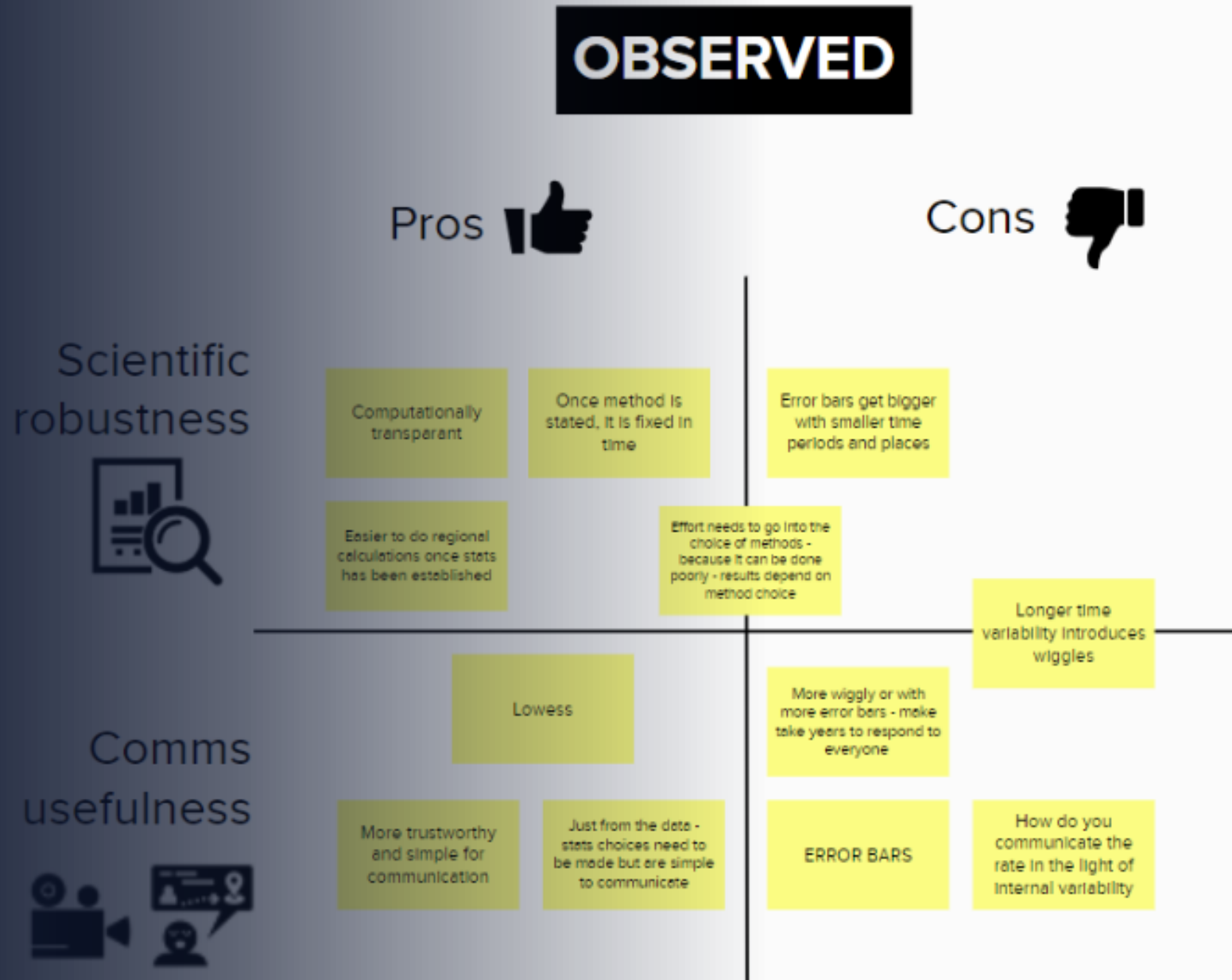
- they 'ticked' several boxes of the useful features of the R number
- together, they tell a story linking the physical causes of climate change to people's own experience

Iterative
design process



Scoping meetings with scientists, data experts and journalists

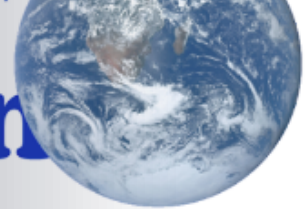
- testing ideas and trade-offs
- understanding feasibility and data availability



Finding the right design partners



creating bridges between
the design community and
orgs resolving challenges



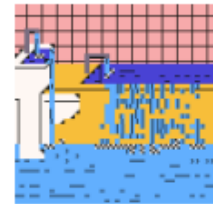
Developing design briefs

What happens when **EEl** is not in balance?

To give you an everyday analogy, imagine what happens when the flow of water into a bath is greater than the flow of water out of the drain. We could call this the Bath Water Imbalance. Expressed as a formula it would be:

$$\text{Bath Water Imbalance} = W_{\text{IN}} - W_{\text{OUT}}$$

If there's more **Water flowing** _{IN} from the tap than can escape _{OUT} through the drains, the overall level of water in the bath keeps going up, and up, and up... Until...→



A preview of **EEl** in 2022

EEl
1.04 W/m²

The **EEl** (as of March 2022) is 1.04 watts per square metre. That means for every square metre of the surface of the Earth, 1.04 watts of

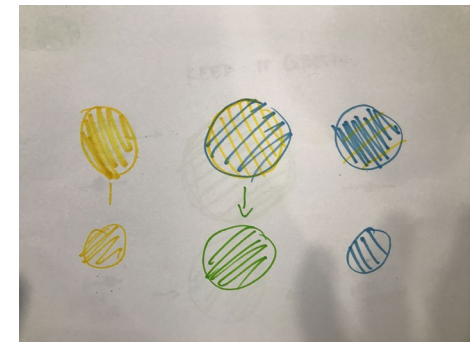
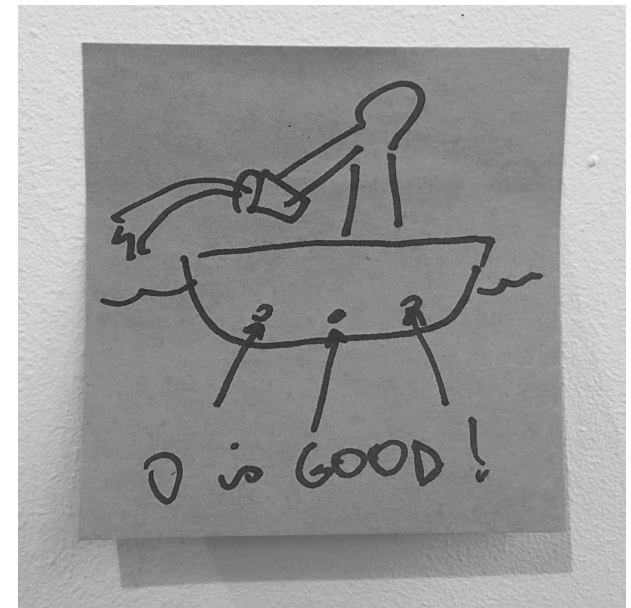
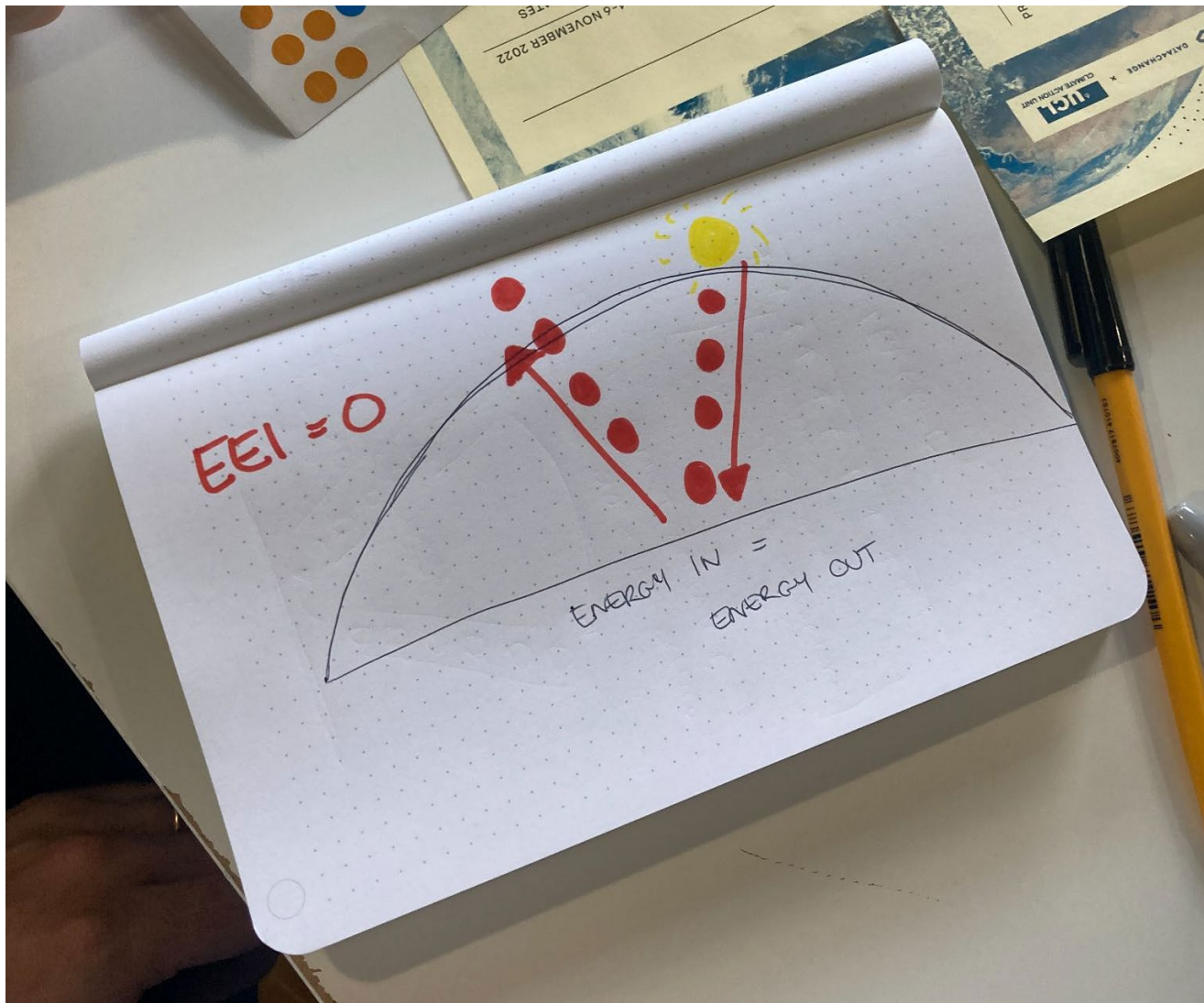
EEl
530 TW

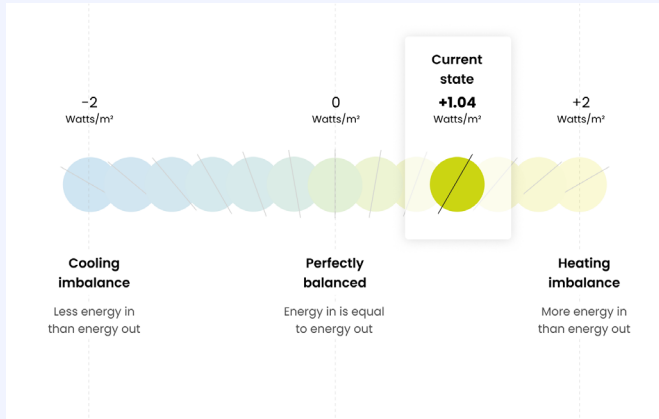
If we sum together all of the extra energy accruing across all of the planet's surface area, then we end up with an **EEl** of 530 **terawatts**. This is a mind-bogglingly large amount of energy.



Design sprint

- three days
- nine visualisation experts and designers
- three design teams

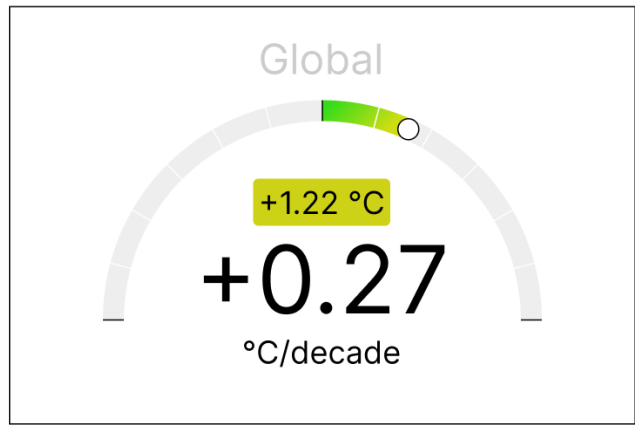
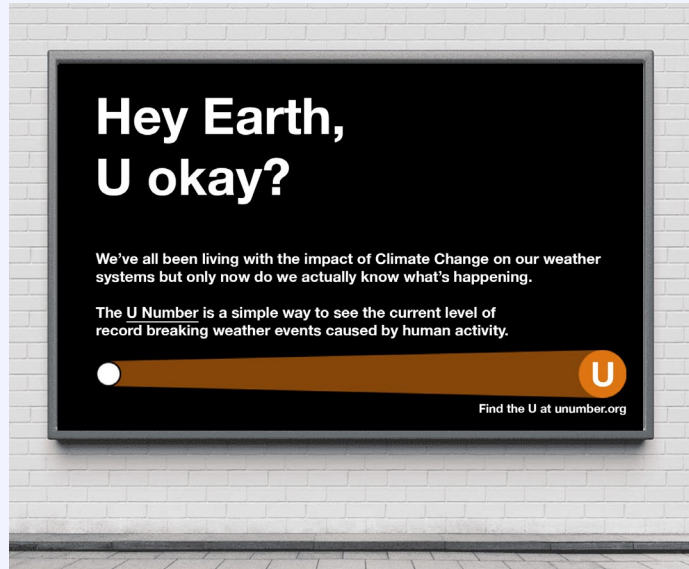




Cooling imbalance
Less energy in than energy out

Perfectly balanced
Energy in is equal to energy out

Heating imbalance
More energy in than energy out



Imbalance	Speed	Oddity
1.04 Watts/m²	0.27 °C/decade	4.1X Out of the Ordinary (OOO)
Earth's Energy Imbalance (EEI) EEI is the imbalance between incoming and outgoing heat. <i>Let's squash this step!</i>	Rate of Temperature Change (RTC) RTC is the speed at which the planet or a region is heating. <i>Let's slow this down!</i>	Weather Oddity Index (WOI) WOI is the oddity of the weather at a global or regional scale. <i>Let's take it back to square one!</i>

We're currently trapping 1.04 Watts/m² of heat. This causes global temperatures to rise by 0.27 °C per decade and makes extraordinary weather events 4.1 times more common.

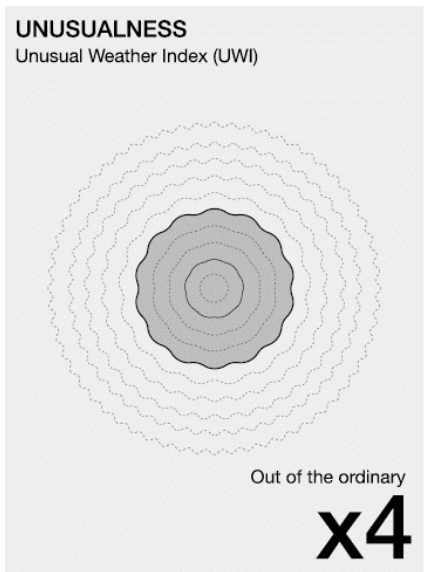
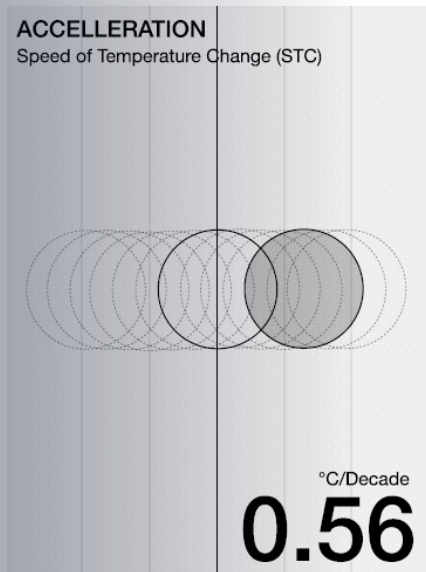
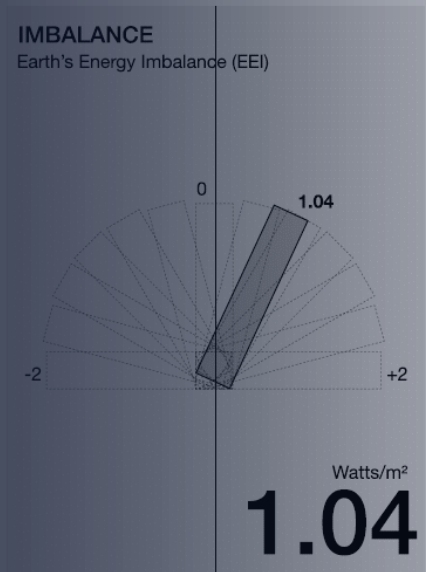
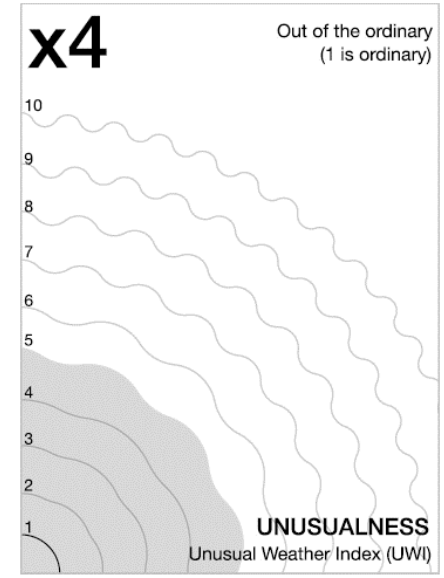
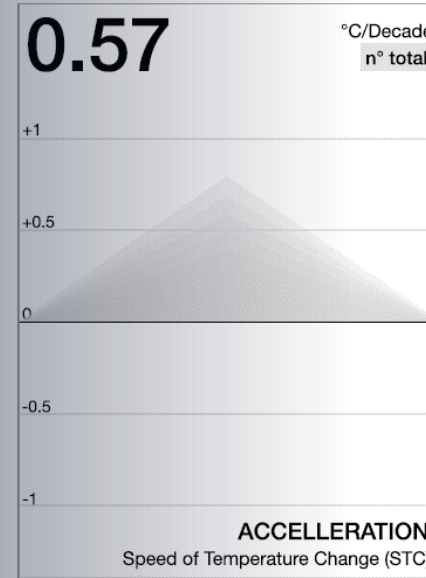
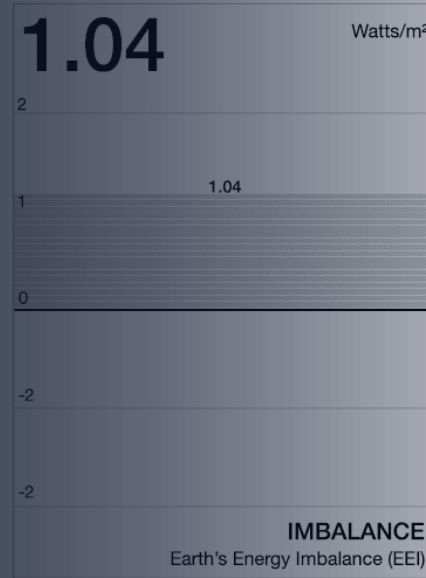
Testing

- how do the visuals work?
- what do you need to explain?
- how do you story-tell?

Metric Testing Feedback - 20/02/2023



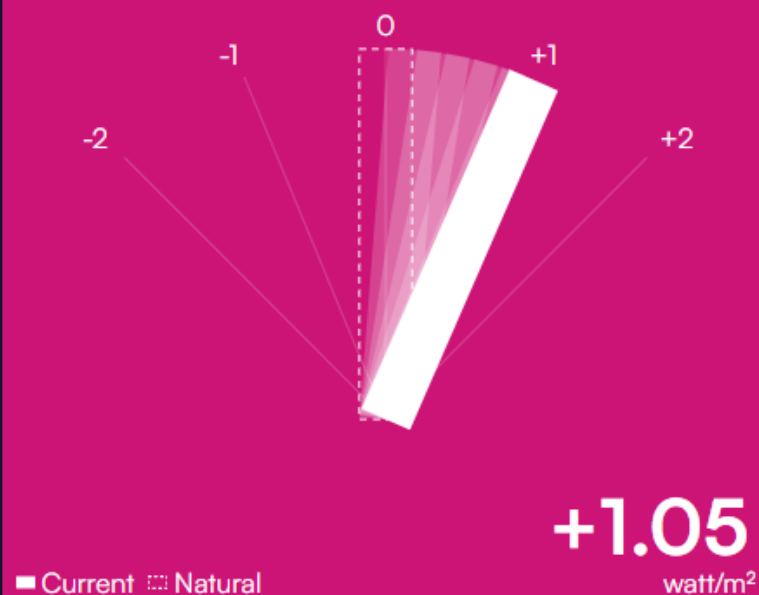
Second design round: prototype development



We're currently trapping **1.05 watt/m² of energy**.
 This causes temperatures to rise by **0.27 °C per decade**
 and makes unusual weather events happen **3.5 times more often**.

Imbalance

Earth's Energy Imbalance

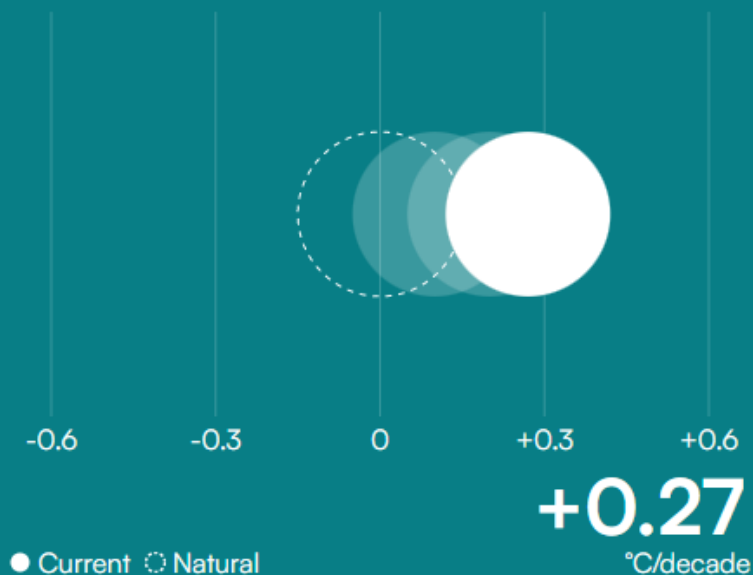


The imbalance between the energy going in and out of the Earth system.

[Explore the metric](#)

Speed

Speed of Temperature Change

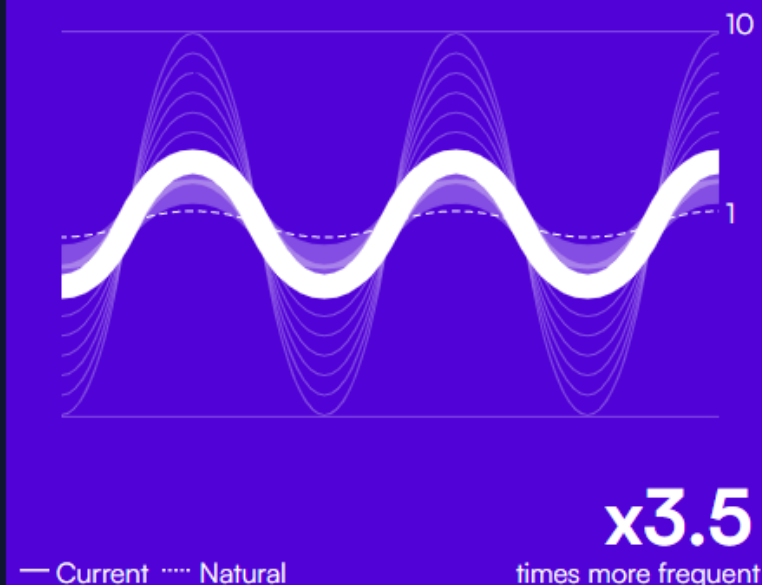


The speed at which the planet is heating.

[Explore the metric](#)

Unusualness

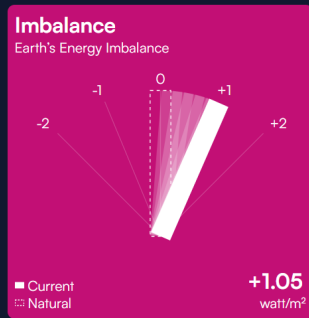
Unusual Weather Index



The level of unusual, record-breaking weather events resulting from climate change.

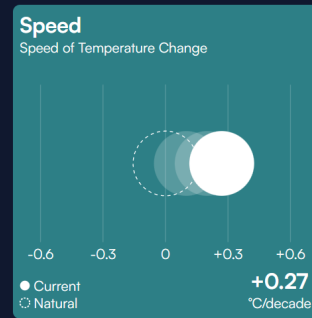
[Explore the metric](#)

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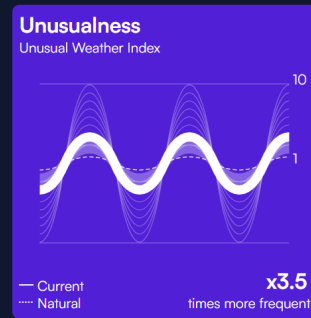
The imbalance between the energy going in and out of the Earth system.

[Explore the metric](#)



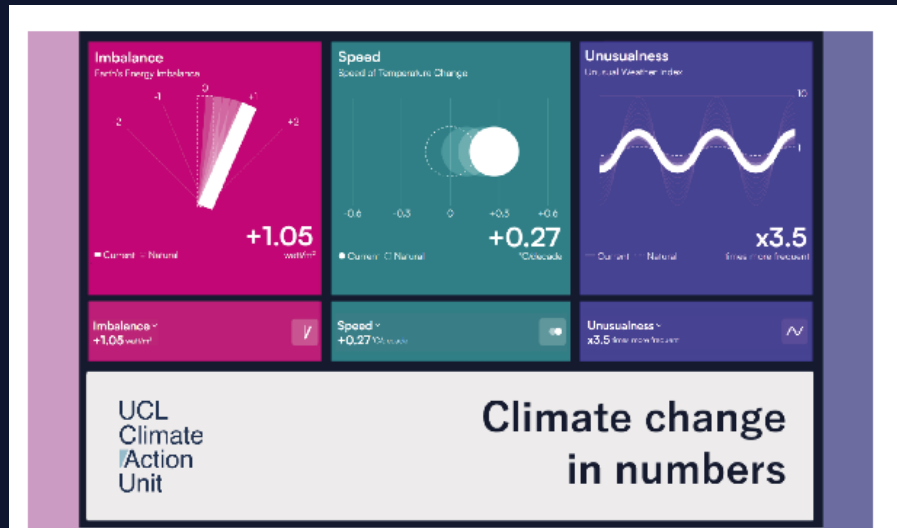
The speed at which the planet is heating.

[Explore the metric](#)



The level of unusual, record-breaking weather events resulting from climate change.

[Explore the metric](#)



Expanding networks for Whole of Society Action

Climate metrics: using data to communicate change

Organised by: UCL Climate Action Unit

Event: Thu 29 Jun at 14:00

Webinar: talk + interactive session

[climatedash.org](https://www.climatedash.org)

Online event — book via:
<https://www.londonclimateactionweek.org/>