Diploma project documentation

Sustainable web design service

Mohammadali Sharifian Dorcheh

Supervisors

Prof. Tomasz Bierkowski
Dr. Paulina Urbańska-Kaczmarczyk

Academy of Fine Arts
and design in Katowice

Design faculty
Graphic Design program
Typography studio

second–cycle studies
2022–2021 Academic year

Index

Problem

The internet ecosystem is growing to become one of our planet's biggest electricity consumers and carbon emitters, studies show that the ICT network is already responsible for around 2% of global carbon emissions, equal to the average emissions of the aviation industry and is estimated to rise more than double in the next decade to almost 7%.

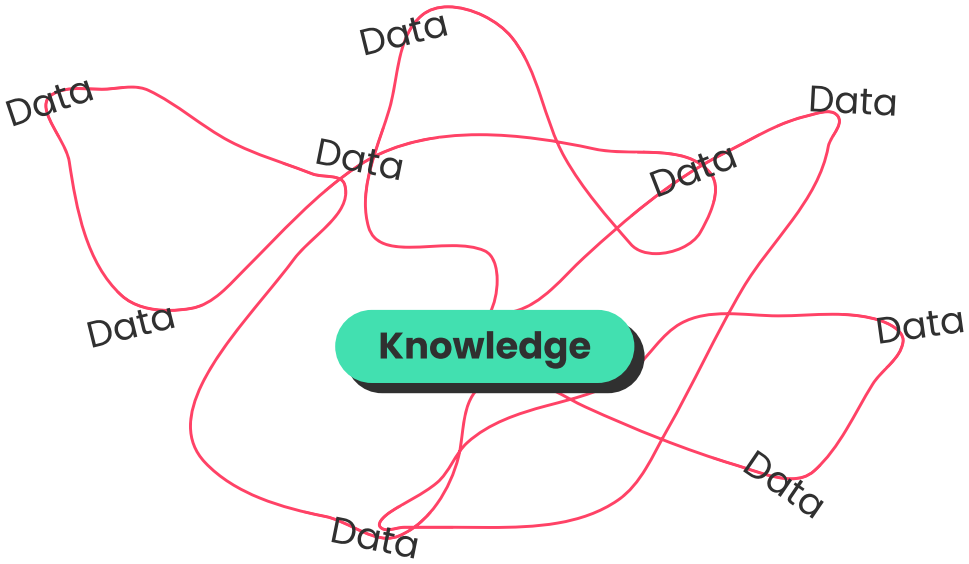
Additionally, web products are becoming heavier and more complicated day by day, demanding more electricity and excluding users with older devices and lower connections accessing their services. This becomes a critical matter in cases of crisis where the connections are disrupted and the access to updated information and services is crucial.

Moreover, as a result of the global climate crisis, sustainability is now being studied and implemented in different industries more than ever. Also, sustainability as a design framework has been around for decades already, especially in architecture, product design, and graphic design. However, despite the rising popularity of web product design, **little has been done to adapt sustainability principles to it.** As we are aware sustainability includes 3 major aspects which can be named in short: the environment, people, and the economy.

Although the public awareness of this matter is increasing, there is still a noticeable lack of knowledge among tech and design professionals, even the environmentally active and aware individuals. Also, the majority of environmentally aware individuals do not consider it a critical matter and do not believe that they can have a role in solving it.

What is the cause of problem?

One reason for this lack of knowledge is the fact that there is not much information available on this topic, and the data is scattered, therefore, one must spend a considerable amount of time to get an idea about the issue and the actionable solutions.



Another reason is that **web products and services are often defined as technical productions, written in codes and the little sustainability information available online is targeting web developers which makes it complicated, difficult to understand and inappropriate to apply by designers.** However, most of the decisions concerning the sustainability of a web product are made in the design phase.

...deciding a page can't exceed 500kB when a mock-up containing three carousels and a full-screen high-resolution background image has already been approved isn't going to do you much good.
(Tim Kadlec)

Available solutions

There is a lack of services related to sustainable web design. Websites such as ***web.dev*** and ***gr491.isit-europe.org*** are examples of a few options available online. By observing and going through these websites, there were several issues found:

Cons:

- Complexity of topics
- Maze of information: each link leads to countless more links and nested information.
- Necessity of spending a considerable amount of time understanding each topic
- Long and complicated articles

On the other hand, there is ***Sustainablewebdesign.org*** which was created by *Wholegraindigital.com*, one of the leading companies in sustainable web, This website is trying to address different topics and roles related to creating a sustainable product. By examining this web service I found that

Pros:

- Ease of navigation through the segments by the use of color and clear segmentation
- Short descriptions
- Trying to keep it simple

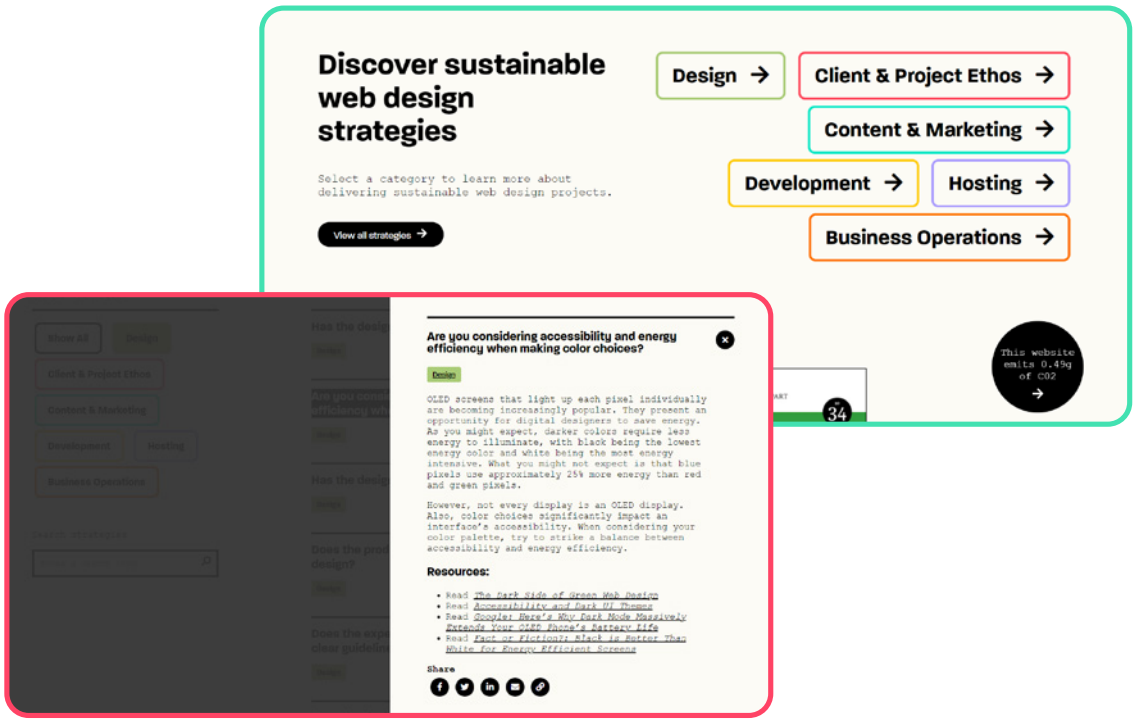
Cons:

- Nested information. Links to other sources, which have links to more sources and so on.
- Not covering all the aspects
- Not providing the useful tools
- The short descriptions are not explanatory

web.dev

gr491.isit-europe.org

Sustainablewebdesign.org



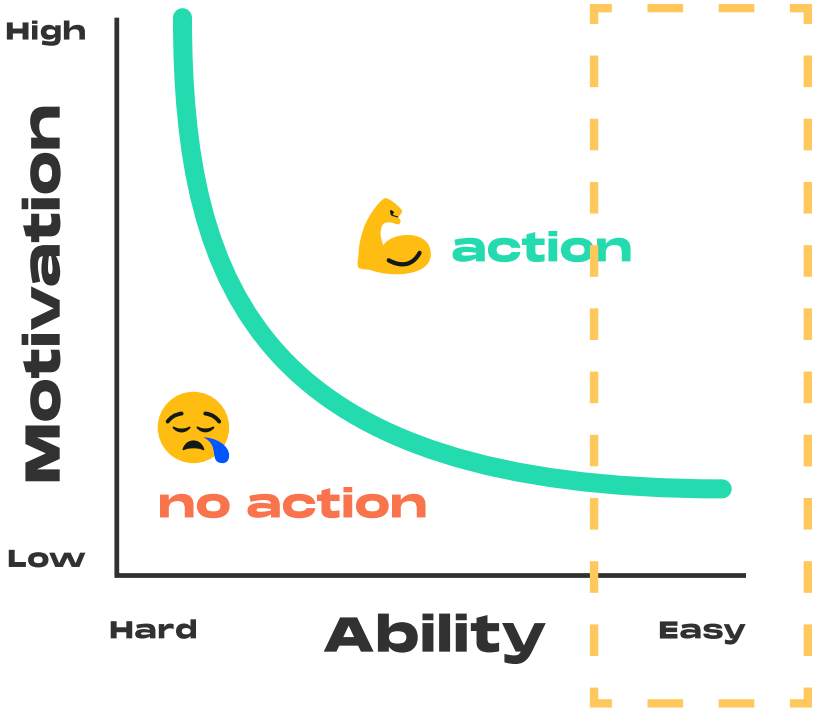
Goal

The main goal is to create a sustainable web for the planet and users by encouraging sustainable web design among designers. For this, I employed Fogg's behavior method:

B=MAP

Behavior = Motivation + Ability + Prompt

In his method, it is suggested that for any kind of behavior change to happen, first, the target audience should know about the behavior and what to change. Secondly, it is necessary to work on the **ability** factor, in other words, to make the target behavior **easy to do**. By implementing this method, I focused my attention on first, creating awareness, and secondly, making sustainable web design easy to do.



Users

This product is generally targeted for Digital Product Designers, user experience, and user interface designers focused on creating web-based products, such as websites, web apps, and web services. Also it is benefitial for team leaders and product managers to be aware of the issue and possible solutions.

To narrow the target group, I have focused on **environmentally aware juniors, graduating graphic design and design students**, aiming for a career in the digital product market for two main reasons:

1. They are already motivated to employ environmental considerations in their life and work, and also, this knowledge can give them an added value that they can bring to their future work since they are eager to learn and employ the knowledge.

2. The educational context is a fertile ground for the knowledge and tool to reach more audiences, therefore, creating awareness with a greater impact.

Personas

Soroush / 31 / Iran
Junior Product designer
Soroush was an architect but he has recently shifted his career into product design, and is encouraged to advance in this field. He is Interested in new technologies, accessibility and social impact of digital product design.

Maja / 28 / Poland
Junior UI/UX designer
Maja has recently graduated from graphic design studies and is working as a junior UI/UX designer in Poland. She is an environmentaly aware and eco-active in perosinal life and interesred in applying sustainable web design in her work

After conducting several in-depth interviews with candidates from my user group I made the following conclusions in case what can actually work for them:

- **A need for a short and explanatory description of the issue**
- **A step by step guide on solutions**
- **Easy to access and understand**
- **It has to be short and simple**
- **Figma is becoming the most popular platform for designing web and digital products**

These conclusions created the basis for the project design assumptions

Design problem

As mentioned the main aim is to solve the sustainability issues of the web ecosystem from the designers angel by creating an environmental and user friendly web products.
Relatively, the main design problem is:

“How to Create a sustainable web?”

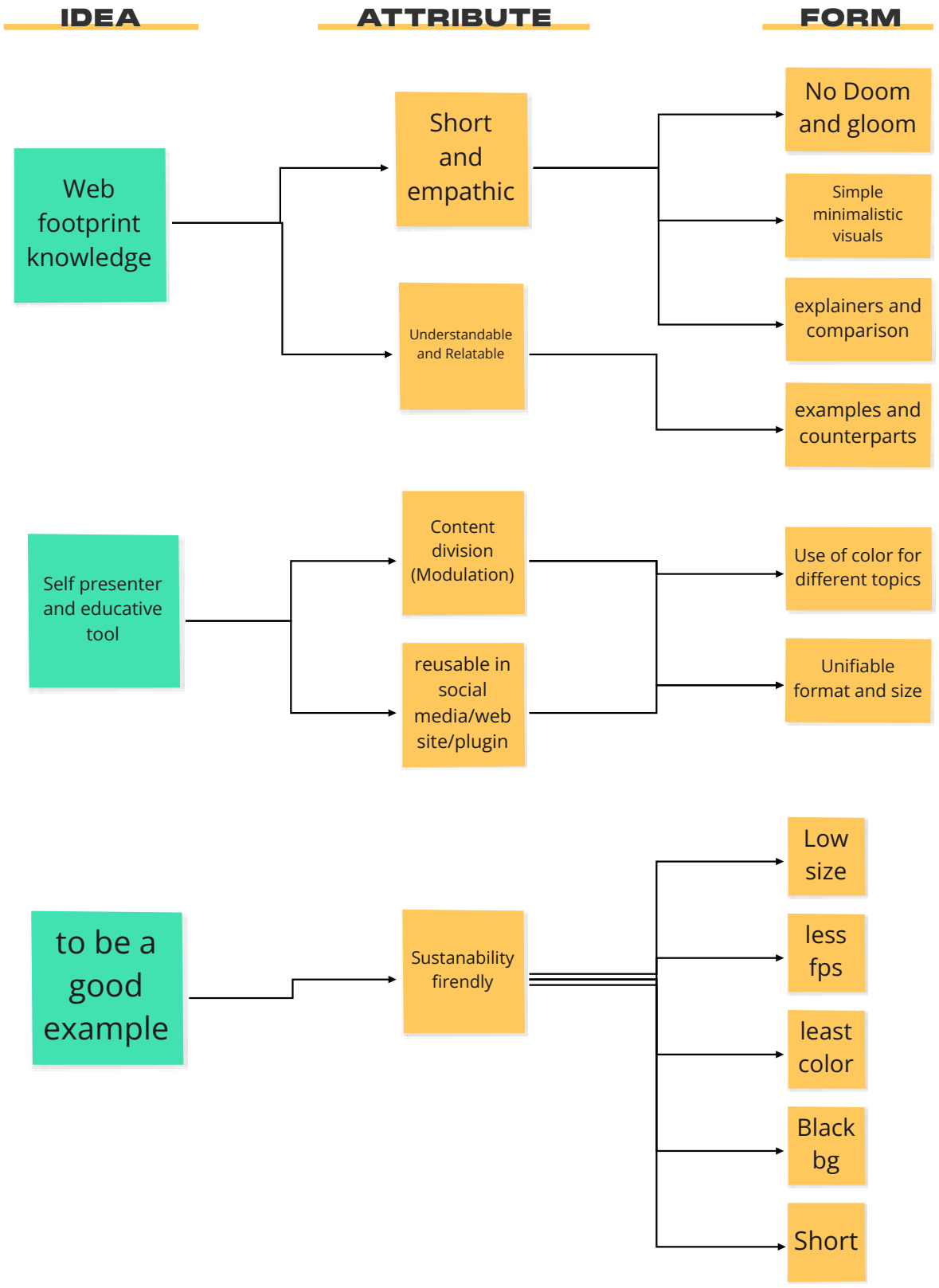
I broke this problem into two smaller problems:

1. How to make a explanatory product, that would catch the attention and raise the awareness about the sustainability issues of the web and also encourage designers to dig deeper.

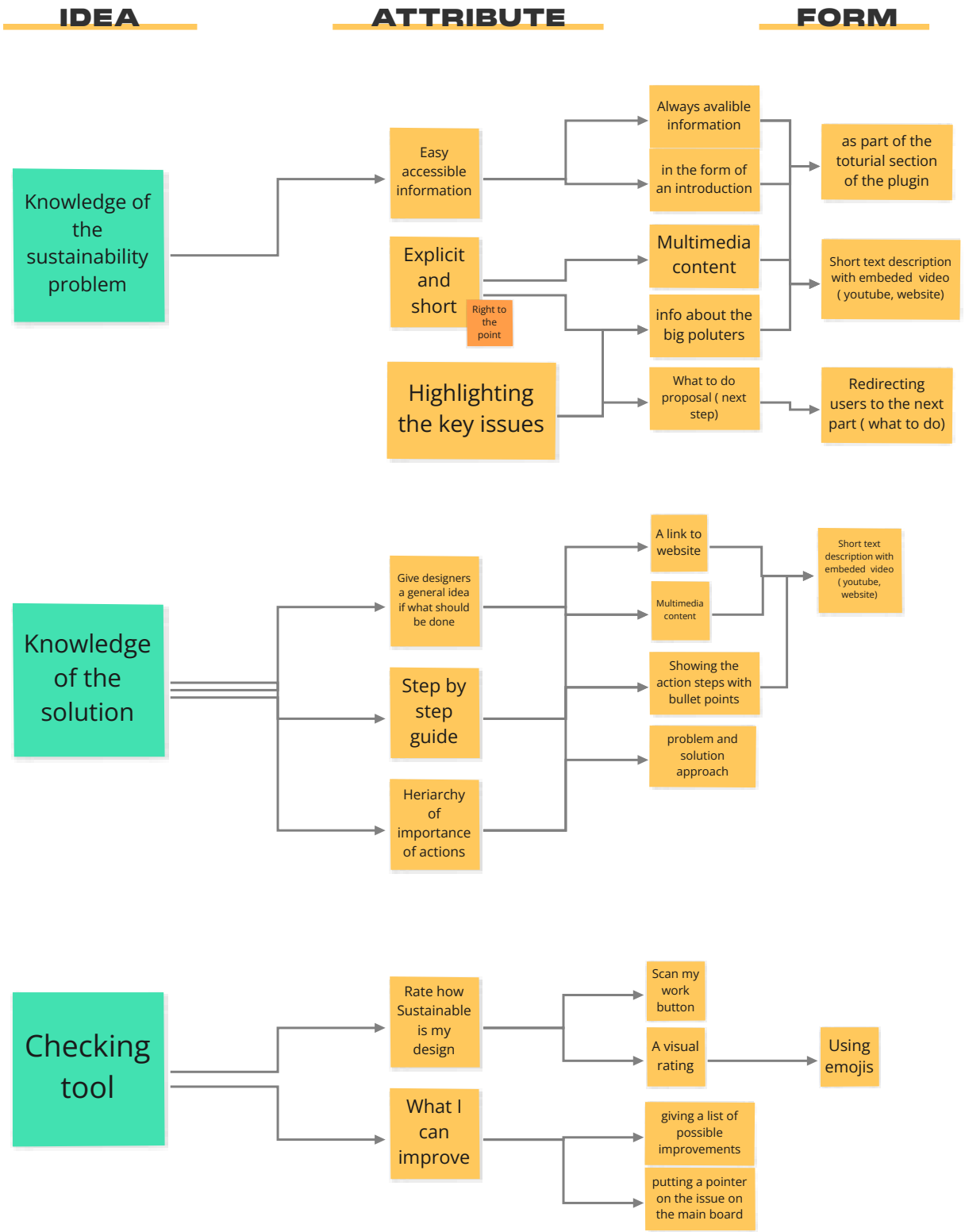
2. How to design a tool, that would make sustainable web design easy to do, educate and enable designer to create better web products.

Design assumptions

1. How to make a explanatory product, that would catch the attention and raise the awareness about the sustainability issues of the web and also encourage designers to dig deeper.



2. How to design a tool, that would make sustainable web design easy to do, educate and enable designer to create better web products.



The Product

Awareness

As for awareness, I decided to use social media as the biggest shared community among users. Also, according to research, video content has the highest interaction rate in social media content and **it is a great medium for giving complex information, short, explicit, and understandable by employing motion design and visual information.**

Therefore, I plan to use animation as a medium and social media as the main channel of communication to share the information and make awareness. These animation will be created with efficiency in mind, making them short, explicit, encouraging, and right to the point, using them on social media, educational workshops and in the main tool.

- The main video consists of these sections:

How internet works

Carbon footprint of the internet

The rising issue and role of corporations

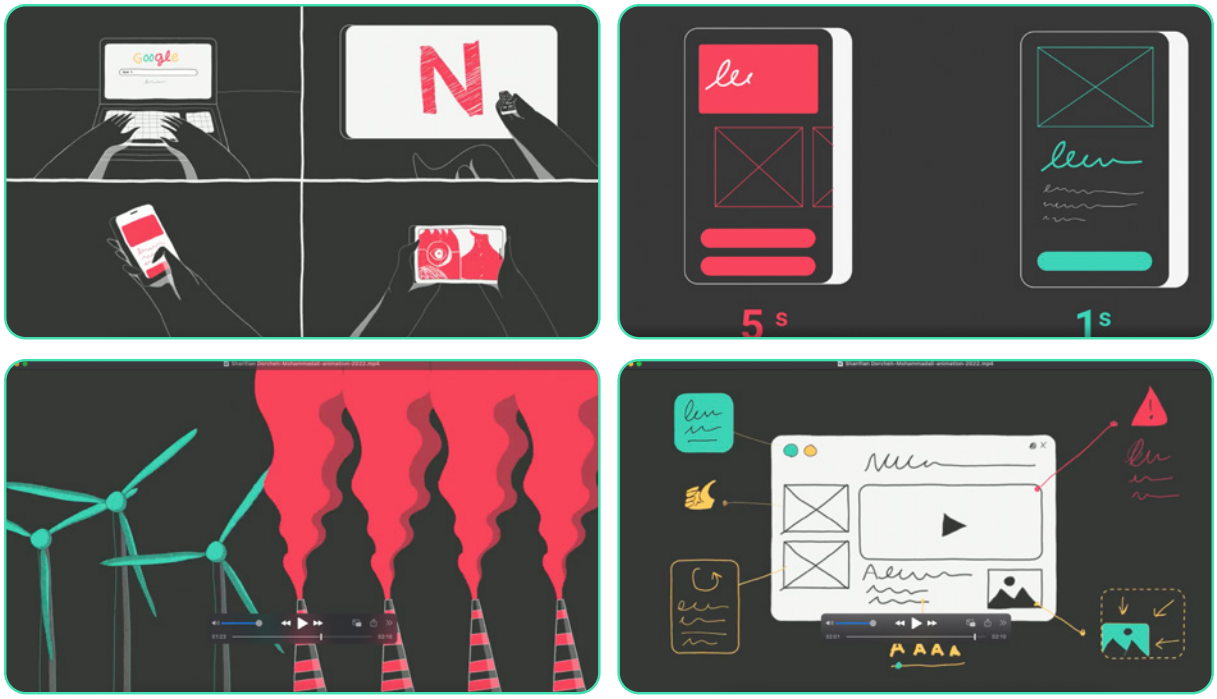
What can we do?

Call to action for designers

- The other videos will be mini animations that are mainly used in the tool as supplementary visualizations about a design issue or solution, they will also be shared as separate material on social media, to explain certain topics related to sustainable web design.

Animations Visual style

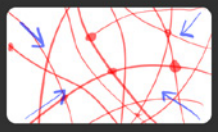
As one of the important points in the awareness assumption, the animation itself has to be a good example of implementing sustainability attitude in practice, so it has to be aligned will all the guidelines and most importantly to be in the most compressed size possible. Therefore, the visual style is in inverted colors with dark background (preserving screen battery consumption) and light lines on top, where our current situation and polutions are in a red and the solutions and good examples in green (this coloring system will be explained in the ability section). Also for the sake of file size, the animation is exported with the highest compression possibility.



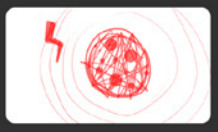
Awareness video storyboard

03
the way internet works
Storyboard

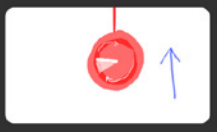
- to reach the audience and show them the notification.



- These networks are strached all around our planet

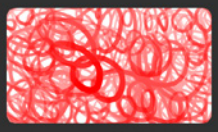


- to work they need a lot of electricity



- 24 hours, every day!

- at least 70% percent of this electricity comes from fossiel fuel burning



- which send a lot of Co2 into the air.

05
data centers detail
Storyboard

- The role of big tech companies

- almost 90% of our internet data travel

- is used for watching videos and online gaming

- while some of the large internet service providers are taking steps in reducing their footprint a lot are not

- AWS is the biggest web service provider that hosts some of the most famous video and music streaming platforms.

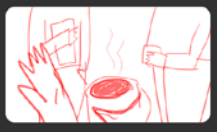
- such as Netflix which shared 15% of the global data transfer in 2018

06
our role
Storyboard

- So what can we do?

- Well, a lot!

- first of all we can spread the knowledge by simply sharing this video



- or talk about it with our friends and colleagues

- Joining causes that pledge big industries like amazon create a cleaner web.

- we can also take small steps

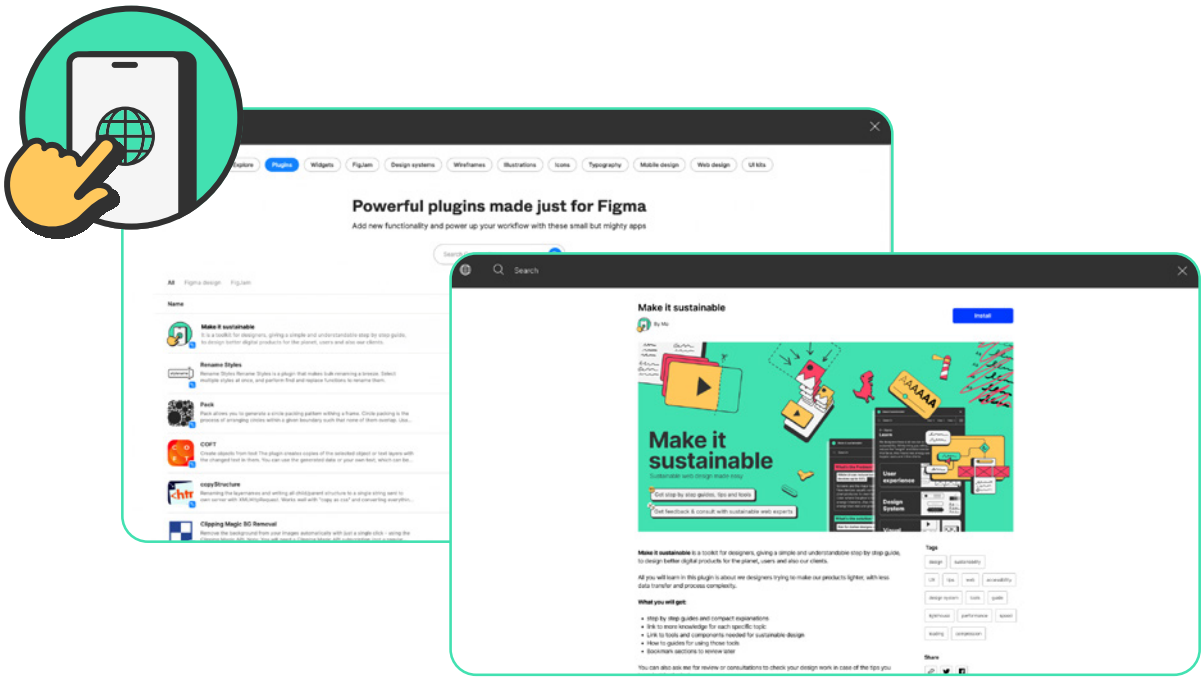
- to reduce our personal impact.

- If you are a designer you can even do better

Ability

Make it sustainable is a service for encouraging sustainable web design among designers by giving them access to the required knowledge all in one place, compact, accessible, and easy to do.

To make it accessible, I avoided creating another website, which would have the same issue as the previouse related services, **they are far from reach of designers and they often get lost and forgotten.** Make it sustainable first of all, will be a plugin in Figma, which is now becoming the **most popular web design platform**, it is free to use and open-source, meaning that anyone can create a plugin for it or share their projects and files there. Figma, is updating rapidly and successfully, with yearly events for presenting new ideas, updates, and plugins. This will give my project additional visibility and accessibility for the users. In the next phase, this project will be updated also for other web design platforms such as Adobe XD, and Sketch and also available as a website.



Make it sustainable

Make it sustainable is a plugin that consists of two parts:

1. Learn: a step-by-step guide, tips, and tools tailored and simplified for web and UI/UX designers, with clear segmentation and a "problem-solution" approach to how to make a web design process more sustainable from the designer's point accompanied with illustrations and mini animations for maximum communication with users. It includes 3 major phases (steps) of web design:

🦶 **Step 1 / User experience**

1.1 Performance budget

- How to lighthouse
- How to performance budget

1.2 User journey

🦶🦶 **Step 2 / Design system**

2.1 Typography

- Reduce'em
- What the font?
- Optimize'em

2.2 Colors

2.3 use of motion

- CPU overload
- Motion sickness

🦶🦶🦶 **Step 3 / Visual assets**

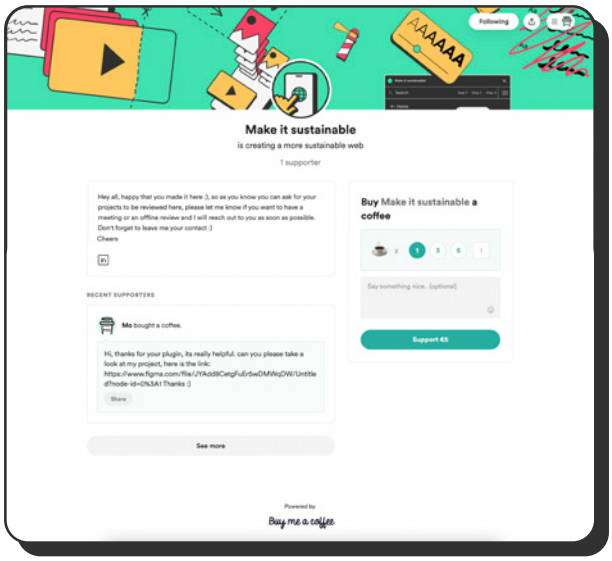
3.1 Imagery

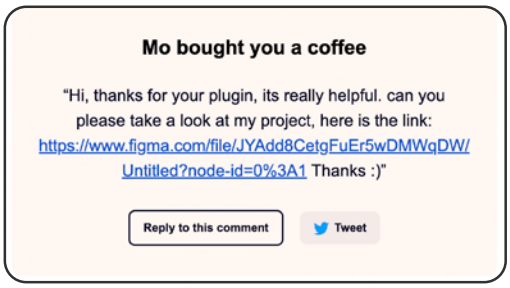
- Reduce'em
- What the image?
- Optimize'em

3.2 Video

- Reduce'em
- What the format?
- Optimize'em

2. Check: reviewing and consultation service on a web design file (in Figma) by sustainable web professionals to give them the necessary support and connection to the sustainable-web community. As for this phase, users can ask for consultation by paying a minimum fee in Buy me a coffee platform, to support the project and help it reach other platforms and grow into a more sophisticated business of sustainable web design service.



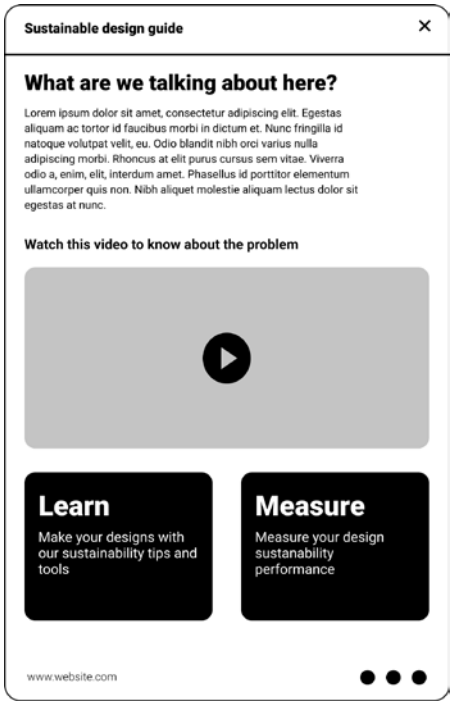


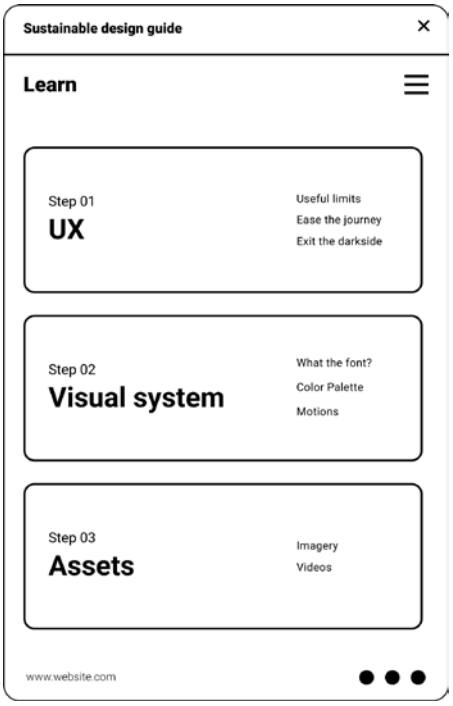
Plugin structure

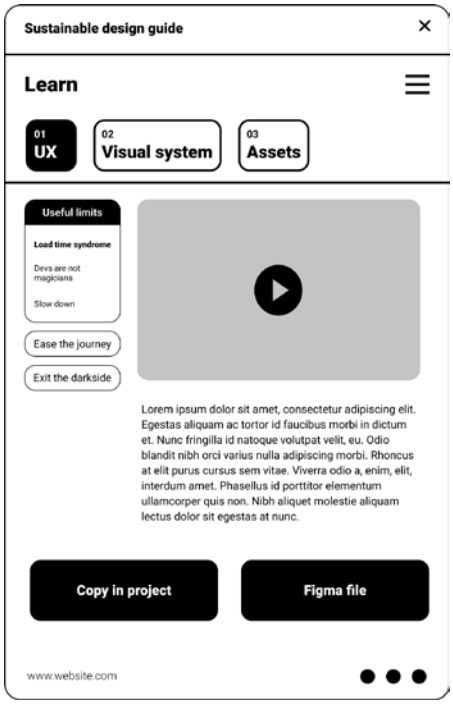
Final arrangement

Early tests

Wireframes

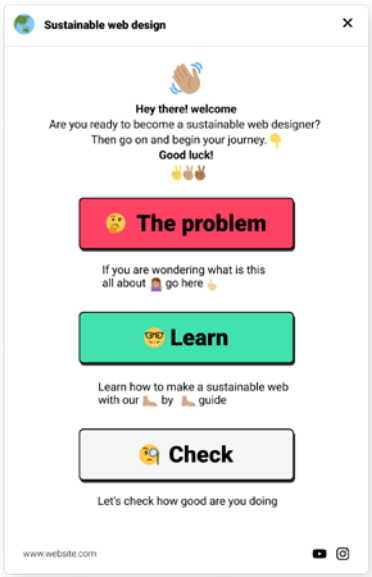

Sustainable design guide
What are we talking about here?
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Egestas aliquam ac tortor id faucibus morbi in dictum et. Nunc fringilla id natoque volutpat velit, eu. Odio blandit nibh orci varius nulla adipiscing morbi. Rhoncus at elit purus cursus sem vitae. Viverra odio a, enim, elit, interdum amet. Phasellus id porttitor elementum ullamcorper quis non. Nibh aliquet molestie aliquam lectus dolor sit egestas at nunc.
Watch this video to know about the problem
Learn
Make your designs with our sustainability tips and tools
Measure
Measure your design sustainability performance
www.website.com

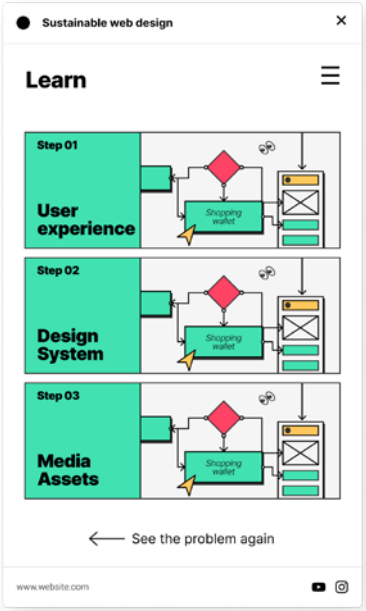

Sustainable design guide
Learn
Step 01
UX
Useful limits
Ease the journey
Exit the darkside
Step 02
Visual system
What the font?
Color Palette
Motions
Step 03
Assets
Imagery
Videos
www.website.com

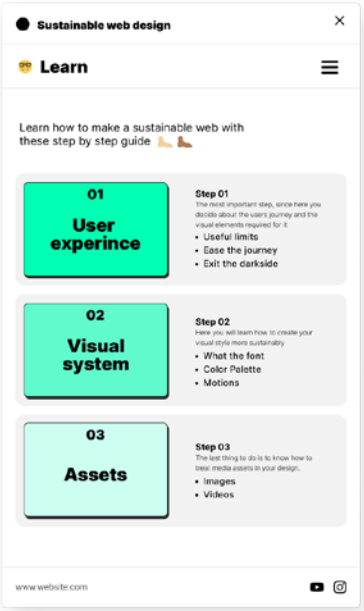

Sustainable design guide
Learn
01 UX
02 Visual system
03 Assets
Useful limits
Load time syndrome
Devs are not magicians
Slow down
Ease the journey
Exit the darkside
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Egestas aliquam ac tortor id faucibus morbi in dictum et. Nunc fringilla id natoque volutpat velit, eu. Odio blandit nibh orci varius nulla adipiscing morbi. Rhoncus at elit purus cursus sem vitae. Viverra odio a, enim, elit, interdum amet. Phasellus id porttitor elementum ullamcorper quis non. Nibh aliquet molestie aliquam lectus dolor sit egestas at nunc.
Copy in project
Figma file
www.website.com

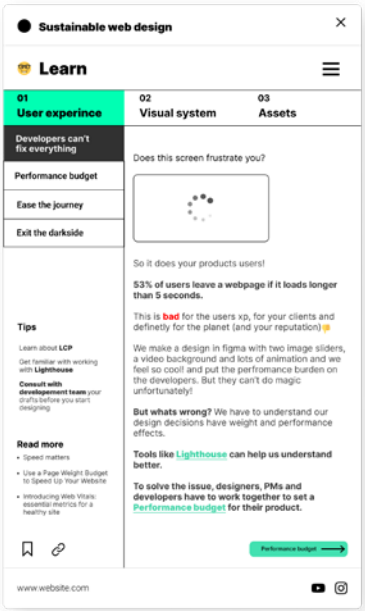

Sustainable design guide
Learn
01 UX
02 Visual system
03 Assets
Typography
color palette
motion & transitions
Reducing fonts
Font styles
Font optimization
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Egestas aliquam ac tortor id faucibus morbi in dictum et. Nunc fringilla id natoque volutpat velit, eu. Odio blandit nibh orci varius nulla adipiscing morbi. Rhoncus at elit purus cursus sem vitae. Viverra odio a, enim, elit, interdum amet. Phasellus id porttitor elementum ullamcorper quis non. Nibh aliquet molestie aliquam lectus dolor sit egestas at nunc.
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Egestas aliquam ac tortor id faucibus morbi in dictum et. Nunc fringilla id natoque volutpat velit, eu. Odio blandit nibh orci varius nulla adipiscing morbi. Rhoncus at elit purus cursus sem vitae. Viverra odio a, enim, elit, interdum amet. Phasellus id porttitor elementum ullamcorper quis non. Nibh aliquet molestie aliquam lectus dolor sit egestas at nunc.
Copy in project
Figma file
www.website.com

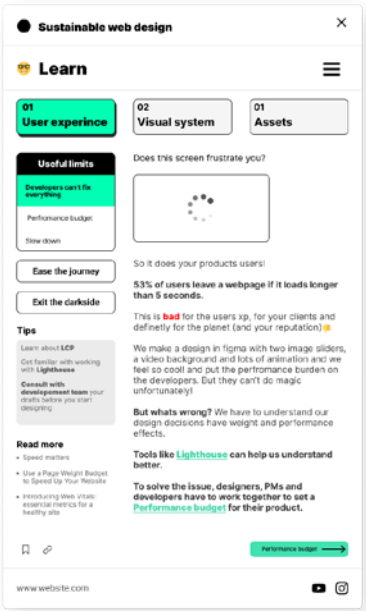
User interface tests

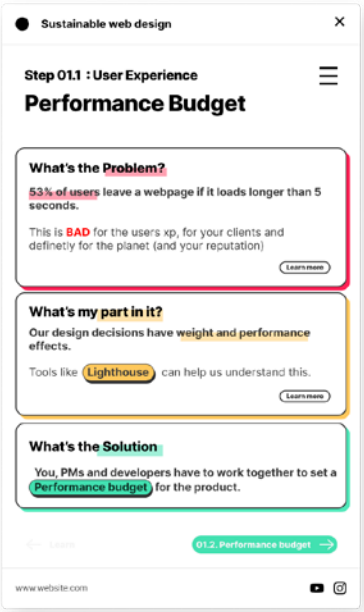












Design system

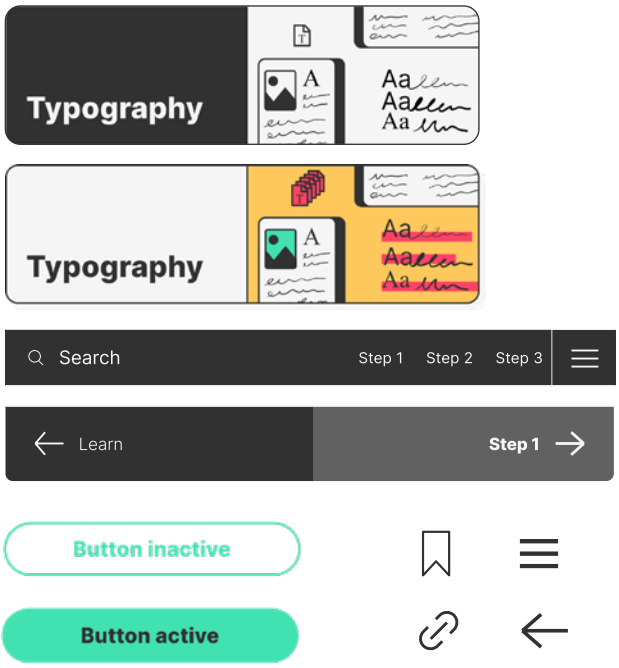
The interface of the plugin was designed in a way to create a simple and understandable narration and also to reflect the same ideas and tips discussed in it.

Typography

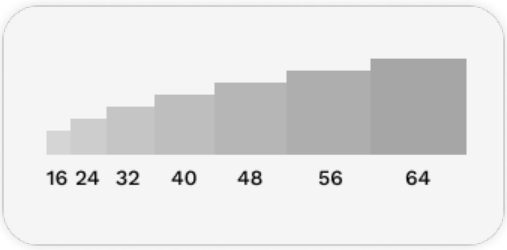
Using the default typeface of Figma: **Inter**

Extra B / 32	**Header 1**
Extra B / 24	**Header 2**
regular / 20	Body
Bold / 20	**Body-bold**
Extra B / 20	**Button-primary**
Extra B / 16	**Button-Secondary**
Regular / 16	**Navigation**

Components



Spaces



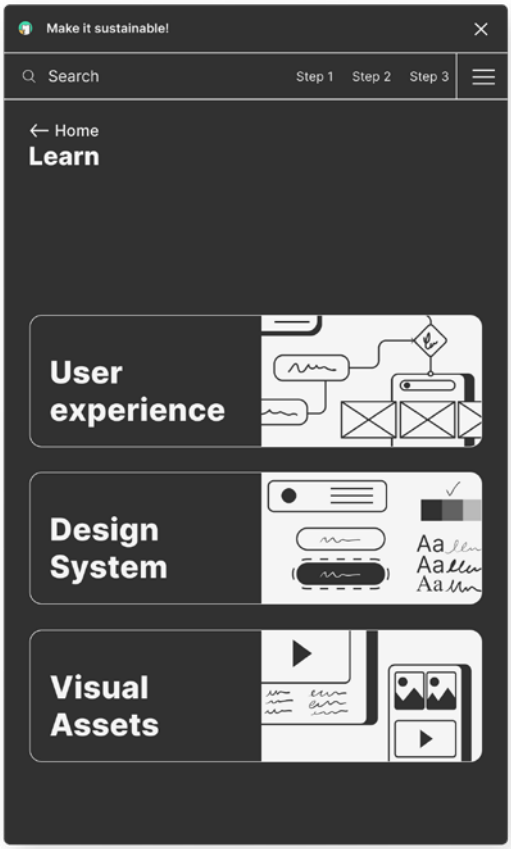
Colors

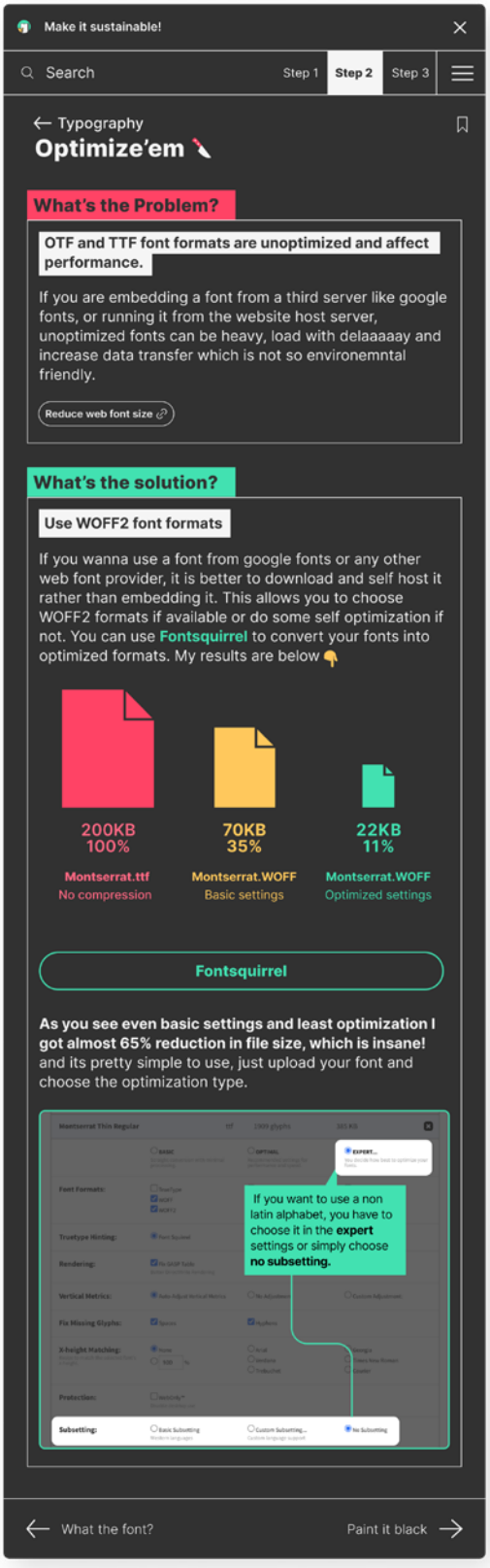
Using the sustainable web color guidlines , the plugin is designed in dark mode, with distictive colors for problem and solutions

Background	Text	Information	Solutions	Problems
#313131	#F5F5F5	#FFC85C	#42E1B1	#FF4365

Final UI design

After several attempts, corrections and user testings I came up with the final structure and design:





Make it sustainable!

Search Step 1 Step 2 Step 3

← Imagery

Optimize'em

What's the solution?

Scale images appropriately for display devices

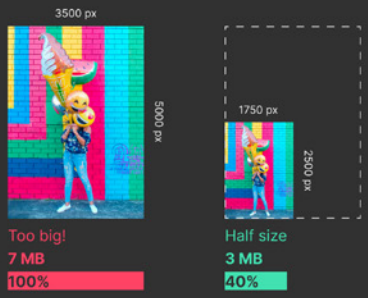
this can be easily solved by developers but you should be aware and mention the necessity of creating responsive images. **You can check lighthouse suggestion for this**

Correct image dimensions

Lighthouse > Performance > Properly size images

Properly size images 2.28 s

Serve images that are appropriately-sized to save cellular data and improve load time. Learn more.



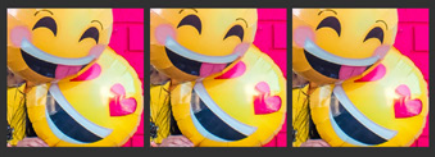
Too big!
7 MB
100%

Half size
3 MB
40%

Image compression

There are plenty of image compression tools, such as **Save for web** tool in Photoshop. but more automated and easy to use ones are **Image optim on MacOS**, and **Tiny PNG**. Tiny PNG has a wordpress plugin as well to automate your image compression.

Tiny PNG | TinyPNG wordpress plugin | ImageOptim



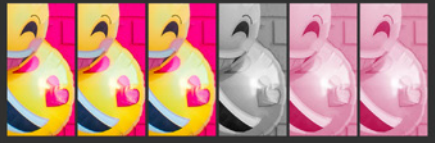
Original Jpeg 7 MB 100%

Save for web 2.4 MB 34%

ImageOptim 1.3 MB 18%

Color and blurring

You can also gain more by bluring unnecessary details. Also consider monochrome images, they are cool and sexy, and quite smaller than colorful images.



Original Jpeg 7 MB

Half size Jpeg 3 MB

Blured Jpeg 1.9 MB

B&W Jpeg 1.2 MB

Mono Jpeg 1.4 MB

Mono WebP 0.12 MB

Make it sustainable!

Search Step 1 Step 2 Step 3

← Step 1

Long journey short

What's the Problem?

Long and complex user journeys, frustrate users and produce more carbon footprint.

Long user journey keeps users on the internet, meaning more data transfer and energy use. We should avoid frictions, Dark patterns, unnecessary page loads and Yoyo journeys that will take the user back and forth between pages. The average webpage weights around 2 MB, every extra page load uses a lot of data and energy.

Dark patterns | Bad UX charactristics

What's the solution?

Find what's most important for the user and create the shortest flow possible

Some general tips:

- **Reduce unnecessary page load**
- **Shorten the user journey**
- **Reduce page bounces**

Start by defining the key audiances and then how they might wish to use the product during an entire engagement with it. Prototype and test it to check if its effience and accurate.

User flow guid | Recuce friction in UX

Next step

← How to performance budget

Make it sustainable!

Search Step 1 Step 2 Step 3

Yuhuuuuuuu!

Congradulations!! You did it

I hope these guides gave you a better understanding of how every small decision we make on the web can have a huge effect on the accessibility and environmental impact of our digital products

Buy me a coffee

Give me feedback

Want me to check your design ?

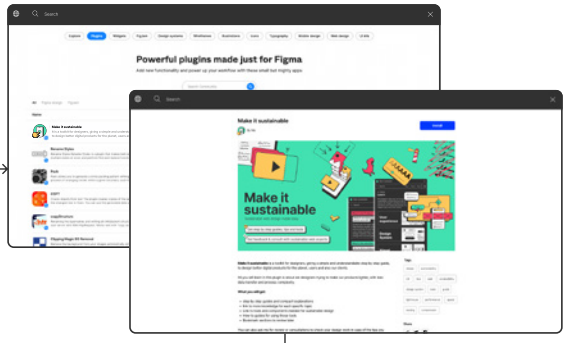
← Back to the beginning

User flow

See the explainer video on instagram

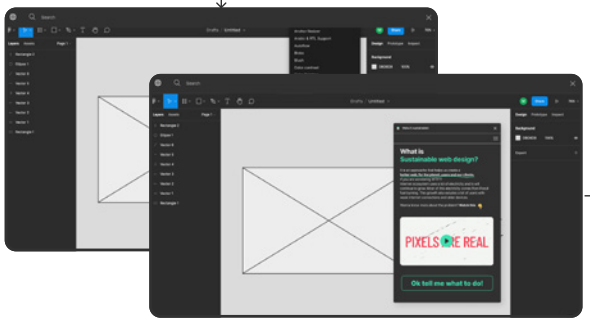
Learn about sustainable web design

Install the plugin

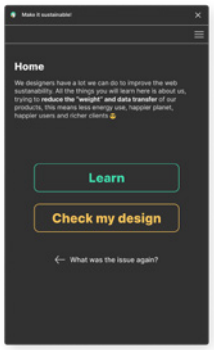


Working on a web design project in FIgma

Wants to know what fonts are more sustainable to use

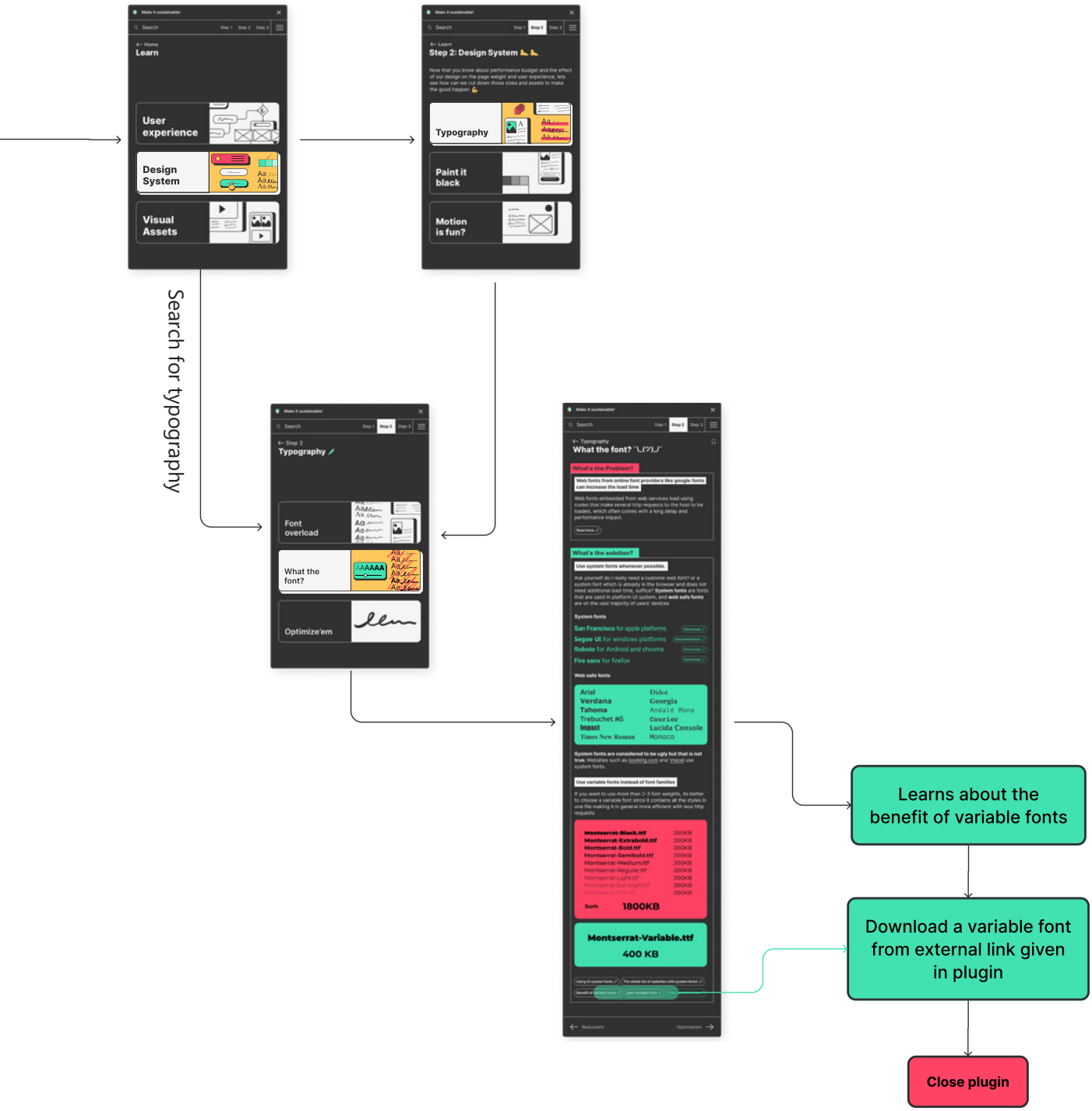


Run the plugin



This is one example of different flows for the plugin. Here the user designing the UI for a web product

Navigate to typography



Bibliography

Books

- Bendell, C., Kadlec, T., Weiss, Y., Podjarny, G., Doyle, N., McCall, M., High-Performance Images: Shrink, Load, and Deliver Images for Speed, California 2016.

- Butcher, A., Engaged: Designing for behavior change, New York 2020.

- Greenwood, T., Sustainable web design, New York 2021.

- Fogg, B. J., Persuasive Technology: Using Computers to Change What We Think and Do, Amsterdam 2002.

- Fogg, B. J., Tiny Habits, New York 2020.

- Frick, T., Designing for Sustainability: A Guide to Building Greener Digital Products and Services, California

- Kramer, K. L, User Experience in the Age of Sustainability, Amsterdam, 2012

Articles

- Andrae. A, Edler, T., Global Electricity Usage of Communication Technology: Trends to 2030 [in:] Challenges, Vol 6/2015, p. 117-157, https://www.mdpi.com/2078-1547/6/1/117

- Android Dev summit, Cost of a pixel color, 2018, https://www.youtube.com/watch?v=UljafaxRcEE&t=4879s

- Cook, G., Pomerantz, D., Clicking clean: A Guide to Building the Green Internet, 2015 Washington., https://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/planet3/PDFs/2015ClickingClean.pdf

- Hazas, M., Our video streaming habits impact the planet. Here's how, 2020, https://edition.cnn.com/videos/world/2021/03/24/video-streaming-environmental-impact-project-planet-lon-orig.cnn/video/playlists/project-planet

- Kadlec.T, Setting a performance budget, 2013, https://timkadlec.com/2013/01/setting-a-performance-budget

- Kravets, U., The Joy of Optimizing Images, 2019, An event apart, https://aneventapart.com/news/post/the-joy-of-optimizing-images-by-una-kravets-aea-video

- Osmani, A., Start performance budgeting, 2018, https://addyosmani.com/blog/performance-budgets

- Shin, H. D., Bull, R., Three Dimensions of Design for Sustainable Behaviour, [in:] Sustainability, Vol 11/ 2019, p.1-15, https://www.mdpi.com/2071-1050/11/17/4610/pdf

- Stopper, J., The performance cost of custom web fonts, and how to solve it, 2019 Wholegrain digital, https://www.wholegraindigital.com/blog/performant-web-fonts

- US Energy Information Administration, How Much US Electricity Is Generated from Renewable Energy?, http://www.eia.gov/energy_in_brief/article/renewable_electricity.cfm