UX Scotland

Sustainability built in from the start
The role of design and UX in delivering green software solutions

bjss SPARCK

Helio
Head of
product design

SPARCK

Sam
Sustainability
services lead

bjss

Today we will cover:

1. Defining sustainable features from the start
2. Sustainability UI checker
3. How design can enable greener software

1. Defining sustainable features from the start

Why think ‘sustainability’ from the start?

Why think about sustainability when you can just let the problems pile up for someone else to deal with later?

Fact sheet

Ministry of Enterprise and Innovation N2017.23

June 2017

For sustainable digital transformation in Sweden – a Digital Strategy

The strategy outlines the focus of the Government's digital policy. The vision is for sustainable digital transformation in Sweden. The overall objective is for Sweden to become the world leader in harnessing the opportunities of digital transformation.

Digitally skilled and digitally

This is what happens when you don’t think ‘sustainability’ from start...

Let’s imagine that a cost-effective house was built.

- 👎 Usable
- 👎 Accessible
- 👎 Sustainable

👍 Usable
👎 Accessible
👎 Sustainable

- 👍 Usable
- 👍 Accessible
- 👎 Sustainable

- 👍 Usable
- 👍 Accessible
- 👍 Sustainable

So think from start...

Creating products that are unusable, inaccessible and unsustainable is a cost-effective way to disappoint everyone.

Cost effective

“Google new logo is only 305 bytes, compared to old logo at ~14,000 bytes

Google	Google	
14,000 bytes	305 bytes	
426,125 GB Bandwidth needed per month	9283 GB Bandwidth needed per month	
x	x	
£0.10 per GB Estimated cost	£0.10 per GB Estimated cost	
£42,612.5	- £928.3	= £41,684.2 Cost reduction

Simulation with 1bi page views

“The new logo’s reduced file size has tremendous impact when you consider our goal of making Google more accessible and useful to users around the world, including the next billion.”

Google Design

Balancing useability, accessibility and sustainability

Usable

Accessible

Sustainable

Usable

Accessible

Sustainable

Usable

Accessible

Sustainable

Usable

Accessible

Sustainable

Beta

2. Sustainable UI checker

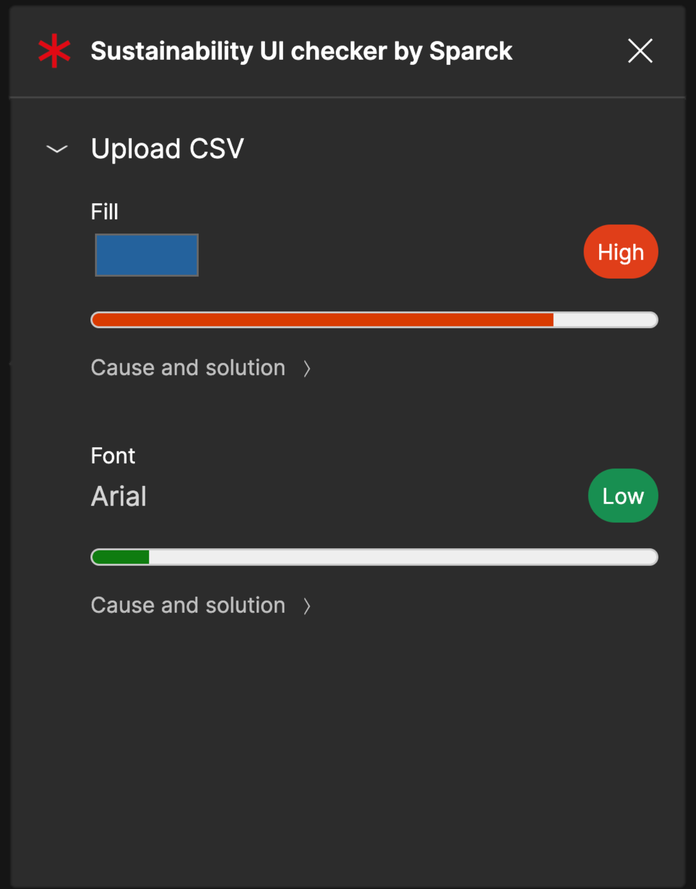
We developed a Figma plugin to help our designers and clients make sustainable UI choices. And we've made it publicly available.

Font

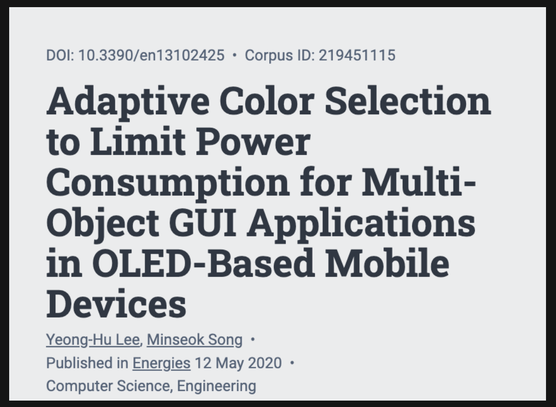
Colours

Effects

Images & videos



Developed from desktop research



Sustainable www

Sustainable Web Design

W3C

Adobe

Mightybytes

Green Software Foundation

Energy consumption guide

The plugin is based on a classification guide for UI choices

	Low	Moderate	High
Font	System fonts	Default/most used fonts	Custom fonts
Colours	Red / Orange	Yellow / Green	Blue / Purple
Effects	Simple effect (no gradient or blur)	Gradient, blurred shadows	Multiple effects
Media (image/video)	Smaller than proportion of dimensions, resolution and file size	Optimal proportion of dimensions, resolution and file size	Smaller than proportion of dimensions, resolution and file size / Video

PLUGIN DEMO

An example of a low-energy consumption colour pallete we developed for a client

Core Black Light

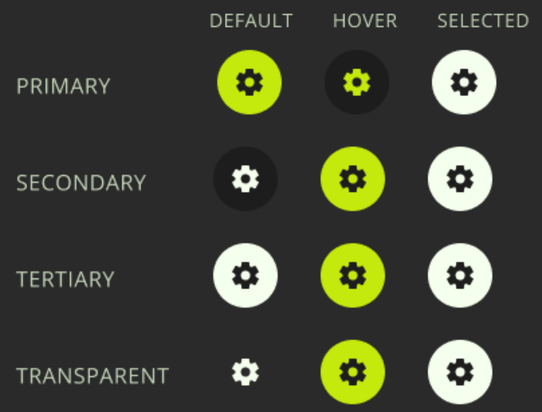
Body text
Leaf+25

Headings
Sun

Links + actions
Leaf

Selected/active links
Core Green

Buttons



Core Black

Body text
Leaf+25

Headings
Sun

Links + actions
Leaf

Selected/active links
Core Green

Buttons

On Layer 2
Leaf+25

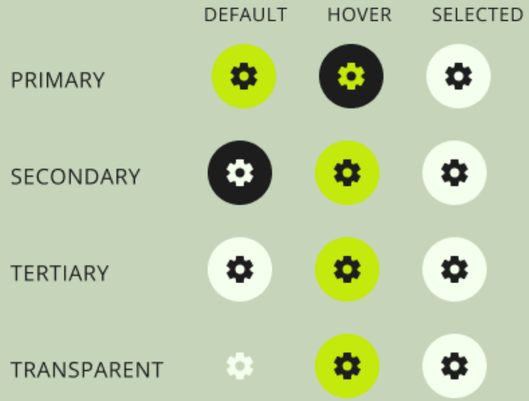
Body text
Core Black

Headings
Leaf+75

Links + actions
UNDEFINED

Selected/active links
UNDEFINED

Buttons



Leaf+50

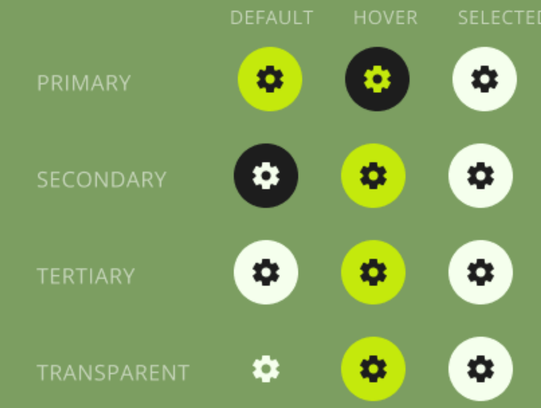
Body text
Core Black

Headings
Leaf

Links + actions
UNDEFINED

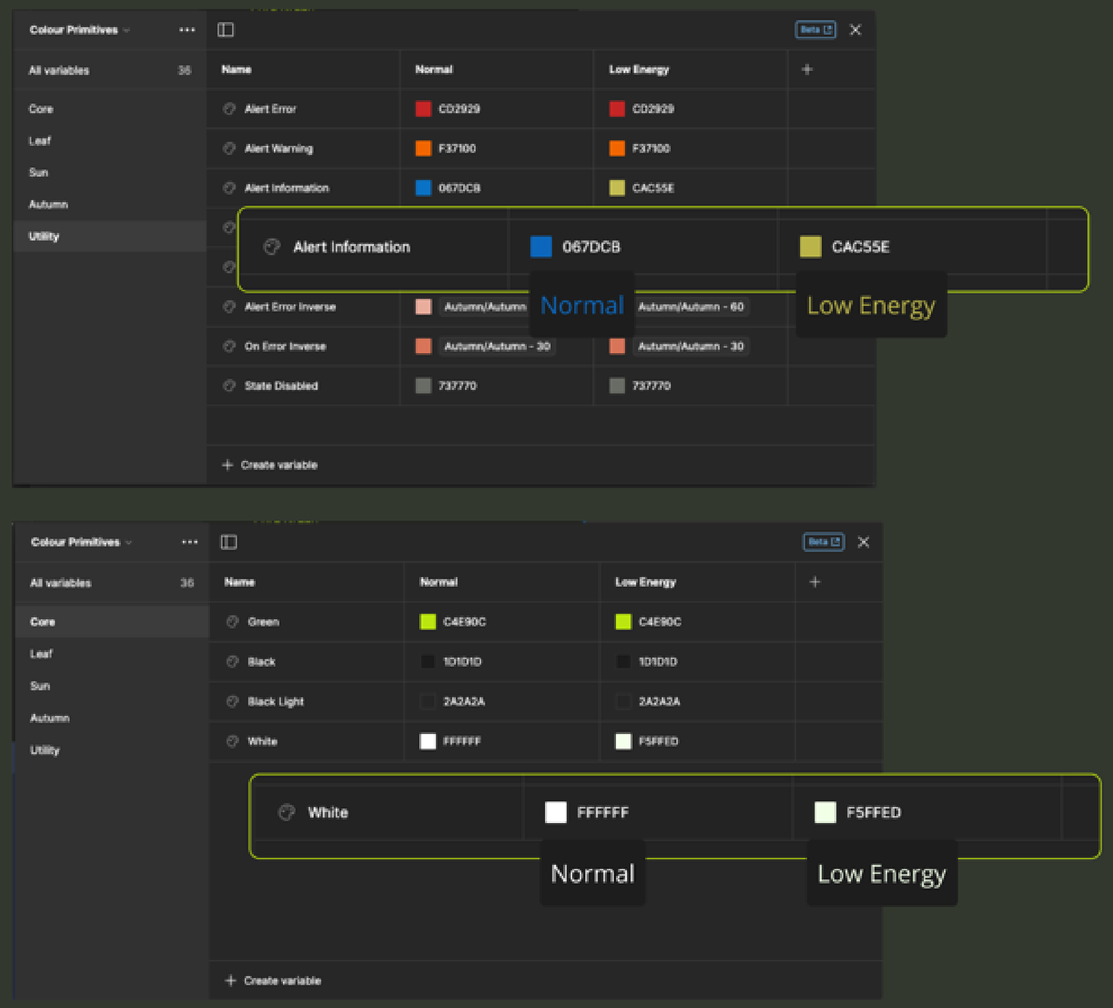
Selected/active links
UNDEFINED

Buttons



Transitioning to low energy mode

To help our client adopt a Low Energy mode ethos, we've started updating the pallete to map colour tokens between normal and low energy mode using local variables in Figma.



3 key takeaways

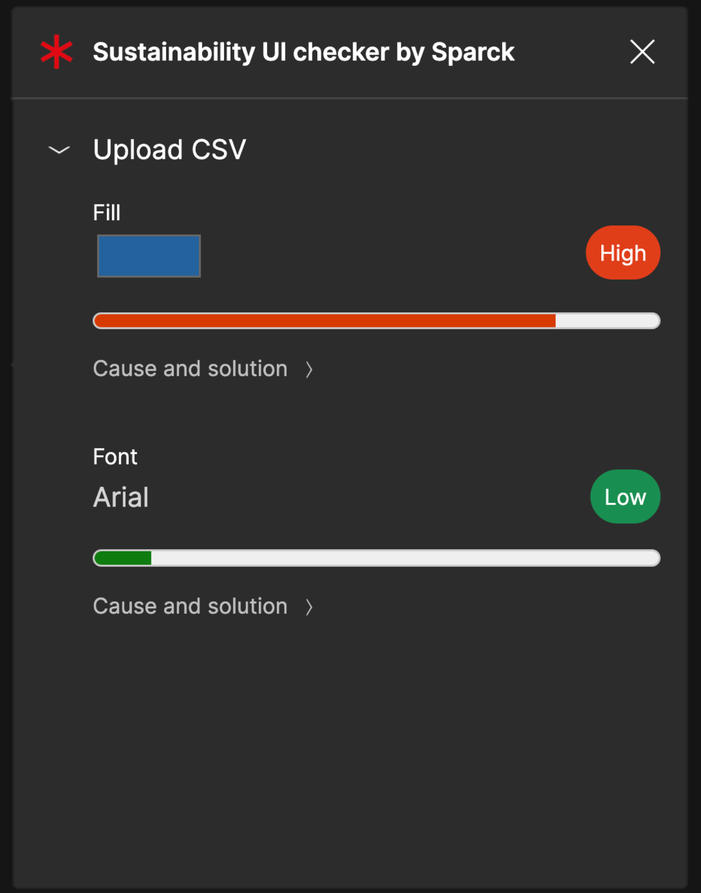
1. Embrace sustainability from the start, save money in the long run.

2. Sustainability improves usability and accessibility, not just the environment.

3. Small, continuous sustainable transitions can have a big impact on the environment and user experience.

Download the plugin

And please, give us feedback!



3. The role of design in enabling greener software

We need to rethink common ‘must haves’

Designers play a key role in not unnecessarily adding to the carbon management burden in the first place.

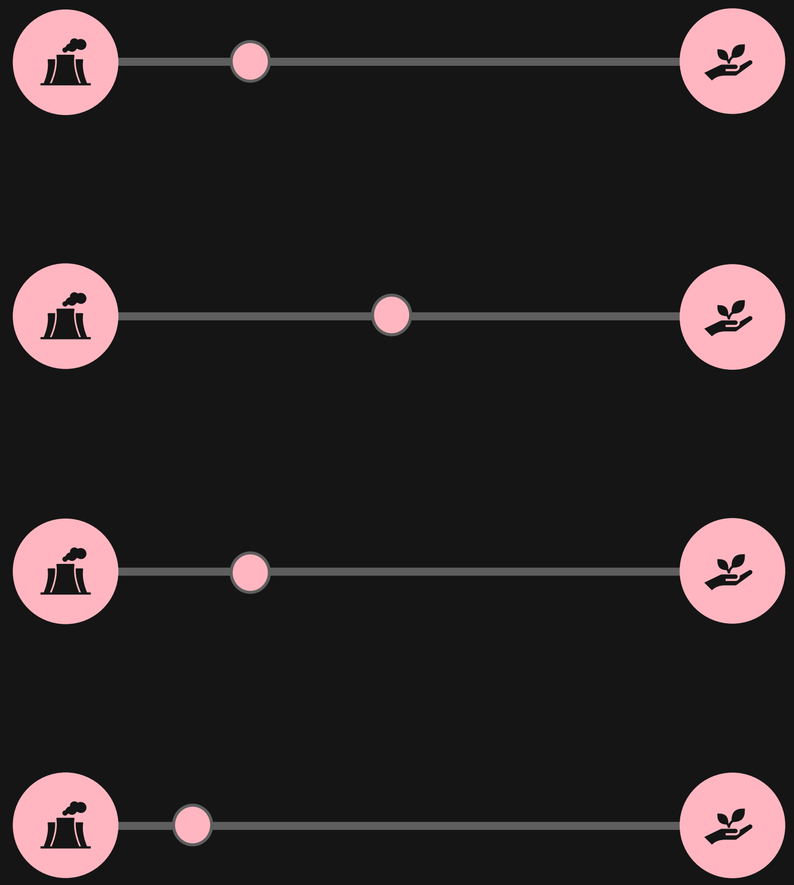
The trend towards...

A. Immediacy
“The service must be real-time”

B. Including ‘just in case’
“We must include this in case...”

C. Richest customer experience
“The user must be highly engaged ...”

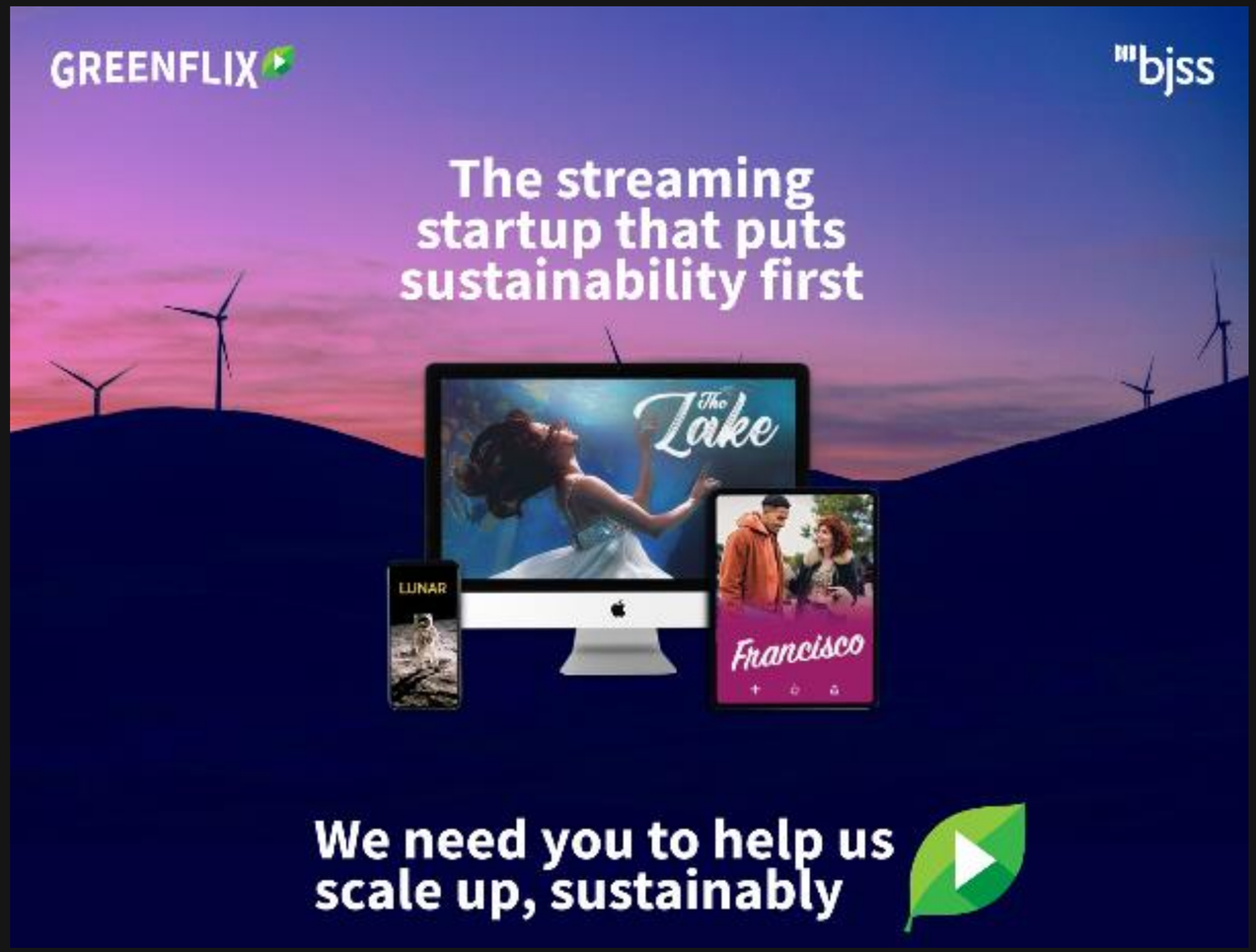
D. Never deleting anything
“We must retain this feature as it was a priority need 5 years ago...”



Low-Carbon Solutions

Introducing Greenflix

Greenflix is the fictional sustainable streaming platform we envisaged to educate our people on sustainable software design and engineering



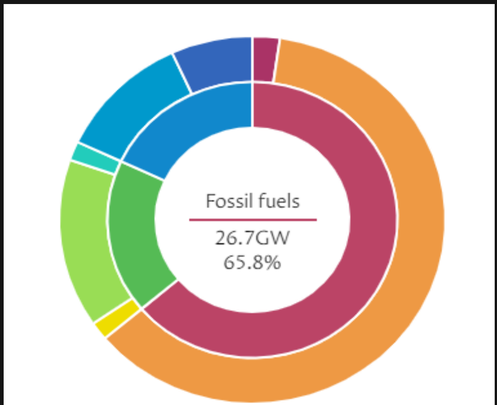
A. Rethinking the need for immediacy

The impact of not acting

- Real time data feeds during peak hours are carbon intensive

Nov 30 @ 3:00pm

65.8% fossil fuels



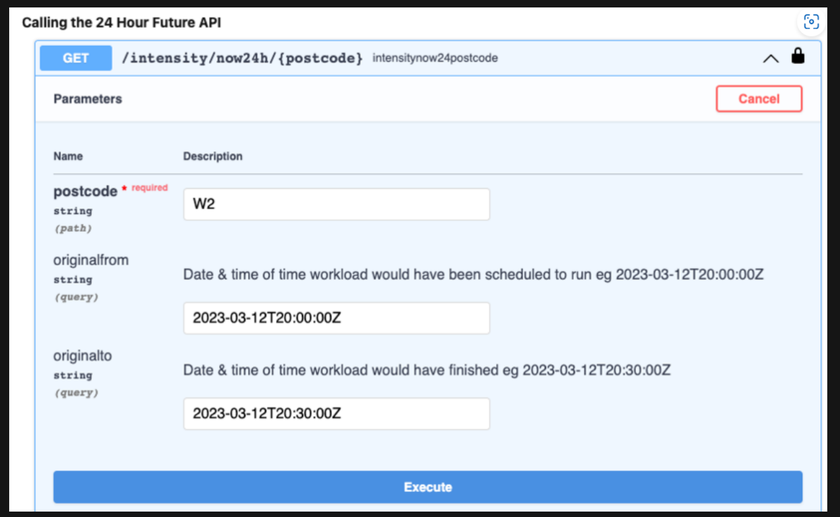
- Data refreshes create significant emissions.

1 GB download / transfer

15 km

The opportunity to be greener

- Carbon Intensity APIs provide a forecast for energy mix and can identify green windows



- Making workloads carbon aware (demand shifting) can result in 45-99% carbon reductions.
- Defining the criticality of features and user actions enables lower-carbon job scheduling

A. Rethinking the need for immediacy

Questions to ask

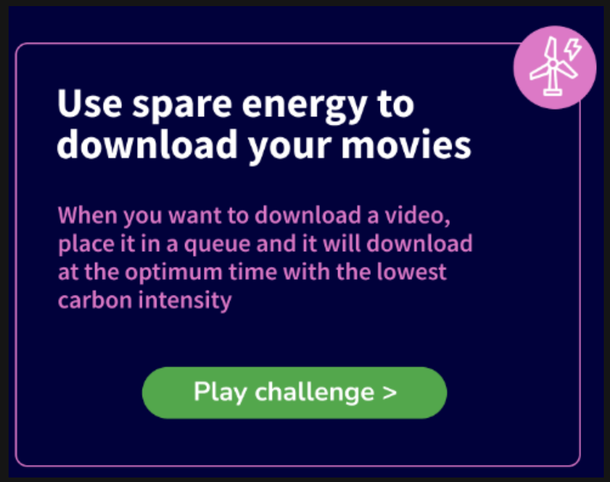
What's the impact of not having real-time or near real-time data?

How time-sensitive is a particular decision?

How can we better tie activation of features to user need?

Applying to Greenflix

Daily content/user info refresh



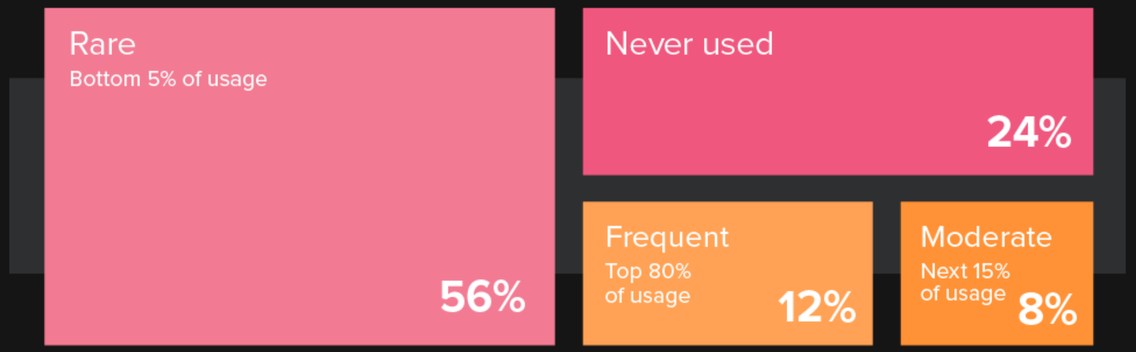
Carbon aware downloads

Load notification centre only on homepage ("what's new?")

B. Rethinking the need for ‘just in case’

The Impact of Not Acting

- 80% of features in the average software product are rarely or never used (Pendo Feature Adoption Report, 2019)



The Opportunity to be Greener

- Design for known/likely use cases, engineers can build in flexibility and observability to respond to future scenarios.
  Flexibility not Perfection.

- Accurately define the when by, how often, how quickly etc. of current and predicted user needs

- We can modularise features and default to ‘switched off’

B. Rethinking the need for ‘just in case’

Questions to ask

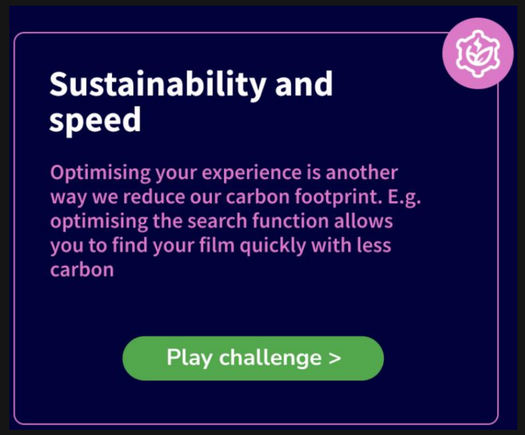
Is there enough clarity around a future scenario to design for it?

Does a choice / trade off I’m making now create a constraint for the future?

How might current trends be affected by increasing climate consciousness?

Applying to Greenflix

Wide-scale adoption of XR uncertain



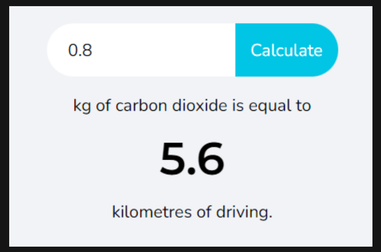
Simple search functionality is ‘good enough’ for now & for most

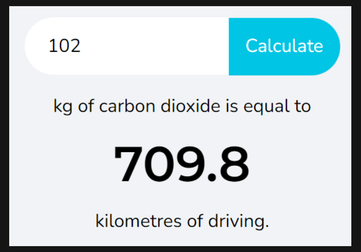
Limits of desirable AI

C. Rethinking the need for the richest CX

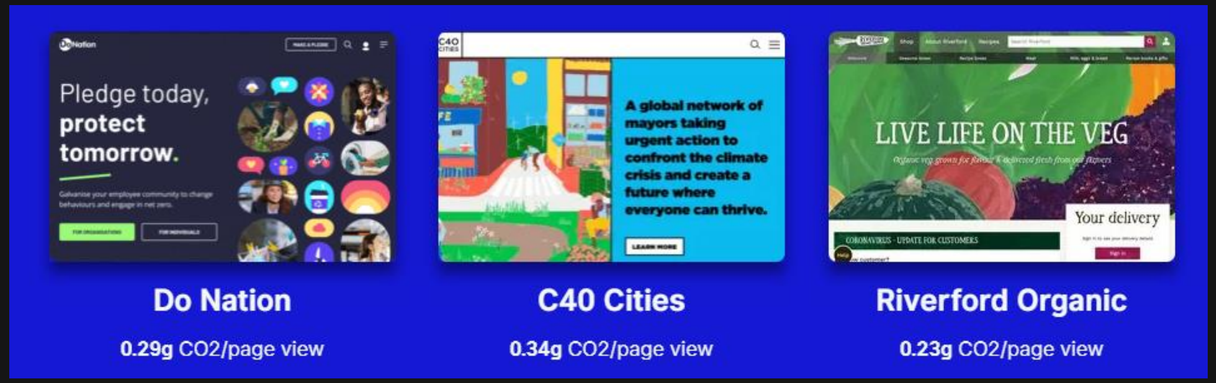
The Impact of Not Acting

Globally, the average web page produces approximately **0.8 grams** CO_2 equivalent per pageview. For a website with 10,000 monthly page views, that's **102 kg** CO_2e per year.





The Opportunity to be Greener



Potential to reduce CO_2 per page view by up to 72%

C. Rethinking the need for the richest CX

Questions to ask

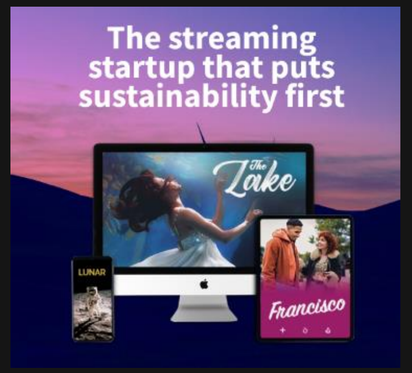
Does the user need to interact with all page components on first view?

How much visual impact is necessary for this stage of the user journey?

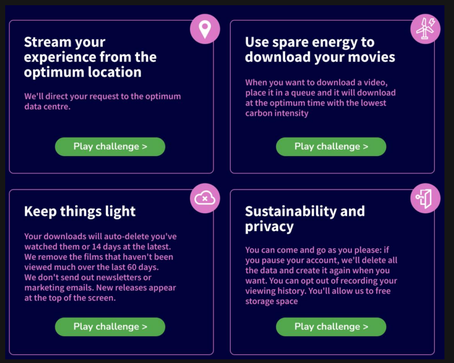
How might I design for the most excluded? (A lighter experience will work for most)?

Applying to Greenflix

User action portal – “what do you want to do?”



A richer UX may be justified to attract new customers



Minimal distractions, simple UX/UI. User chooses own journey

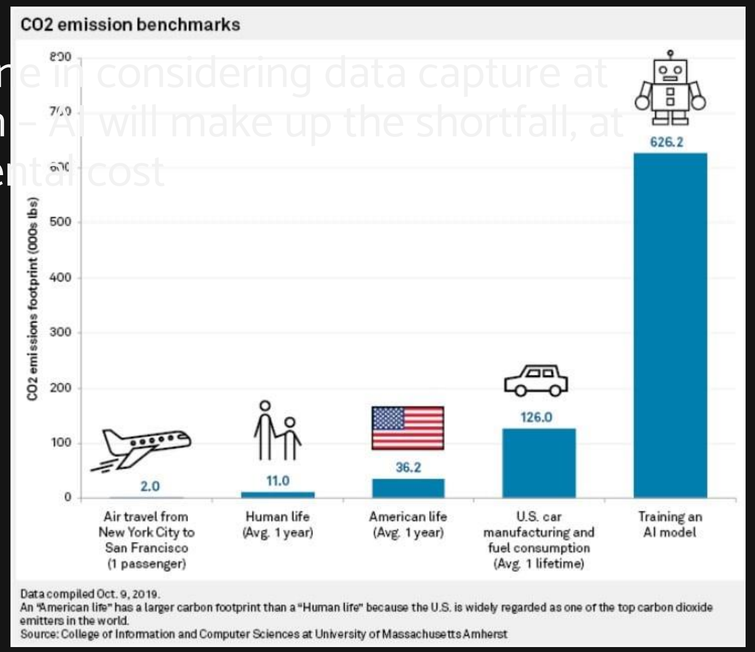
D. Rethinking the need to retain everything

The Impact of Not Acting

Veritas estimated that in 2020, 5.8 million tonnes of CO2 was pumped into the atmosphere as a result of storing unnecessary ‘dark data’ would require a forest 500 times the size of Manhattan to absorb.

If the work isn’t done in considering data capture at the solution design – AI will make up the shortfall, at a heavy environmental cost

Co2 emissions from training a Large Language Model once



The Opportunity to be Greener

- Much of that 55% of dark data can be re-used. We can avoid duplicating assets that already exist.
- Multiple tools exist to support data retention monitoring and feature monitoring
- Engineers and designers need to work together to identify what can be removed

D. Rethinking the need to retain everything

Questions to ask

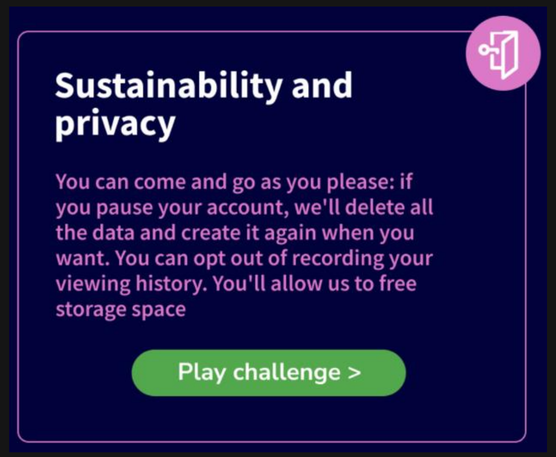
Am I defining an information need or assuming a data requirement?

Is data captured elsewhere that can be used?

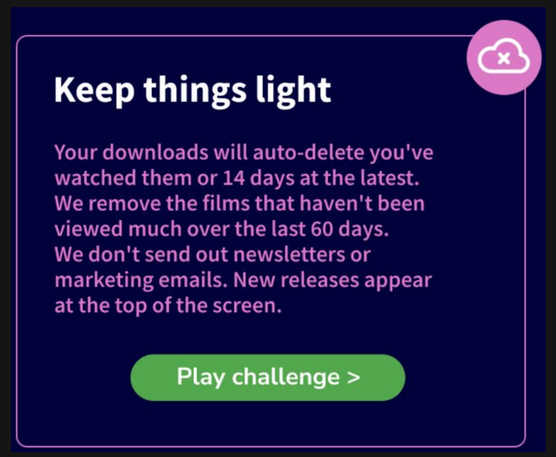
What usage policies need to be applied to identify and delete unused features / data?

Applying to Greenflix

Periodic request for viewing preferences – avoid AI

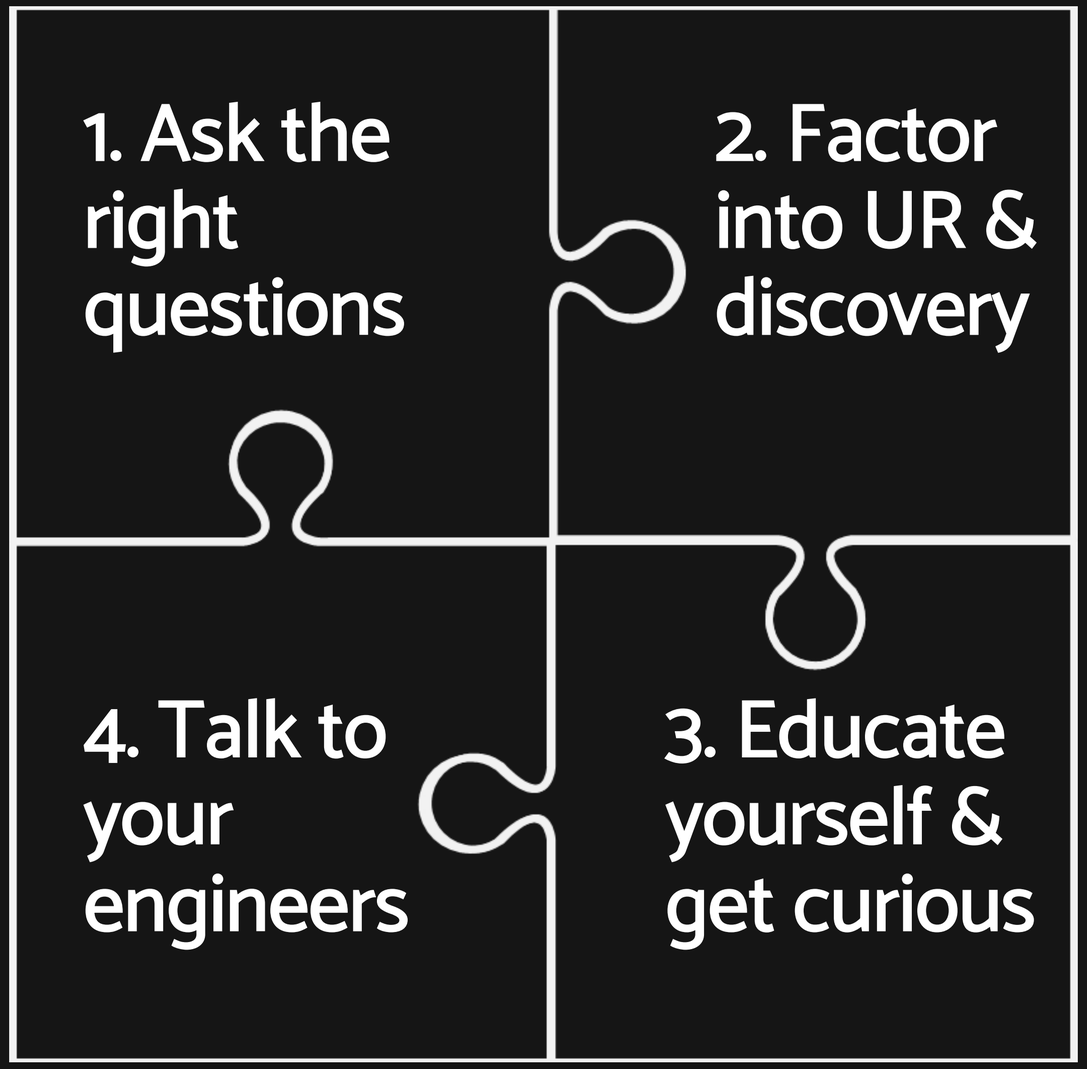


Minimal data set stored for paused accounts



Viewing history and downloads regularly purged

Key takeaways – unlocking greener solutions



Thank you – questions?

Defining sustainable features and designing sustainable UI

1. Embrace sustainability from the start
2. Sustainability improves usability and accessibility, not just the environment
3. Small, continuous sustainable transitions make big impact

Unlocking greener solutions

1. Ask the right questions
2. Factor into UR and discovery
3. Educate yourself and get curious
4. Talk to your engineers

bjss * SPARCK