



# Building a greener web

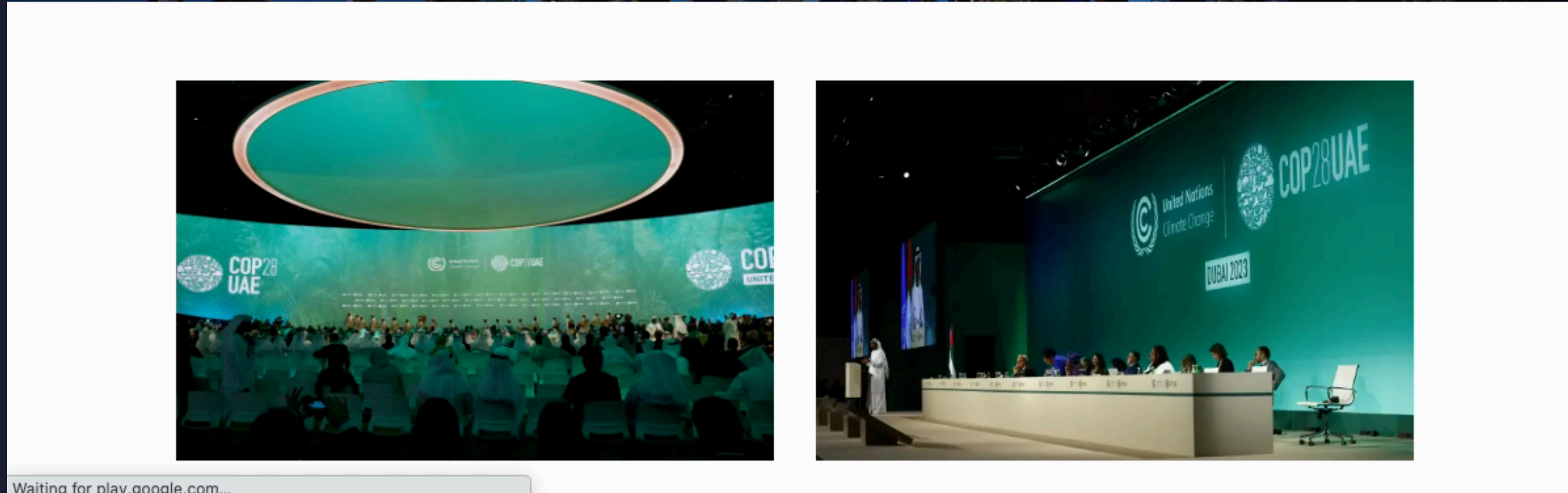
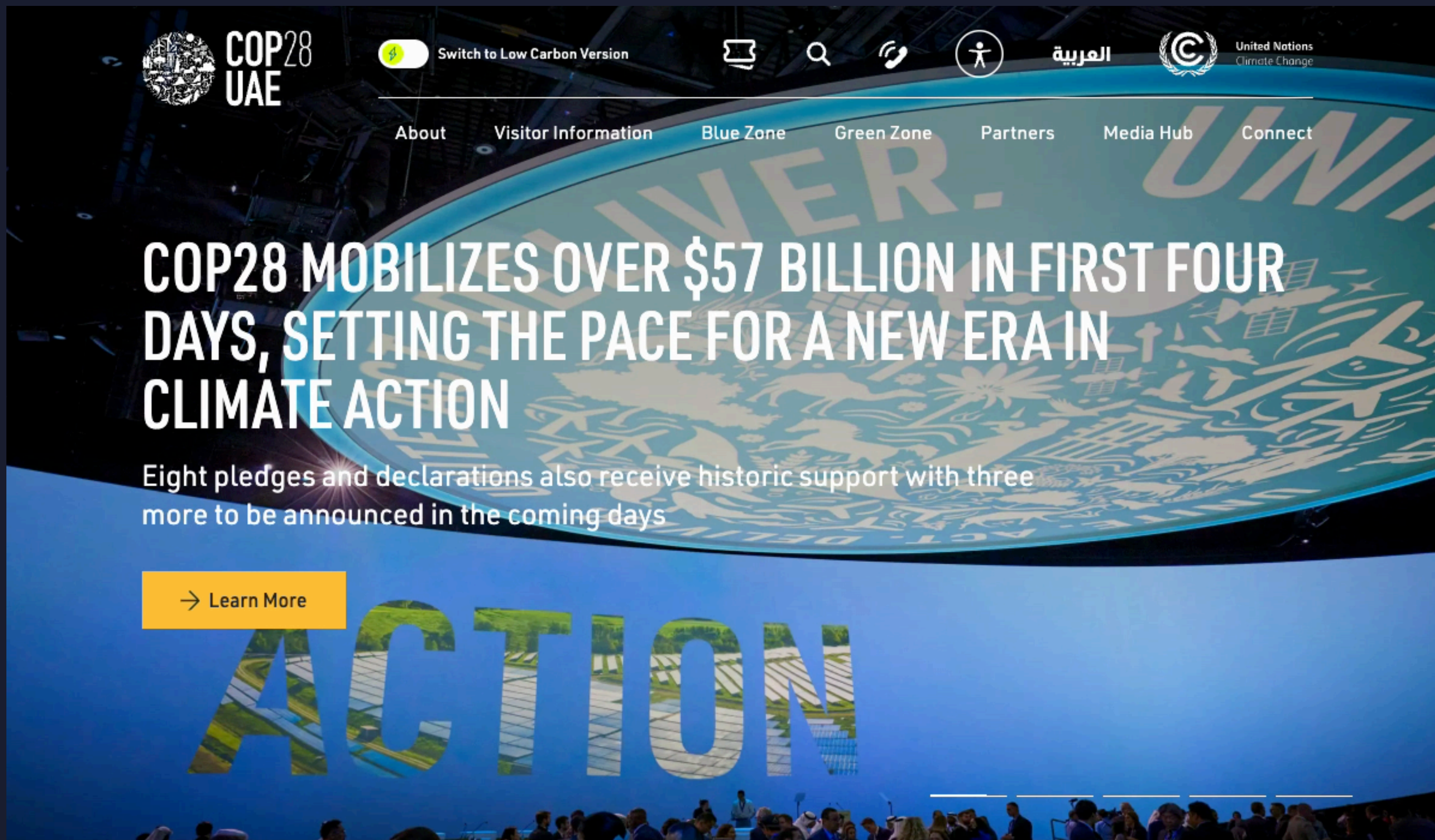
Web sustainability for designers and developers

Senior Front End Developer at



Ada Mode





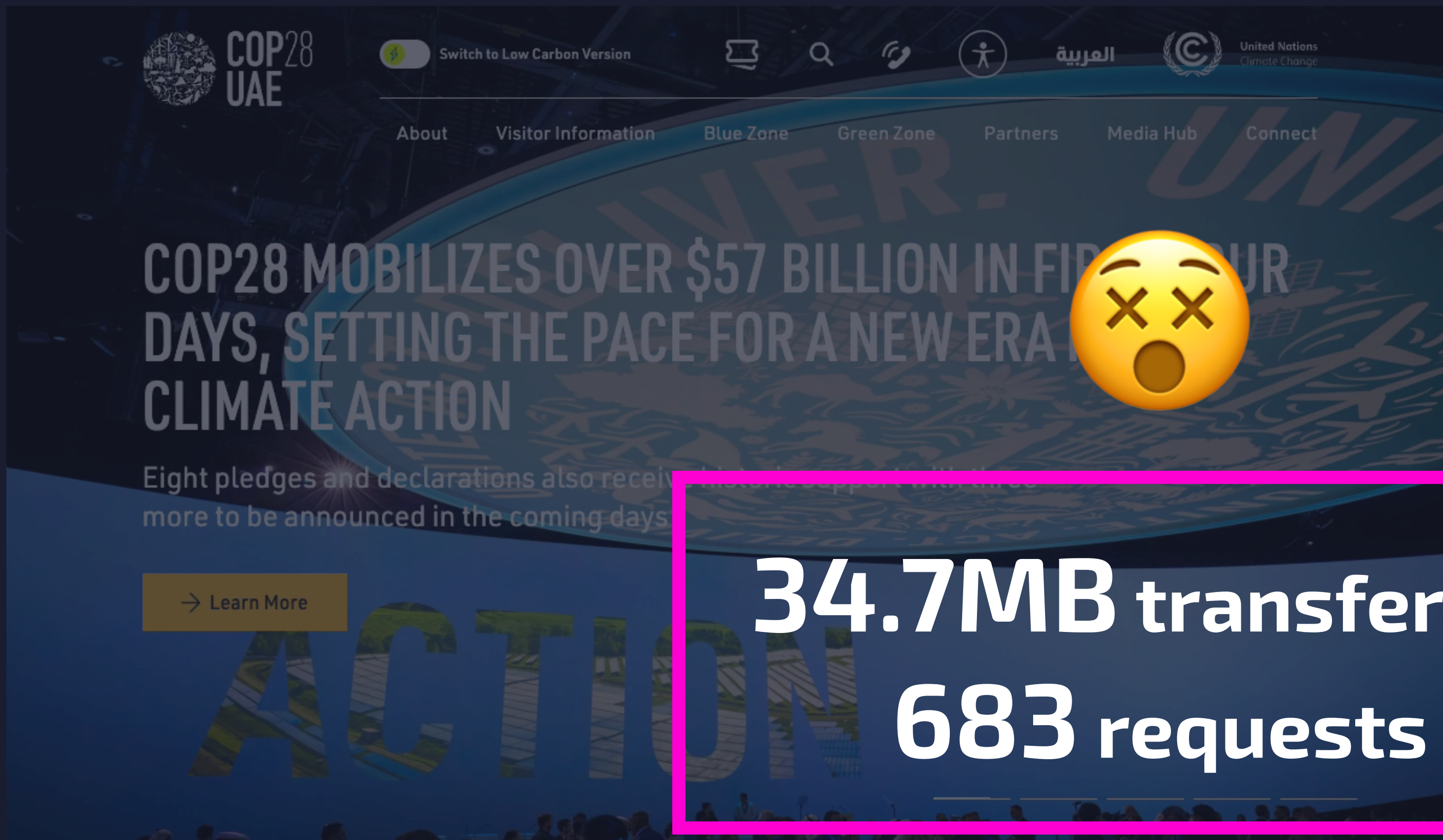
Name	Status	Type	Initiator	Size	Time	Waterfall
en/	200	document	Other	1.8 kB	Pen...	

1 requests | 1.8 kB transferred | 0 B resources

Enhanced search

View all matches in a line of a minified file in search results and enjoy boosted search speed.

New section for custom properties in Elements



**34.7MB transferred**  
**683 requests**

Name	Status	Type	Initiator	Size	Time	Waterfall
en/	200	document	Other	1.8 kB	Pen...	

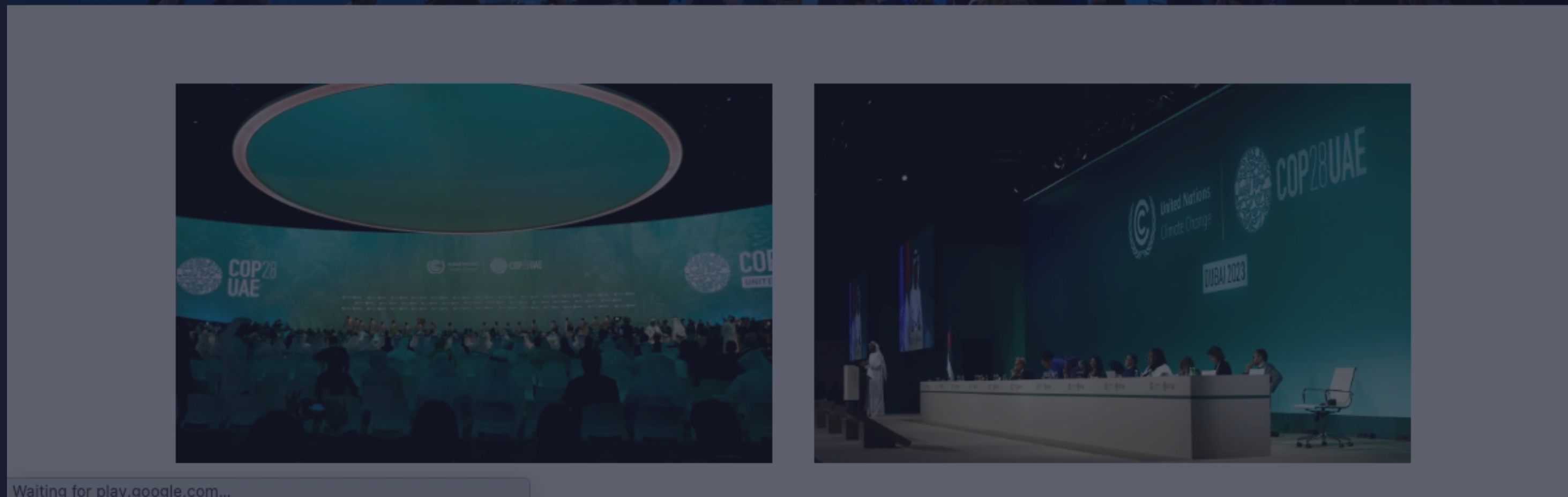
1 requests | 1.8 kB transferred | 0 B resources

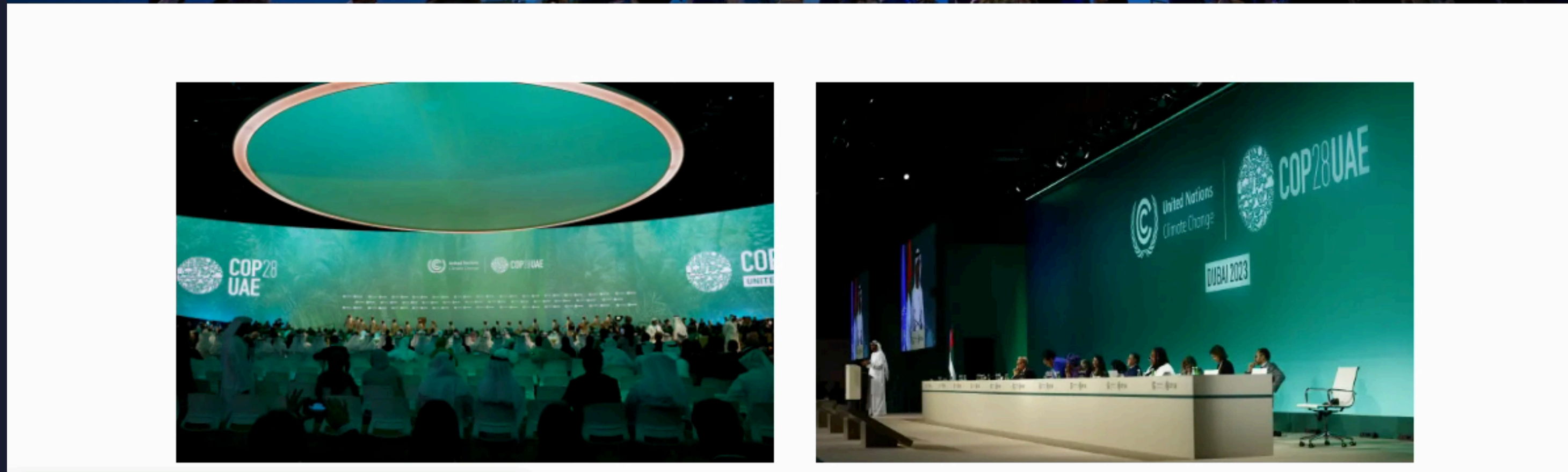
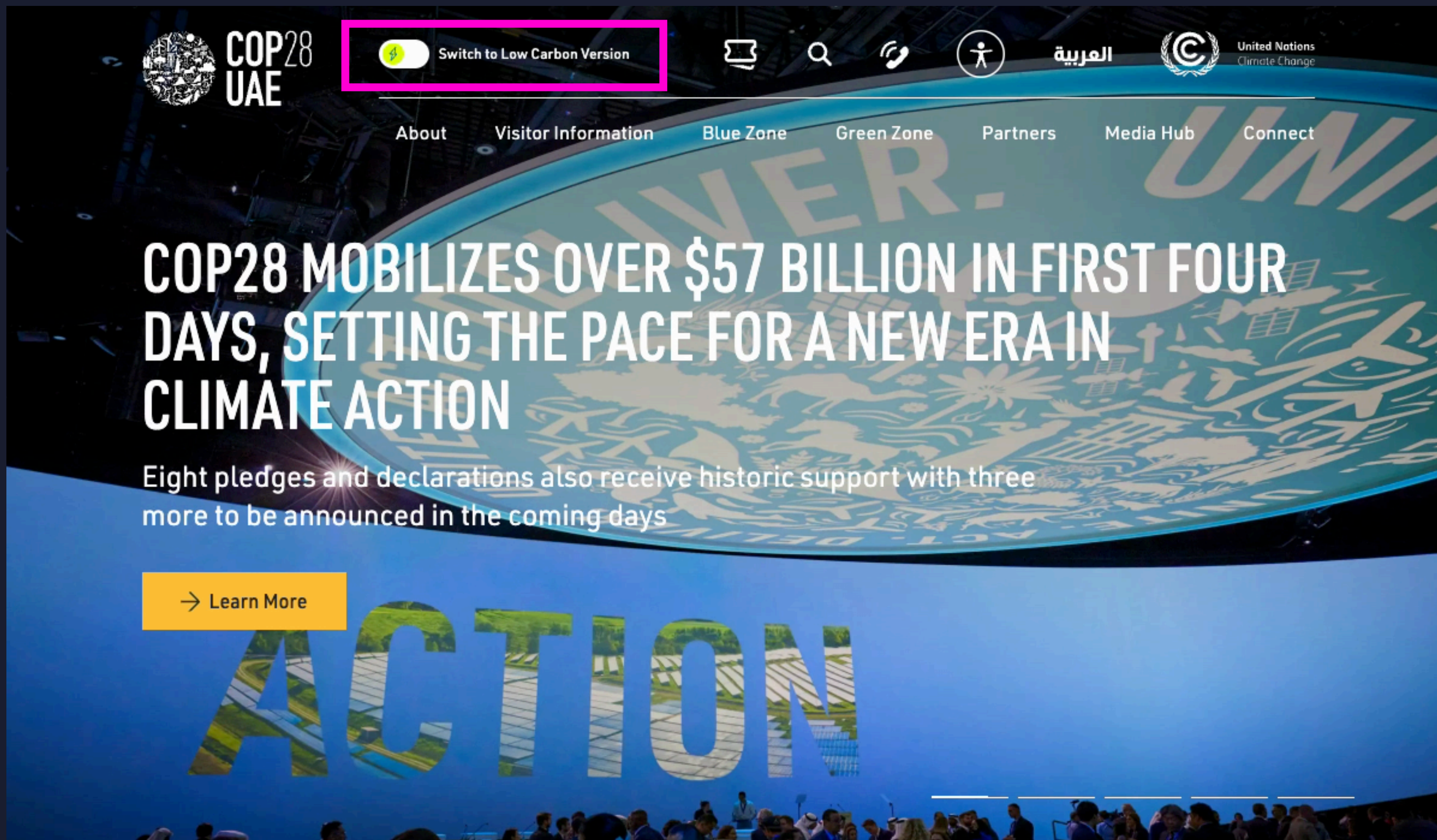
Console | What's New x

Highlights from the Chrome 118 update

**Enhanced search**  
View all matches in a line of a minified file in search results and enjoy boosted search speed.

**New section for custom properties in Elements**





Name	Status	Type	Initiator	Size	Time	Waterfall
en/	200	document	Other	1.8 kB	Pen...	

1 requests | 1.8 kB transferred | 0 B resources

Console [What's New](#) x

Highlights from the Chrome 118 update

**Enhanced search**  
View all matches in a line of a minified file in search results and enjoy boosted search speed.

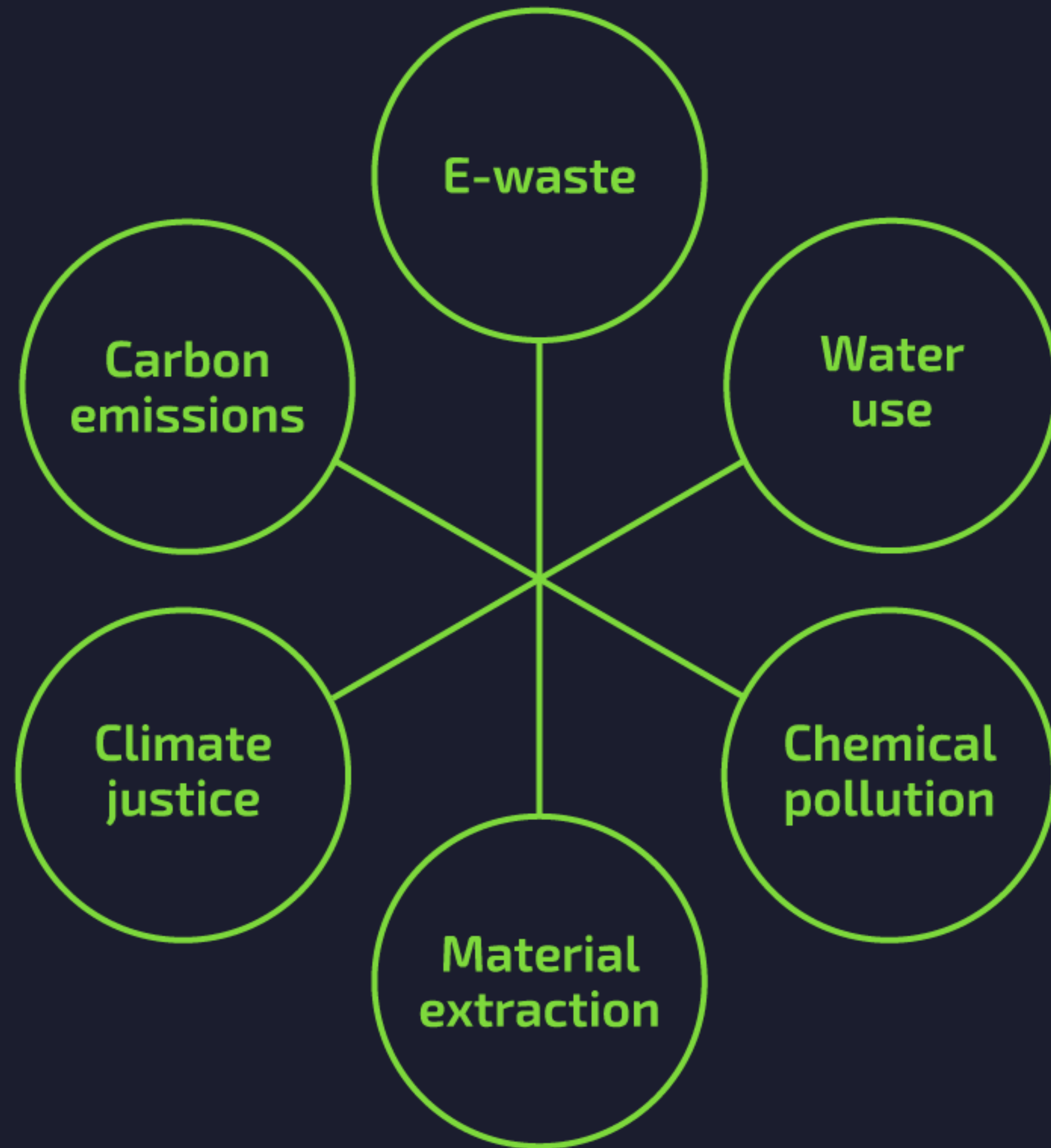
**New section for custom properties in Elements**



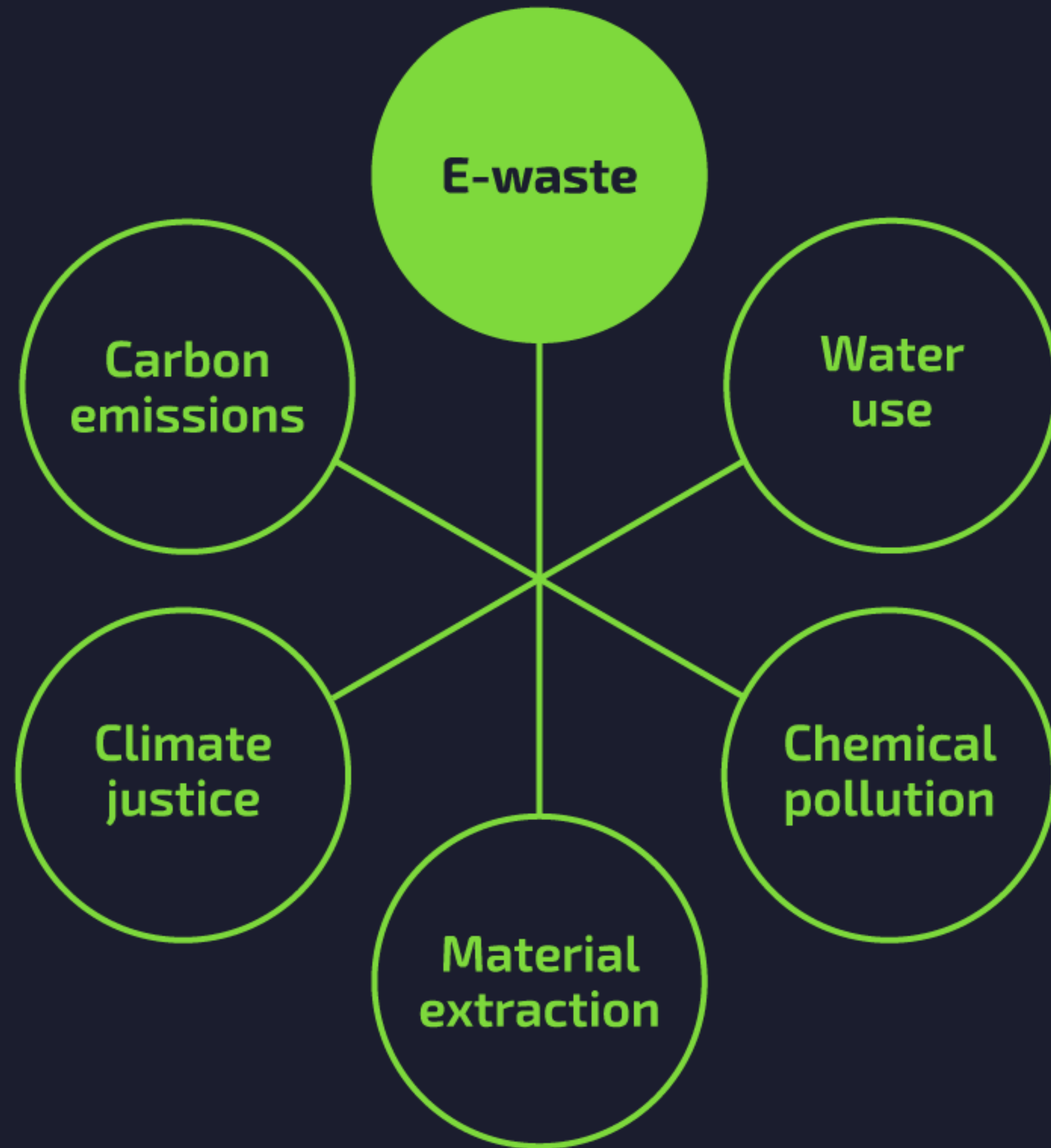


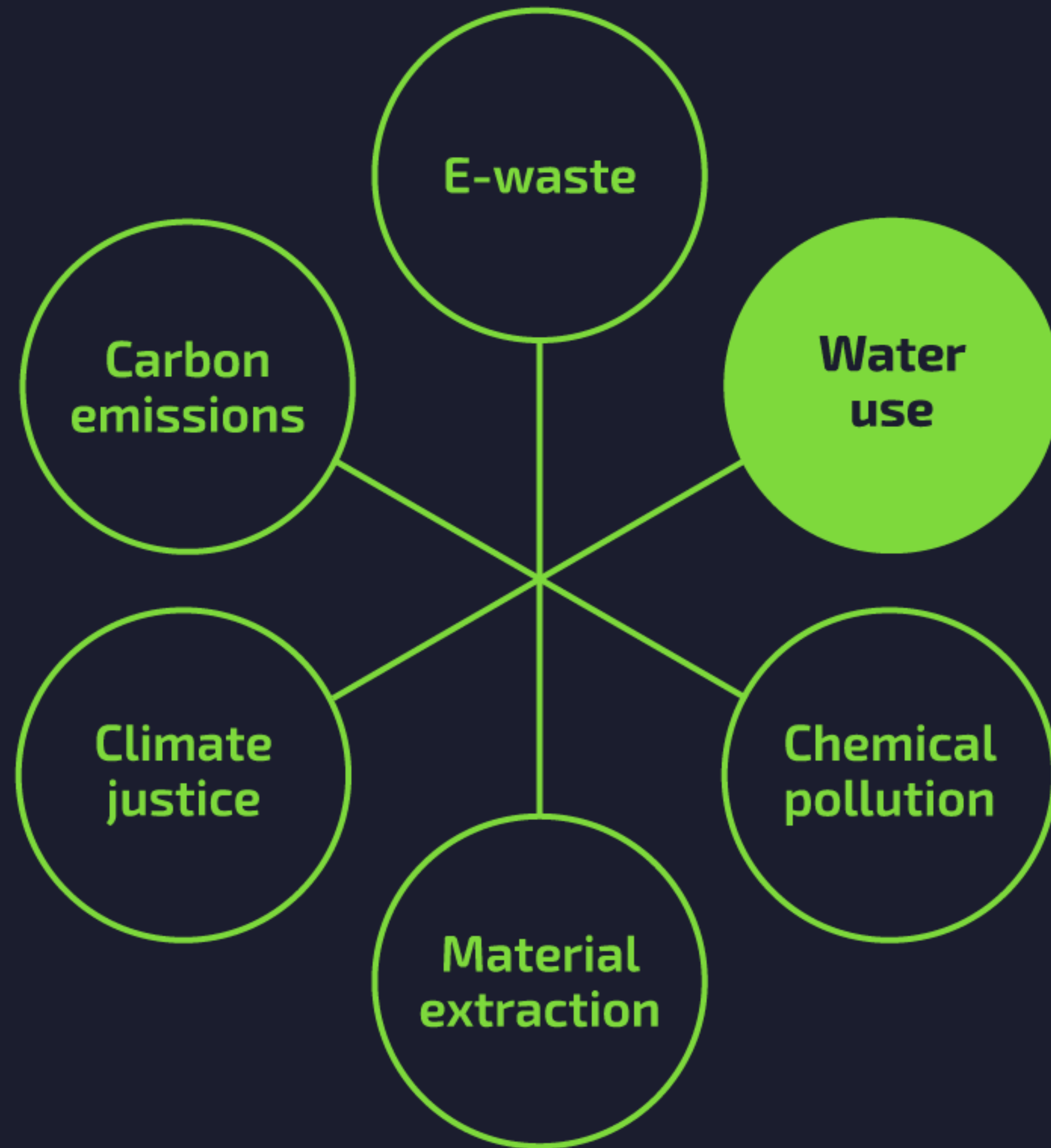
**3.7%**

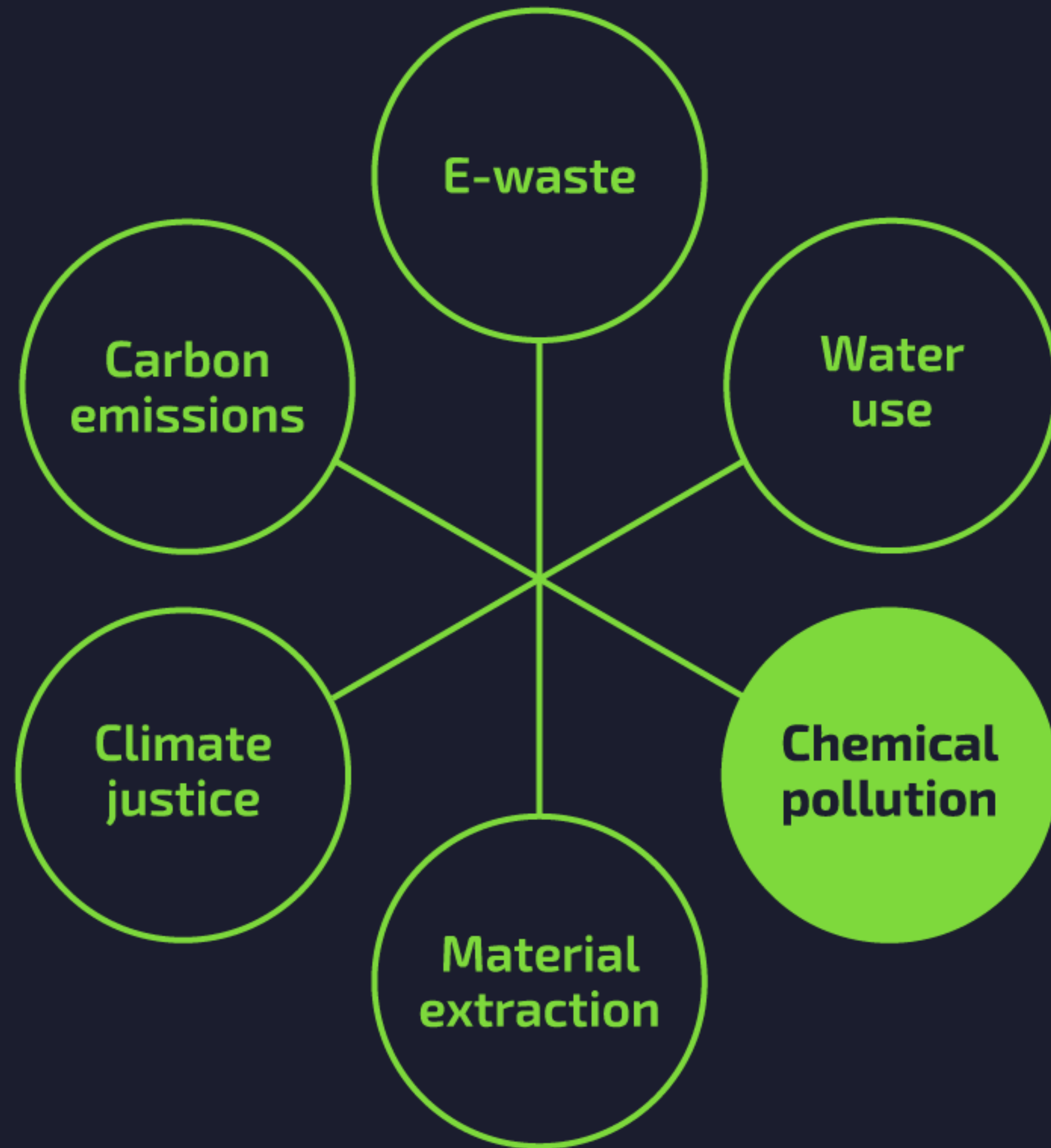
**of worldwide CO<sub>2</sub>e emissions**

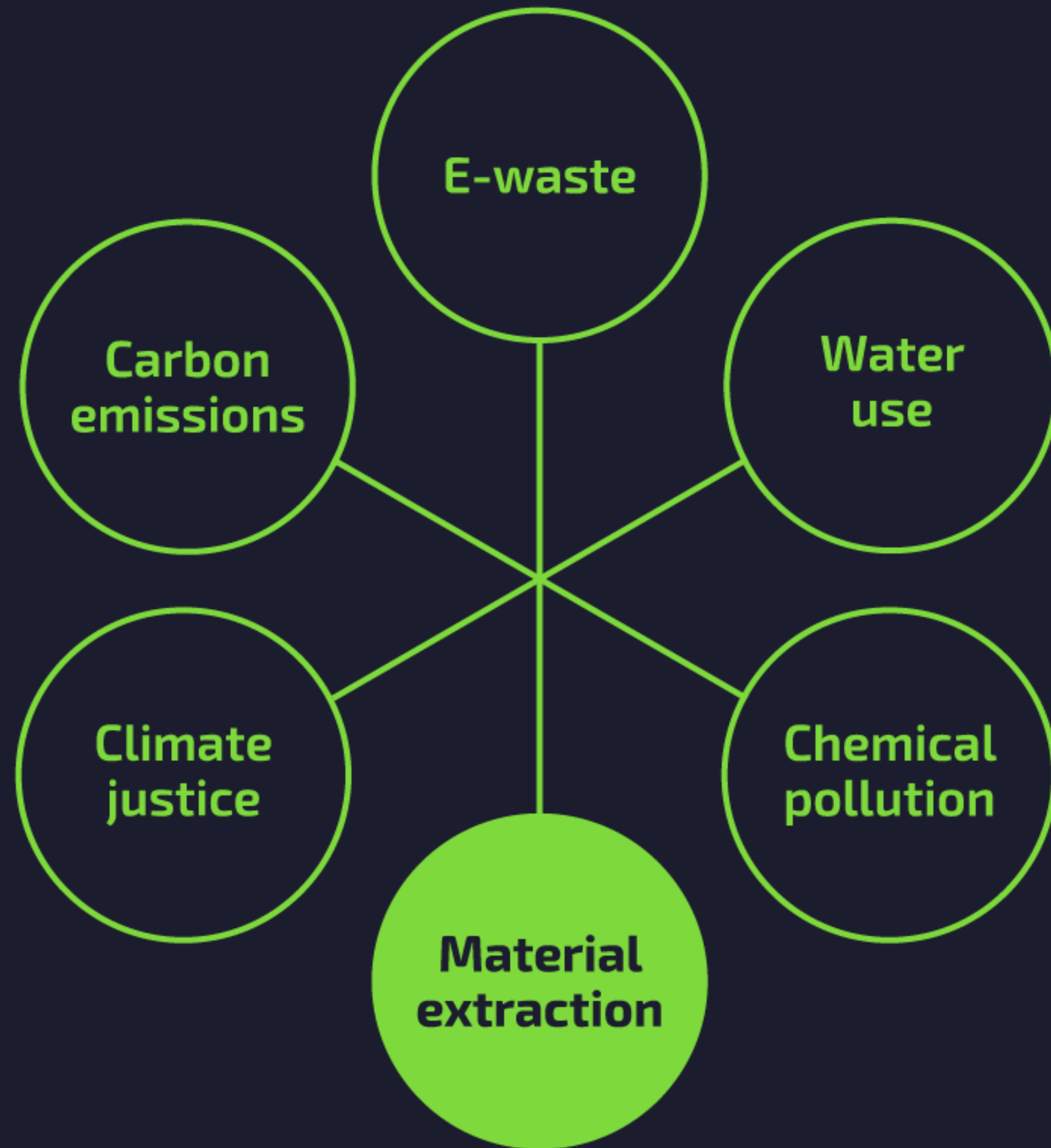


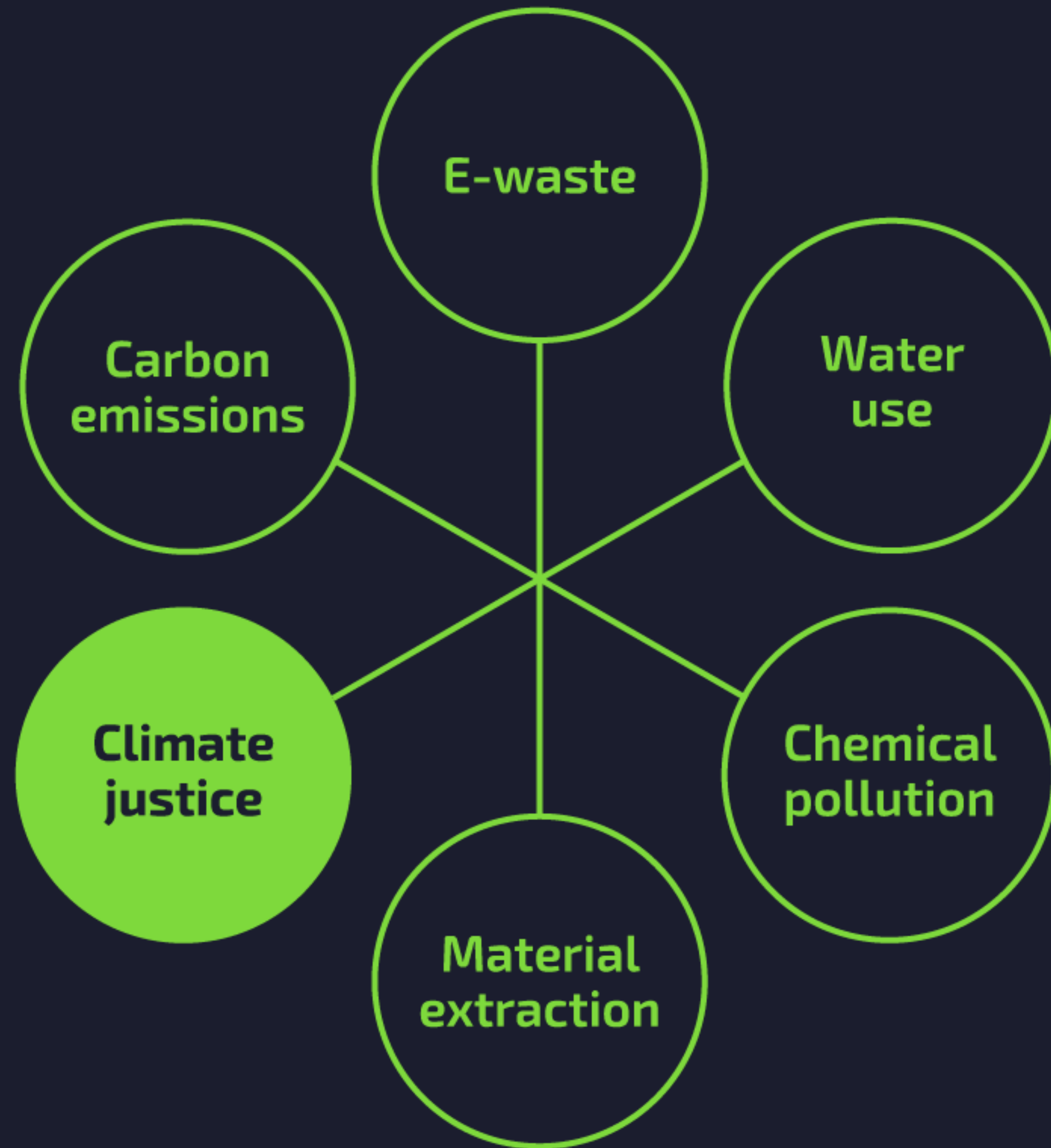


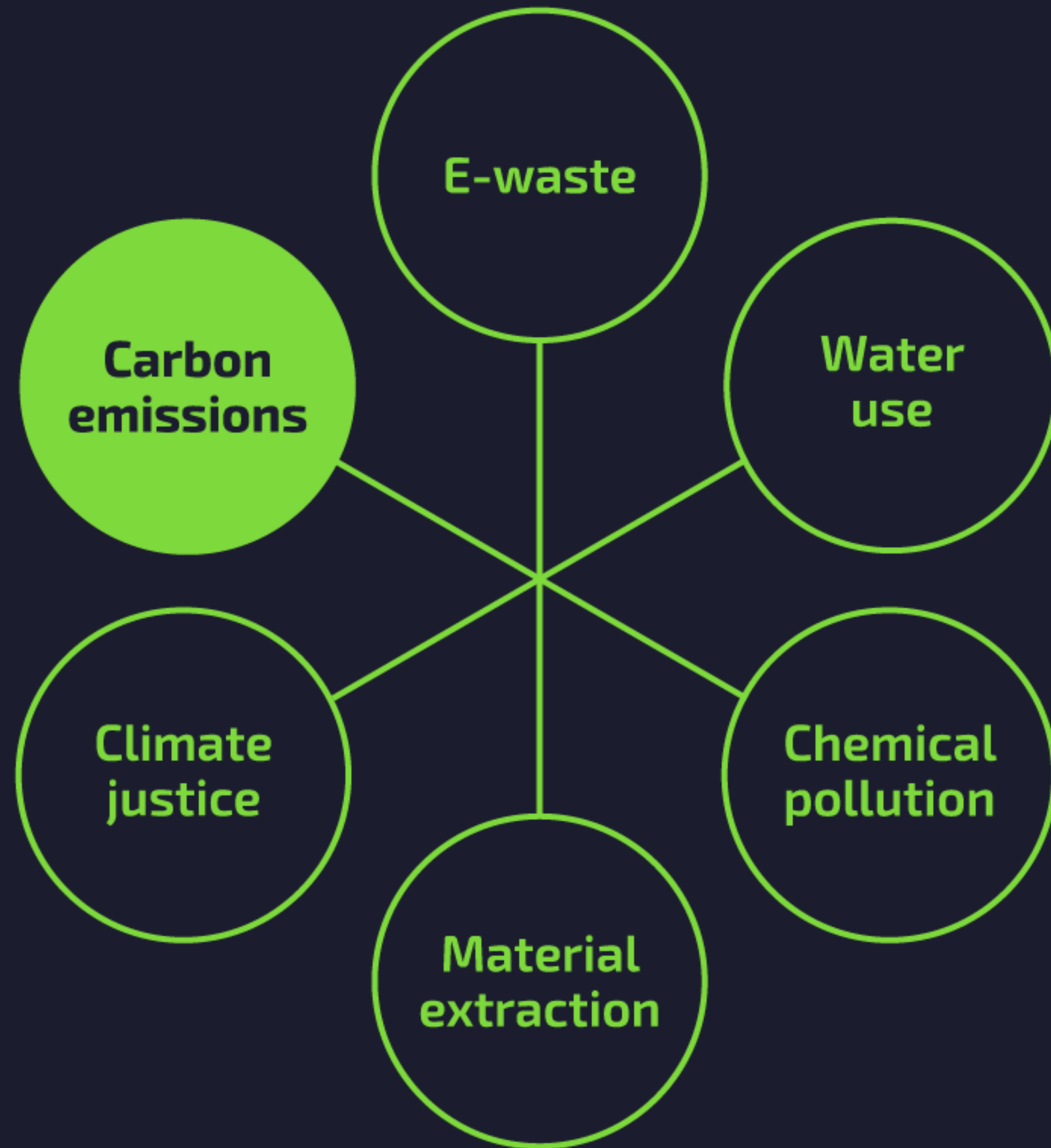












Device  
manufacture



Infrastructure



Device use



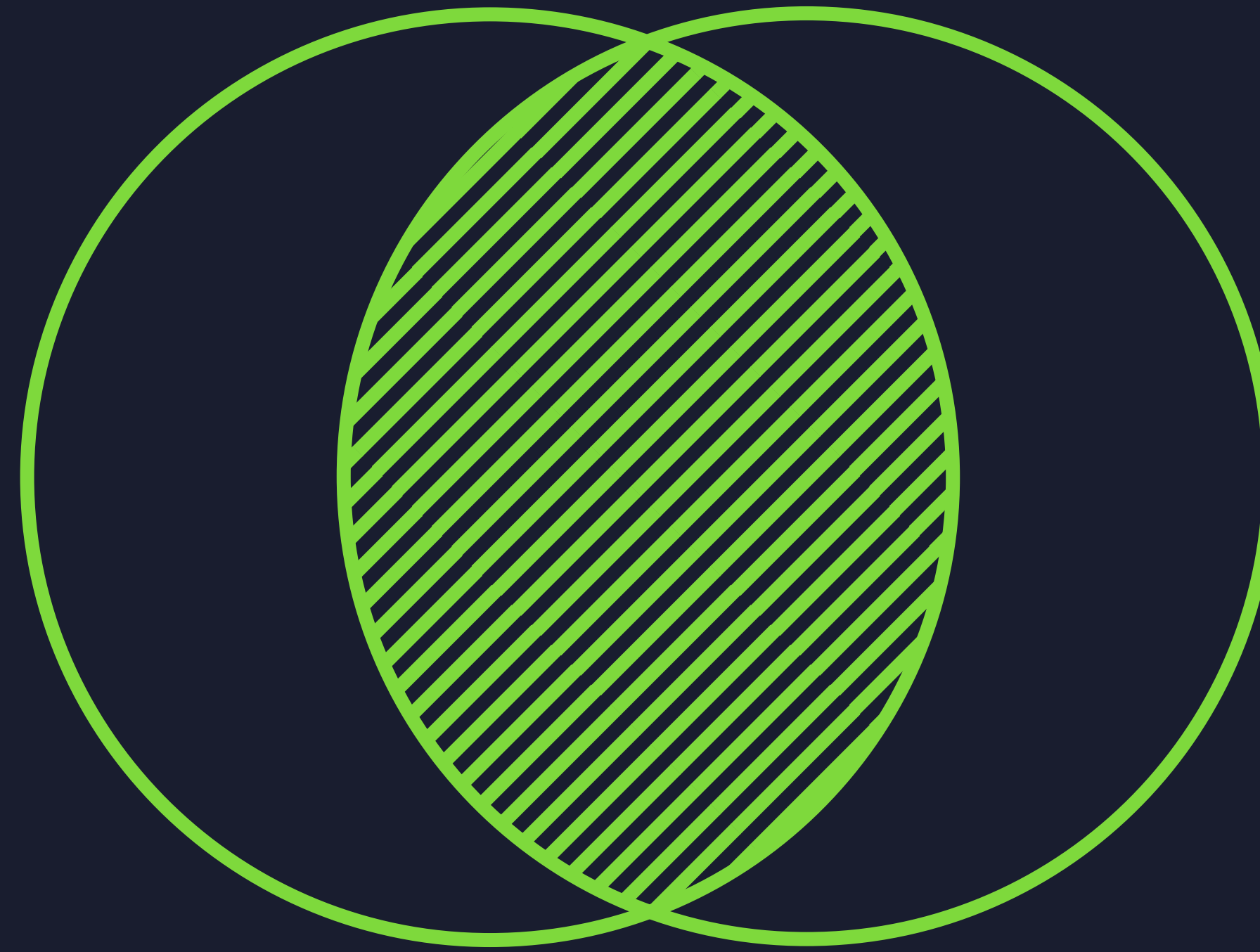


**2 MB**

**Average web page size**



Fast websites



Low-carbon  
websites



# WebPageTest



Platform ▶ **WebPageTest**

Start Test

Test History

Products ▾

Pricing

Resources ▾

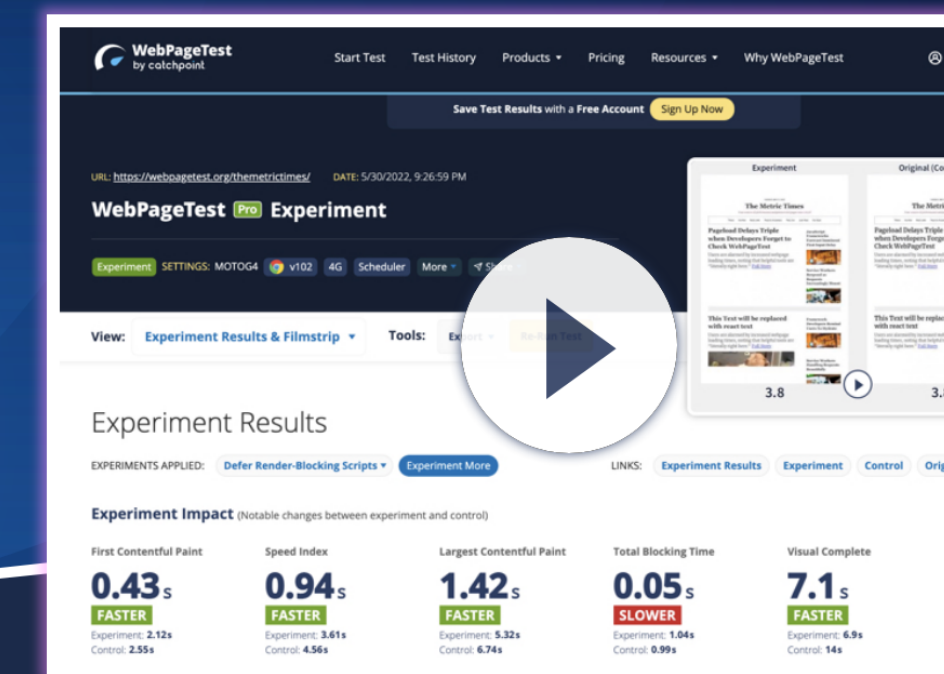
About

👤 Login

## Say hello to **WebPageTest Pro**

All of the WebPageTest features you already love, plus **API Access** & **No-Code Experiments!**

[View Plans & Learn More >>](#)



Start a **Site Performance** Test!

Enter a website URL...

✔ **Simple Configuration** 3 test runs from recommended location and browser presets



WebPageTest



PageSpeed Insights

Report from Apr 25, 2023, 4:47:09 PM

https://css-irl.info/

Analyze

Mobile Desktop

Discover what your real users are experiencing

This URL Origin

Core Web Vitals Assessment: Passed

Expand view

Largest Contentful Paint (LCP)

1.1 s

First Input Delay (FID)

3 ms

Cumulative Layout Shift (CLS)

0.08

OTHER NOTABLE METRICS

First Contentful Paint (FCP)

1.1 s

Interaction to Next Paint (INP)

34 ms

Time to First Byte (TTFB)

0.6 s

Latest 28-day collection period

Various desktop devices

Many samples (Chrome UX Report)

Full visit durations

Various network connections

All Chrome versions



WebPageTest



PageSpeed Insights



GTMetrix

GTmetrix [Features](#) [Pricing](#) [Resources](#) [Blog](#) [Log In](#) [Get Started](#)

# How fast does your website load? Find out with GTmetrix

See how your site performs, reveal why it's slow and discover optimization opportunities.

Enter URL to Analyze... [Test your site](#)

**Analysis Options:** Testing in Vancouver, Canada using Chrome (Desktop) with an Unthrottled Connection. [Change Options](#)

**Latest News**  
[View Changes](#)

- If the browser's main-thread is blocked, your page can't respond to user inputs like screen taps, keyboard presses... <https://t.co/fcJgxAHkiE>  
April 24, 2023
- Efficiently encoding images i.e., serving compressed images, can reduce image file sizes and speed up image download... <https://t.co/75JeiTgM2d>  
April 20, 2023
- CDNs are an appropriate solution for most speed improvements, but not every site needs one. <https://t.co/8enjw5abCD>  
April 19, 2023

SAMSUNG Microsoft Adobe L'ORÉAL 1,061,619,036 pages analyzed so far

Join thousands of people and companies around the world

# Core Web Vitals

**LCP**

Largest Contentful Paint

**FID**

First Input Delay

**CLS**

Cumulative Layout Shift



# Carbon budgets



websitecarbon.com

Website Carbon Calculator

[Get the badge!](#) [How does it work?](#) [FAQ](#)

# How is your website impacting the planet?

Estimate your web page carbon footprint:

Your web page address

Calculate

By using this carbon calculator, you agree to the information that you submit being stored and published in our public database.

# css-irl.info produces



**7.28kg of CO2 equivalent.**

The same weight as 0.05  
sumo wrestlers and as much  
CO2 as boiling water for 987  
cups of tea



**8 billion bubbles**

Woah, that's a lot of bubbles!



# ecoping.earth

Ecoping [Indexes](#) [Pricing](#) [FAQs](#) [Blog](#)

Login

[Get Started - It's Free](#)

Making your website more eco-friendly

## Tools to reduce your company's website **carbon emissions** & boost performance

[Get Your Free Daily Report](#)



EcoScore  
**Needs improvement**

CO2 grams ⓘ  
**3.67**

Renewables ⓘ  
**46%**

CO2 intensity ⓘ  
**379.83**  
gCO<sub>2</sub>eq/kWh

Transferred ⓘ  
**24.49 MB**

Load Time ⓘ  
**3.7s**

Requests ⓘ  
**162**

Join more than 350+ companies taking action.

 PAN MACMILLAN

de  
zeen

Siegel+Gale



digitalbeacon.co

# Beacon



<https://css-irl.info>

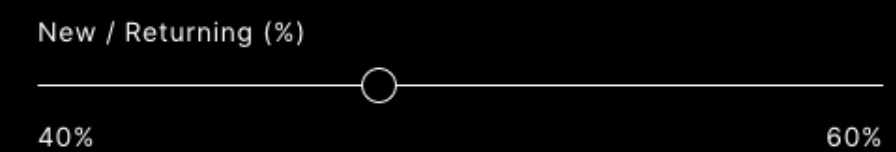
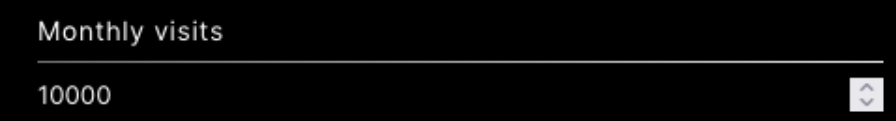
First visit  
CO<sub>2</sub> 0.086g      SIZE 116.53 KB

Return visit  
CO<sub>2</sub> 0.081g      SIZE 109.64 KB

🟢 Overall this web page is rated as amazing when it comes to its carbon footprint

This website is hosted using renewable energy or carbon offsets.

#### EMISSIONS CALCULATOR



Total: 832.90g PER MONTH

This is equivalent to:  
Driving 0.60 miles in a Tesla Model S  
Watching 1 hours of Netflix (in HD)

At least 1 trees would be needed to offset the CO<sub>2</sub> in a year



**Images**



**43%**

Bytes transferred

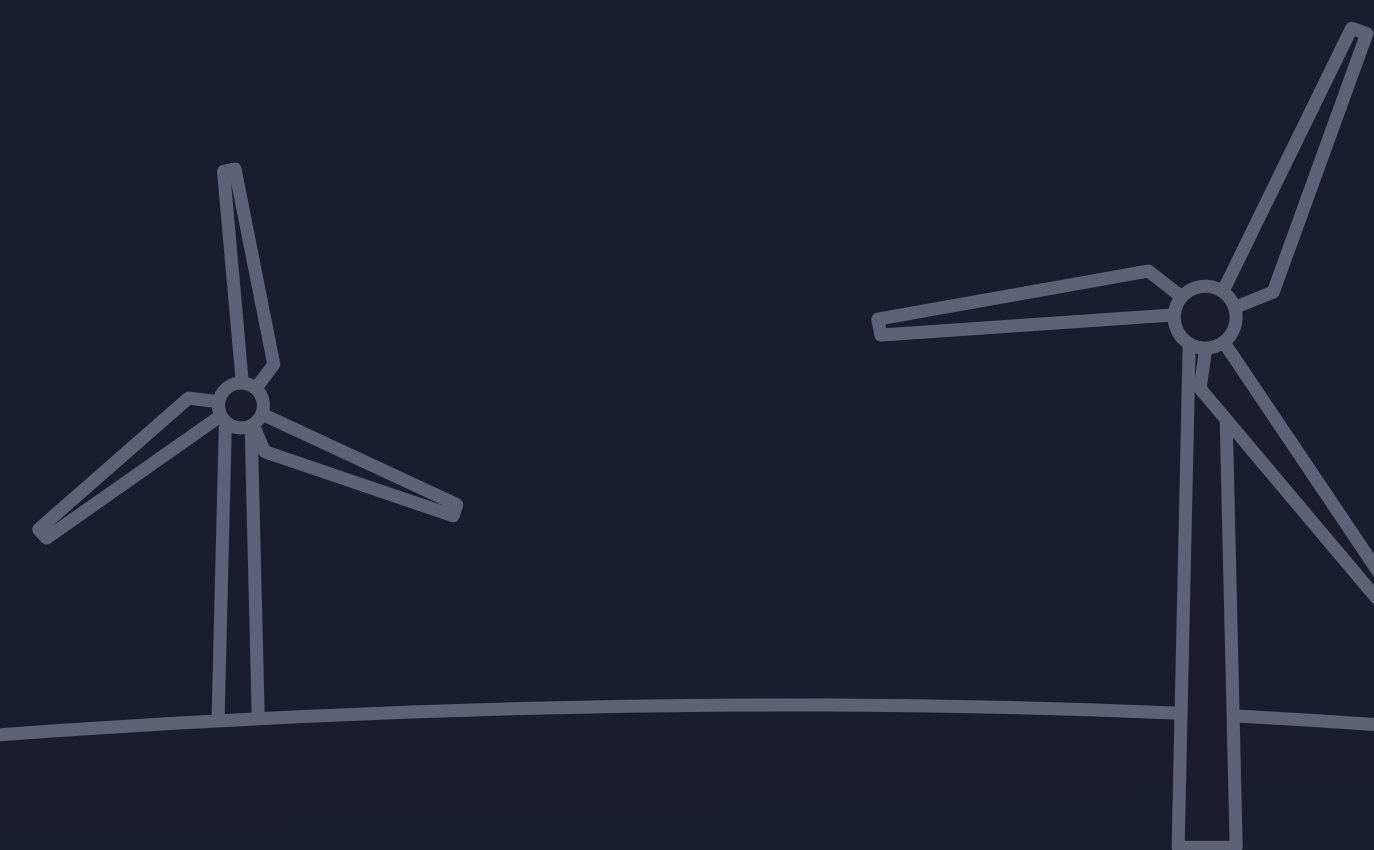


**30%**

Requests



Use fewer images





Use fewer images



Use smaller images



556kb



326kb



-41%



Use fewer images



Use smaller images



Optimise





326kb



100kb



-69%



Use fewer images



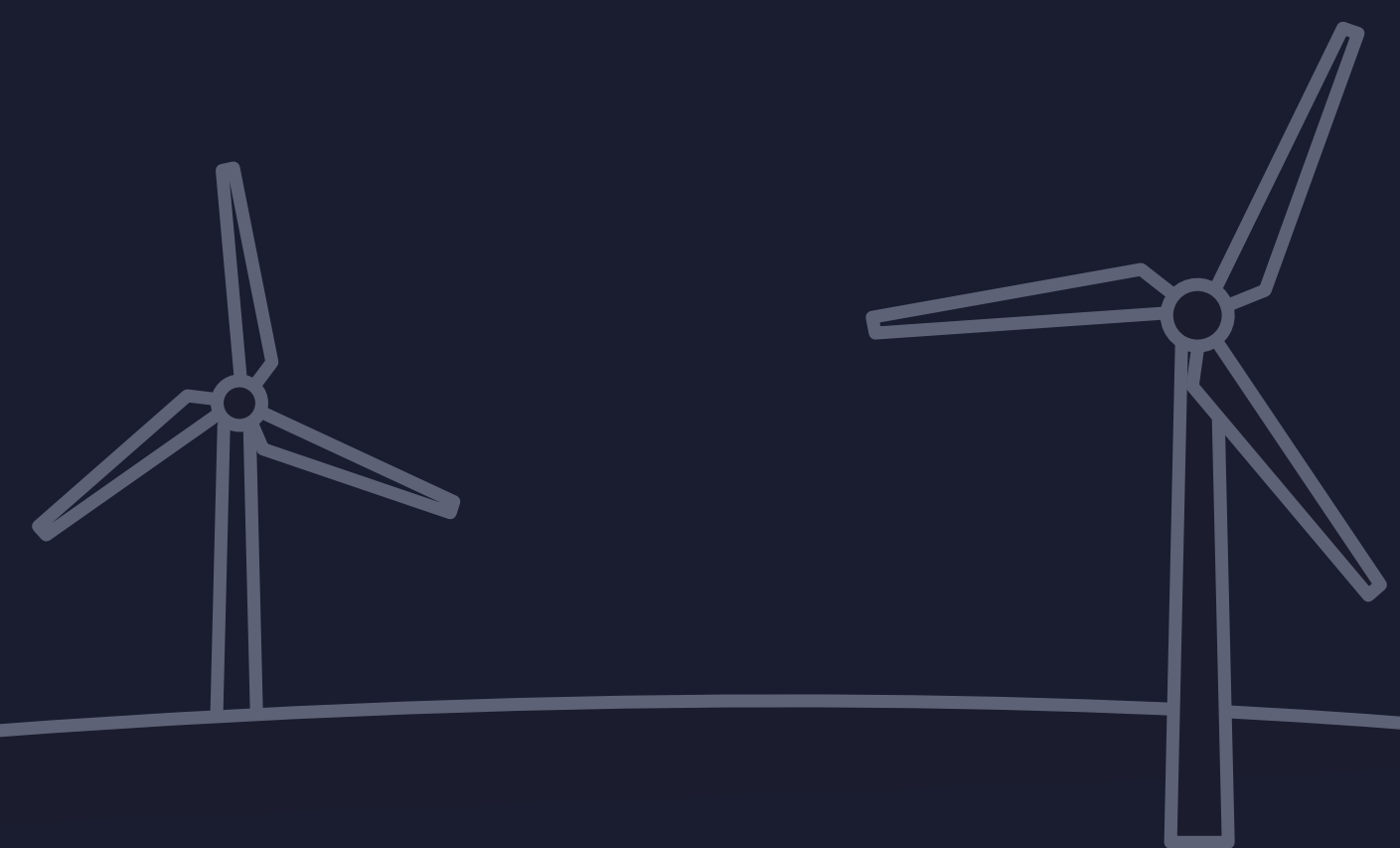
Use smaller images



Optimise



Serve the right images for the user's device





Use fewer images



Use smaller images



Optimise



Serve the right images for the user's device



Use modern image formats (WebP, AVIF)



```
<picture>
  <source
    type="image/webp"
    srcset="robin.webp 400w..."
    sizes="(min-width: 1200px) 50vw, 100vw">
  
</picture>
```



Use fewer images



Use smaller images



Optimise



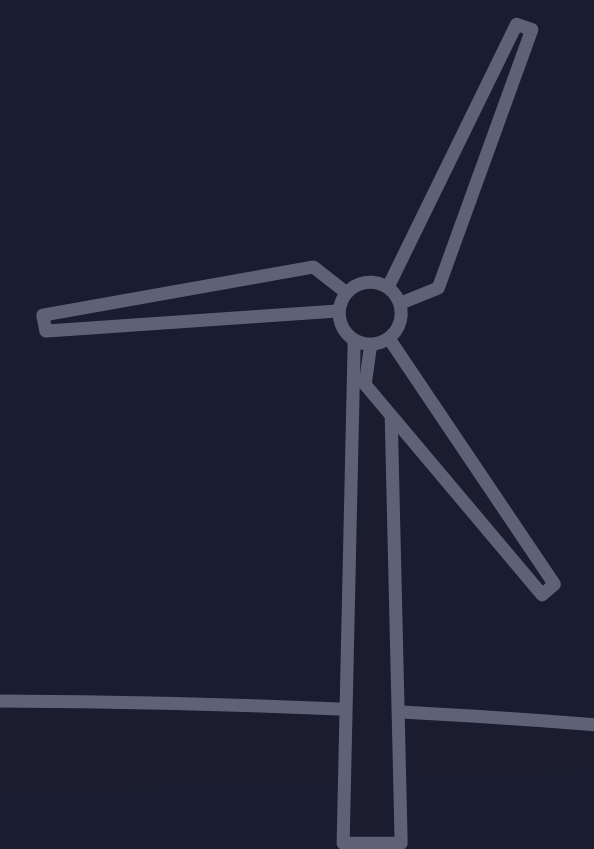
Serve the right images for the user's device



Use modern image formats (WebP, AVIF)



Lazyload



```

```



Aa

Fonts



Use fewer fonts







Use fewer fonts



Consider variable fonts



# ***Variable font example***

Lorem ipsum dolor, sit amet consectetur adipisicing elit. Placeat tenetur maxime impedit accusantium illum excepturi quis odit magni exercitationem pariatur veniam fuga, vel veritatis fugit, consequuntur assumenda quisquam, perferendis dolorem.

## **Heading 2**

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Ea sint illo quo consequatur hic expedita vero doloremque dignissimos itaque veniam architecto, id alias, quia repudiandae dolore eaque et est nulla?

**“Lorem ipsum dolor sit amet consectetur adipisicing elit. Minima ab qui voluptatum asperiores natus perferendis repellat, recusandae rem inventore adipisci similique dicta.”**

## **Heading 3**

Lorem ipsum dolor sit amet consectetur adipisicing elit. Voluptate unde eveniet veritatis blanditiis pariatur obcaecati non debitis minus temporibus sunt, rem eius iure aliquam



Use fewer fonts



Consider variable fonts



Use modern font formats (e.g. WOFF2)



[github.com/google/woff2](https://github.com/google/woff2)





Use fewer fonts



Consider variable fonts



Use modern font formats (e.g. WOFF2)



Subset fonts



# w3.org/TR/IFT

## TABLE OF CONTENTS

<b>1</b>	<b>Introduction</b>
1.1	Patch Subset
1.2	Range Request
1.3	Technical Motivation: Evaluation Report
<b>2</b>	<b>Opt-In Mechanism</b>
<b>3</b>	<b>IFT Method Selection</b>
3.1	IFT Method Fallback
<b>4</b>	<b>Patch Based Incremental Transfer</b>
4.1	Font Subset
4.1.1	Font Subset Definition
4.2	Data Types
4.2.1	Encoding
4.2.2	Primitives
4.2.3	ProtocolVersion
4.2.4	SparseBitSet
4.2.5	IntegerList
4.2.5.1	Delta Encoding
4.2.5.2	Zig-Zag Encoding
4.2.5.3	UIntBase128 Encoding
4.2.6	SortedIntegerList
4.2.7	RangeList
4.2.8	FeatureTagSet
4.2.9	AxisSpace
4.2.10	Objects

## Incremental Font Transfer

W3C Working Draft, 28 June 2022



### ▼ More details about this document

#### This version:

<https://www.w3.org/TR/2022/WD-IFT-20220628/>

#### Latest published version:

<https://www.w3.org/TR/IFT/>

#### Editor's Draft:

<https://w3c.github.io/IFT/Overview.html>

#### History:

<https://www.w3.org/standards/history/IFT>

#### Feedback:

[public-webfonts-wg@w3.org](mailto:public-webfonts-wg@w3.org) with subject line “[IFT] ... message topic ...” ([archives](#))

[GitHub](#)

[Inline In Spec](#)

#### Editors:

[Chris Lilley](#) (W3C)

[Myles C. Maxfield](#) (Apple Inc.)

[Garret Rieger](#) (Google Inc.)

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## Abstract



Use fewer fonts



Consider variable fonts



Use modern font formats (e.g. WOFF2)



Subset fonts



Self-host



gwfh.mranftl.com/fonts

⊗ ▼

**google-webfonts-helper**  
Get eot, ttf, svg, woff and woff2 files + CSS snippets

**Urbanist** sans-serif

# google-webfonts-helper

## A Hassle-Free Way to Self-Host Google Fonts

by [Mario Ranftl](#)

---

⊖ Select a font to continue...

[View project on GitHub](#) [Read the author's note](#) [API](#)

### Useful resources

- [Google Fonts Open Source Font Attribution](#)
- [Using @font-face](#)
- [Can I use woff? \(compatibility information\)](#)
- [WOFF 2.0 – Learn more about the next generation Web Font Format](#)
- [Sample MIME server config \(Apache, Nginx, IIS\)](#)
- [Google Fonts Webpack Plugin](#)
- [How to Host Google Fonts Locally in WordPress](#)





## Third-party embeds

# YouTube embeds

Testing the performance impact of social media embeds.

[Home](#) [Twitter](#) [Twitter with two embeds](#) [Twitter with video](#) [Twitter with YouTube](#) [YouTube](#) [Instagram](#)

## Single embed

Transferring data from social-media-embed-test.netlify.app...

The screenshot shows the Network tab of a browser's developer tools. The top bar includes icons for Inspector, Console, Network, and other tools. Below the bar, there are filters for 'Filter URLs', 'Disable Cache' (checked), and 'No T...'. A list of request types is shown: All, HTML, CSS, JS, XHR, Fonts, Images, Media, WS, Other. The main area displays a table of network requests:

Status	Meth...	Domain	File	Initi...	T	Transf...	Size
	GET	social-...	youtube.html	doc...			
	POST	www.yo...	log_event?alt=json&ke	xhr			

At the bottom, a summary bar shows: 2 requests, 0 B / 0 B transferred, Finish: 2 ms.



Avoid embeds





Avoid embeds



Defer loading if possible





Avoid embeds



Defer loading if possible



Lazyload





Avoid embeds



Defer loading if possible



Lazyload



Import on interaction



# github.com/paulirish/lite-youtube-embed

☰ readme.md

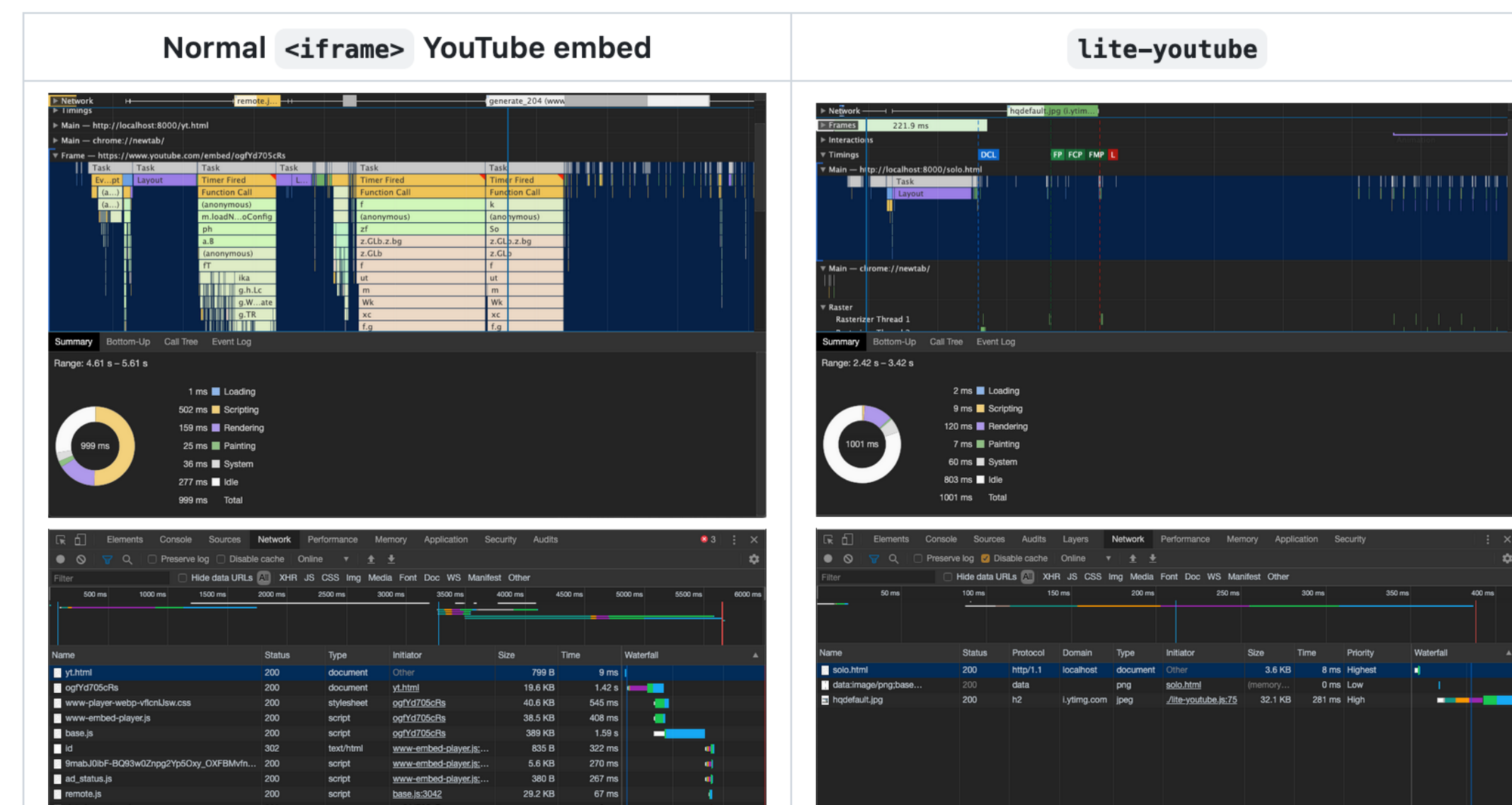
## Lite YouTube Embed npm v0.2.0

Renders faster than a sneeze.

Provide videos with a supercharged focus on visual performance. This custom element renders just like the real thing but approximately 224x faster.

Demo: <https://paulirish.github.io/lite-youtube-embed/>

## Comparison



Used by 644



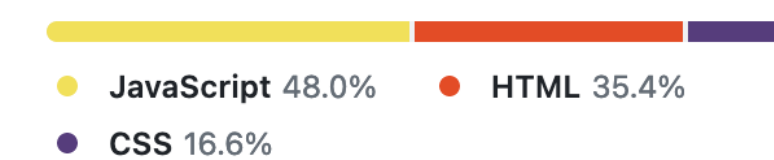
Contributors 19



Environments 4

- Preview Active
- github-pages Active
- Production Active
- staging Abandoned

Languages





Avoid embeds



Defer loading if possible



Lazyload



Import on interaction



Don't use Google Analytics





withcabin.com

Cabin.

How green is your website?

Pricing

Docs

News

Sign In

Get Started Free →

# Privacy-first, carbon conscious web analytics



No cookies or consent banners



Faster, lighter and greener



No data sharing or ad networks



Compliant with all privacy laws

Cabin.

normally.com

NS Normally Studio

Summary

Top Pages

Referrals

Events

Tweets

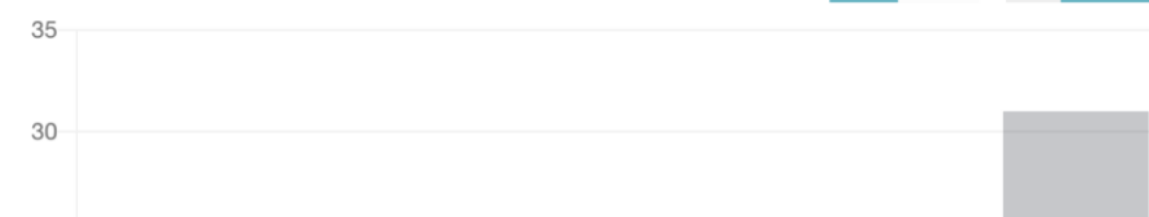
Sources

Energy & Carbon

Today 7d 14d 30d ...

PAGE HITS  
**134**

days hours line column

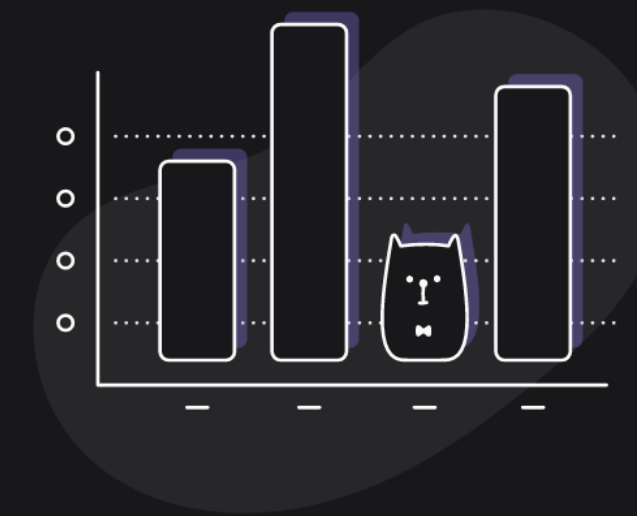


## The Google Analytics alternative without compromise

New [Filter your dashboard by event completions](#)

For the longest time, website analytics software was seriously bad. It was hard to understand, time-consuming to use, and worse, it exploited visitor data for big tech to profit.

Fathom is a Google Analytics alternative that doesn't compromise visitor privacy for data. We revolutionized website analytics by making them easy to use and respectful of privacy laws (like GDPR and more).



View a live demo

Get started for free

aremythirdpartiesgreen.com

[Are my third parties green?](#)

[Why?](#)

[How](#)

[API](#)

[Directory](#)

[Test a web page](#)

# Are my third parties green?

Check the third party resources used by a website.

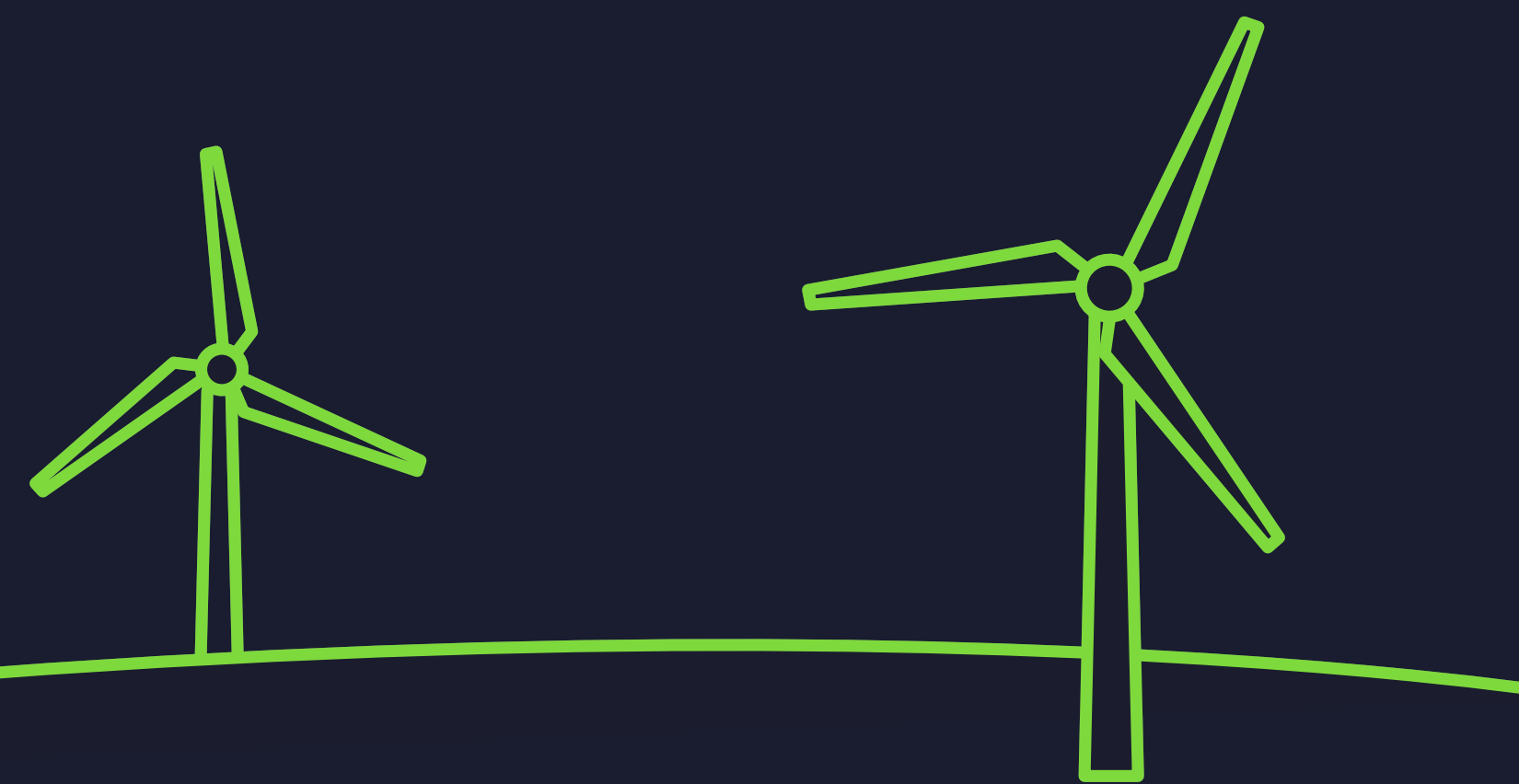
Enter a URL

Test

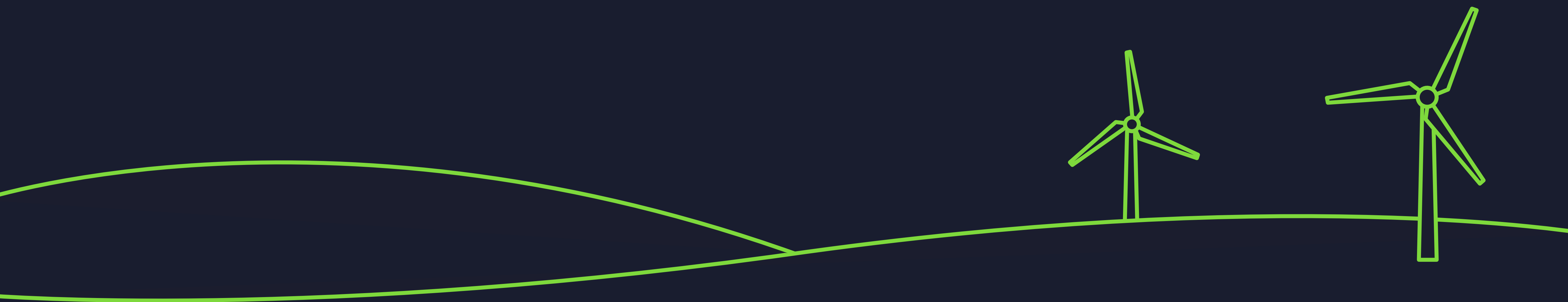
[Advanced settings](#)

All test data is anonymously saved and stored privately. Test results pages are not indexed, but are publicly accessible to anyone with the right URL.

**Not all bytes are  
created equal**



**Use less Javascript**







## Design for less JS





Design for less JS



Use native APIs







Design for less JS



Use native APIs



Do you need to transpile?





Design for less JS



Use native APIs



Do you need to transpile?

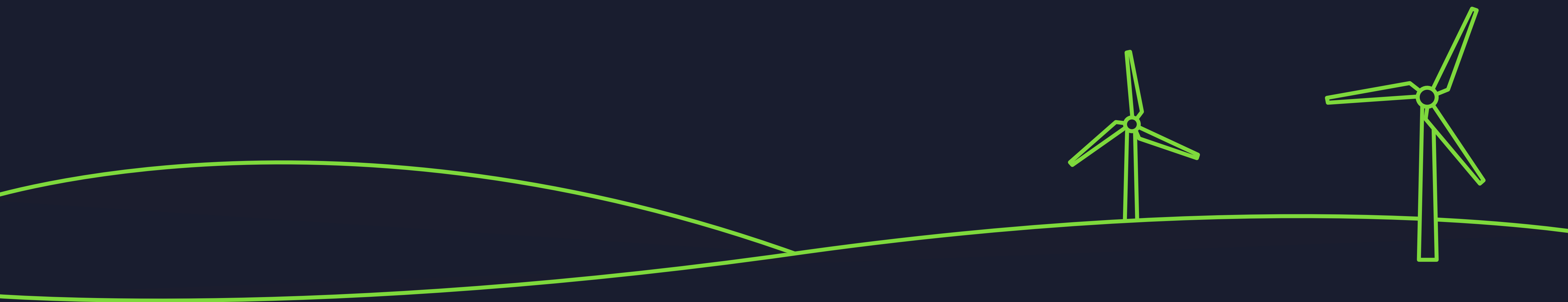


Embrace the platform!





**Optimise all the things**





Caching



bit.ly/40B38ou



4 March, 2019

## Cache-Control for Civilians

### Table of Contents

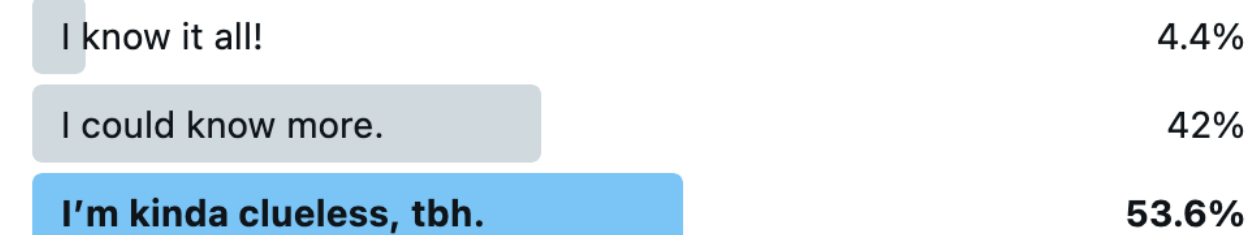
The best request is the one that never happens: in the fight for fast websites, avoiding the network is far better than hitting the network at all. To this end, having a solid caching strategy can make all the difference for your visitors.



**Harry Roberts**  
@csswizardry · [Follow](#)



How is your knowledge of caching and Cache-Control headers?



1,696 votes · Final results

10:22 PM · Mar 3, 2019



[Read the full conversation on Twitter](#)



25



Reply



Copy link

[Read 11 replies](#)



Hi there, I'm Harry. I am an **award-winning** Consultant Web Performance Engineer, designer, developer, writer, and **speaker** from the UK. I **write**, **Tweet**, **speak**, and **share code** about measuring and improving site-speed. You **should hire me**.

[Follow @csswizardry](#)

[Arrange a consultation.](#)

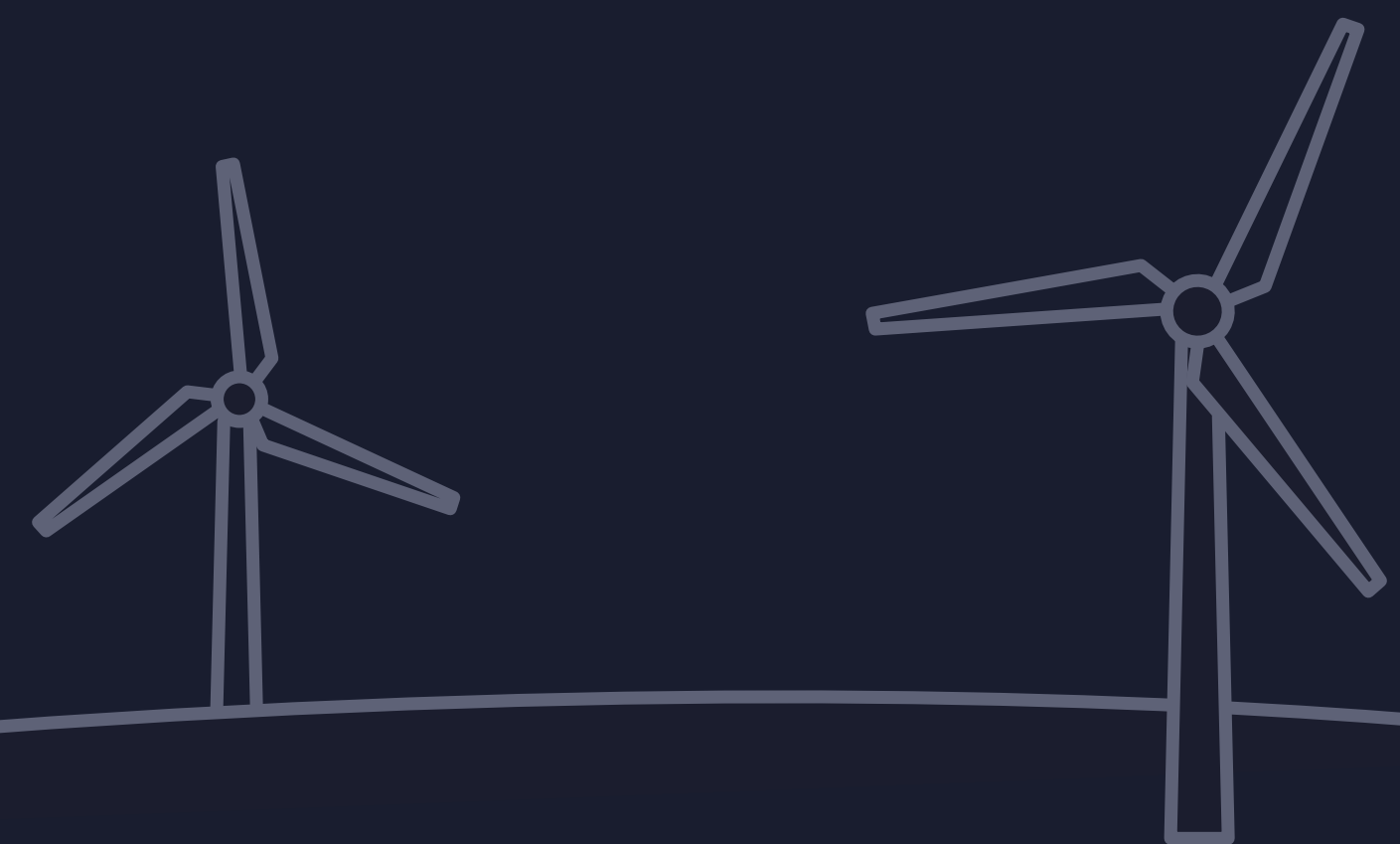
[Projects](#)



Caching



Minification and compression





Caching



Minification and compression



Tree-shaking







Caching



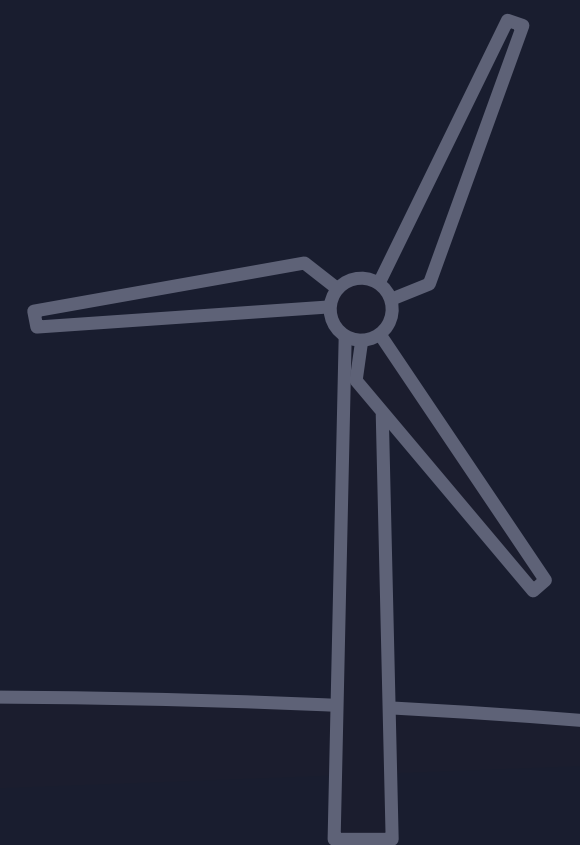
Minification and compression



Tree-shaking



Code splitting



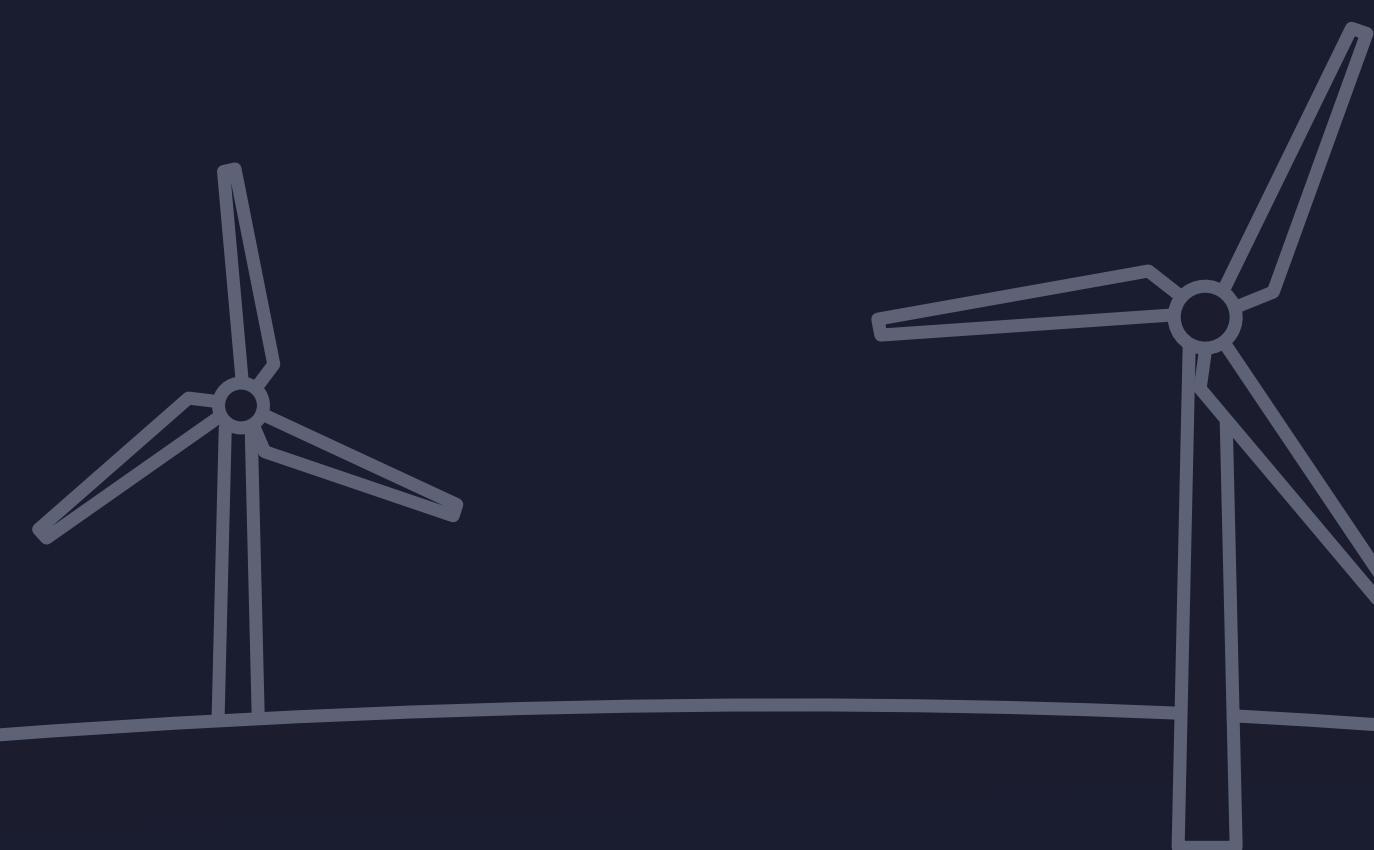
# Static import

```
import { Auth } from "@aws-amplify/auth";  
const user = Auth.currentAuthenticatedUser();
```



# Dynamic import

```
import("@aws-amplify/auth").then(({ Auth }) => {  
  const user = Auth.currentAuthenticatedUser();  
});
```





Caching



Minification and compression



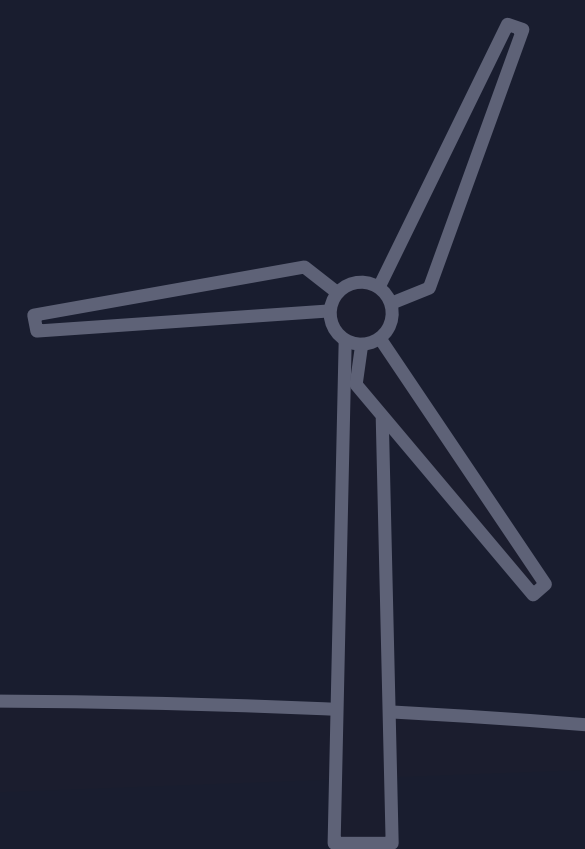
Tree-shaking



Code splitting



Dependency auditing



Device  
manufacture



Infrastructure



Device use



Device  
manufacture



Infrastructure



Device use

Device  
manufacture



Infrastructure



Device use



Device  
manufacture



Infrastructure



Device use







**Low-energy colour scheme**



**User journey**

Device  
manufacture



Infrastructure



Device use





**Renewable energy**

# thegreenwebfoundation.org/directory

Towards a fossil free internet by 2030

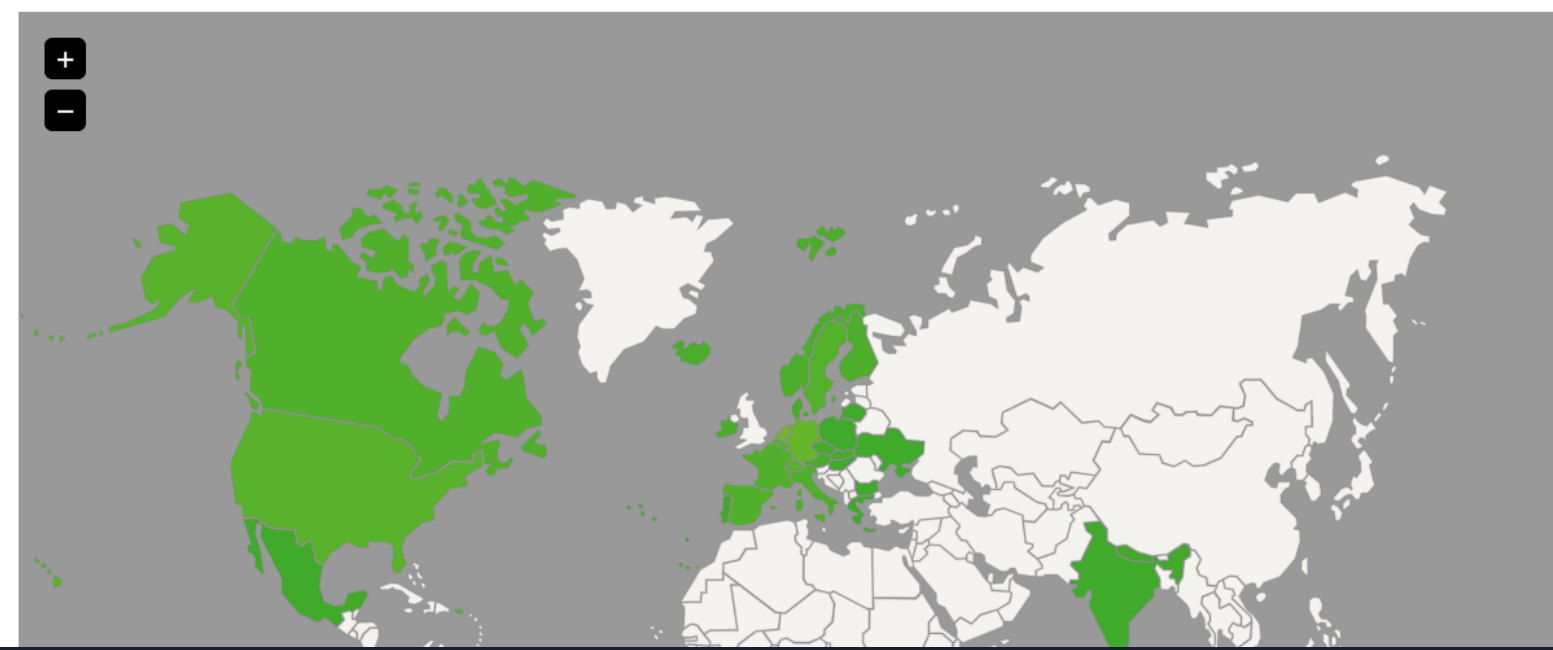
## The Green Hosting Directory, as used by the apps

On this page, you will find our Green Hosting Directory.

For every country, the list starts with [Partners](#): the hosting companies that provide proof of their green claims.

This service is provided free of charge [for green hosters that can be identified through AS numbers and/or IP ranges](#).

Are you missing a green hosting provider in this list? Please [register yourself](#) or [ask them to register with us](#).





**Timing**

branch.climateaction.tech



ISSUES

ABOUT

DONATE

OPEN CALL



? GRID INTENSITY VIEW: **LOW** ▼

# Magazine for a Sustainable and Just Internet for All

Issue 4: The Open Climate Edition

SUMMER 2022



branch.climateaction.tech



ISSUES

ABOUT

DONATE

OPEN CALL



? GRID INTENSITY VIEW: **HIGH** ▼

# Magazine for a Sustainable and Just Internet for All

**Issue 4: The Open Climate Edition**

**SUMMER 2022**

*Crafting a more vibrant future  
with joy and community*





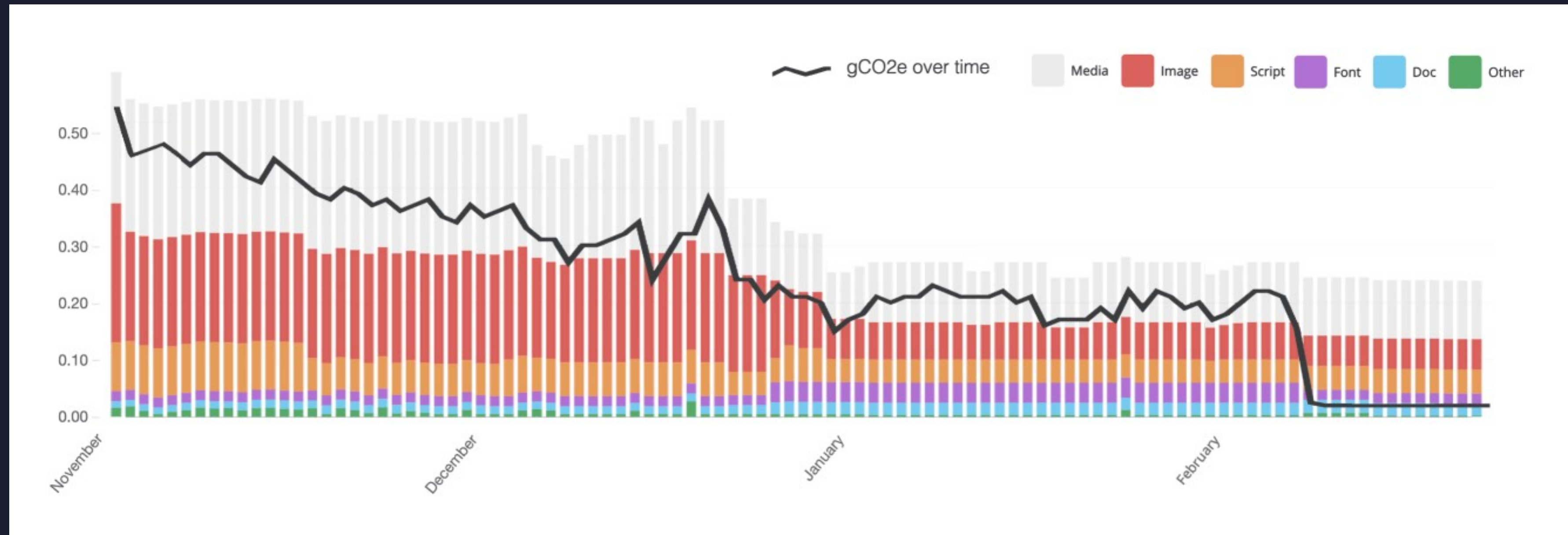
**Location**

# Case study: UsTwo



# Case study: UsTwo

0.54gCO<sub>2</sub>e → 0.02gCO<sub>2</sub>e



45% to 99%

carbon reduction



# greensoftware.foundation



Learn how to build, maintain and run greener applications

Take Our Course



[About](#) [Working Groups](#) [Projects](#) [Resources](#) [Articles](#)



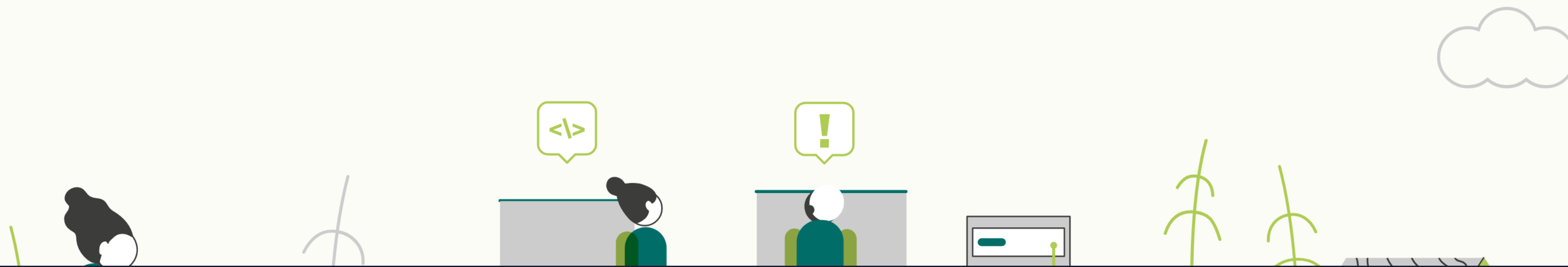
JOIN US

We are building a trusted ecosystem of people,  
standards, tooling and best practices for

## GREEN SOFTWARE

Sign up to our newsletter...

Sign up





**Developer tooling**

“

**If I was a better programmer, I'd write a script that shows you the cumulative CO<sub>2</sub> you've generated every time you type `npm install` .**

**Eric Bailey**



Consider a static site







Consider a static site



Don't run optimisations in development





Consider a static site



Don't run optimisations in development



Remove unused dependencies





Consider a static site



Don't run optimisations in development



Remove unused dependencies



Reduce complexity



“

**Shaving off a single kilobyte in a file that is being loaded on 2 million websites reduces CO2 emissions by an estimated 2950 kg per month.**

**Danny van Kooten**



**Why do our individual actions matter?**



A photograph of a volcanic eruption. A large, billowing plume of dark ash and smoke rises from a dark, rocky landscape. The base of the plume is illuminated by bright orange and yellow lava flows. The sky is a dark, overcast grey.

**Unfortunately,  
capitalism**



**Amplify our voices**



**Lead by example**





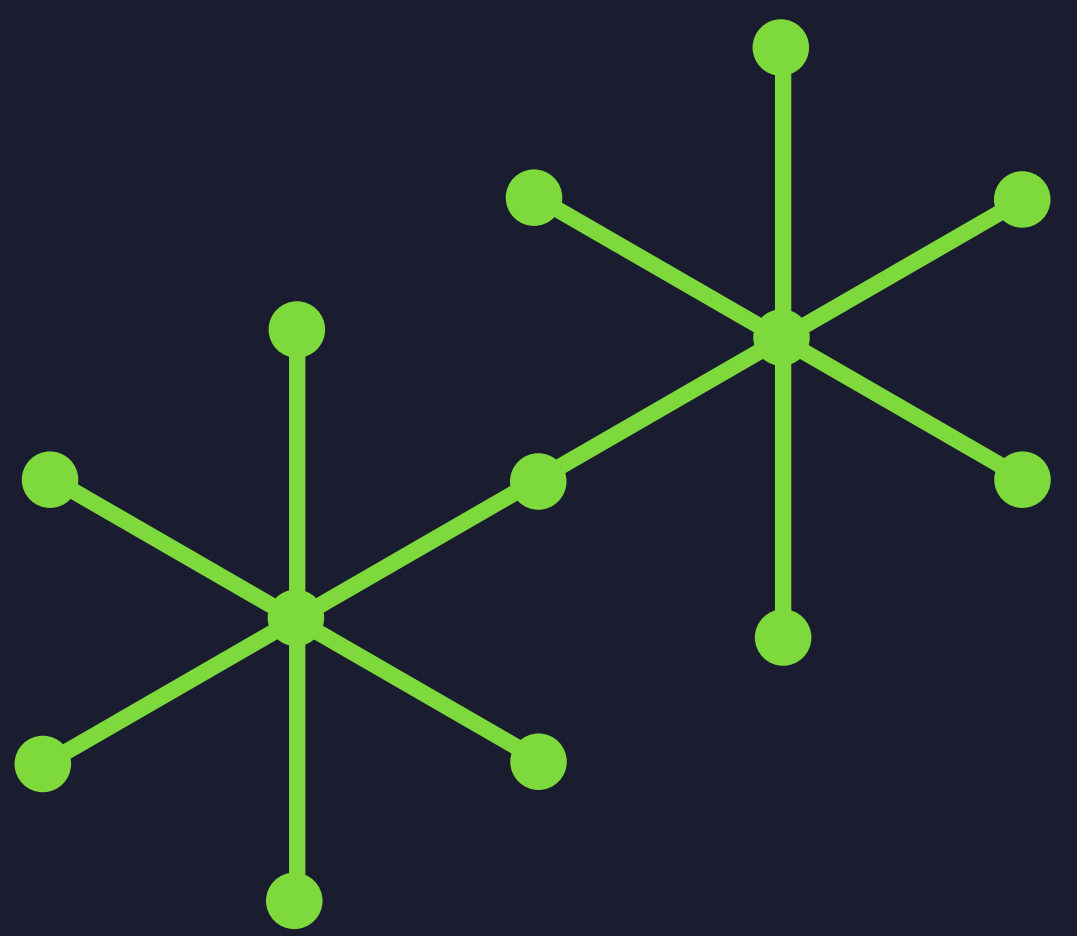
**Regulation**

“

**Cultural revolutions don't happen because of systems change; they happen when a group of people voice a compelling story that propagates across society and becomes a social norm.**



# Networks



A close-up portrait of Elon Musk, looking slightly to the right with a skeptical or questioning expression. He has short brown hair and a light beard. The background is a solid blue color. Overlaid on the image is white text in a bold, sans-serif font.

**Elon Musk isn't going to  
solve climate change**

# Form a workplace action group



Support each other to take climate action



Push the climate agenda and greener practices within your organisation



Share resources



Hold each other accountable



# Share your learning



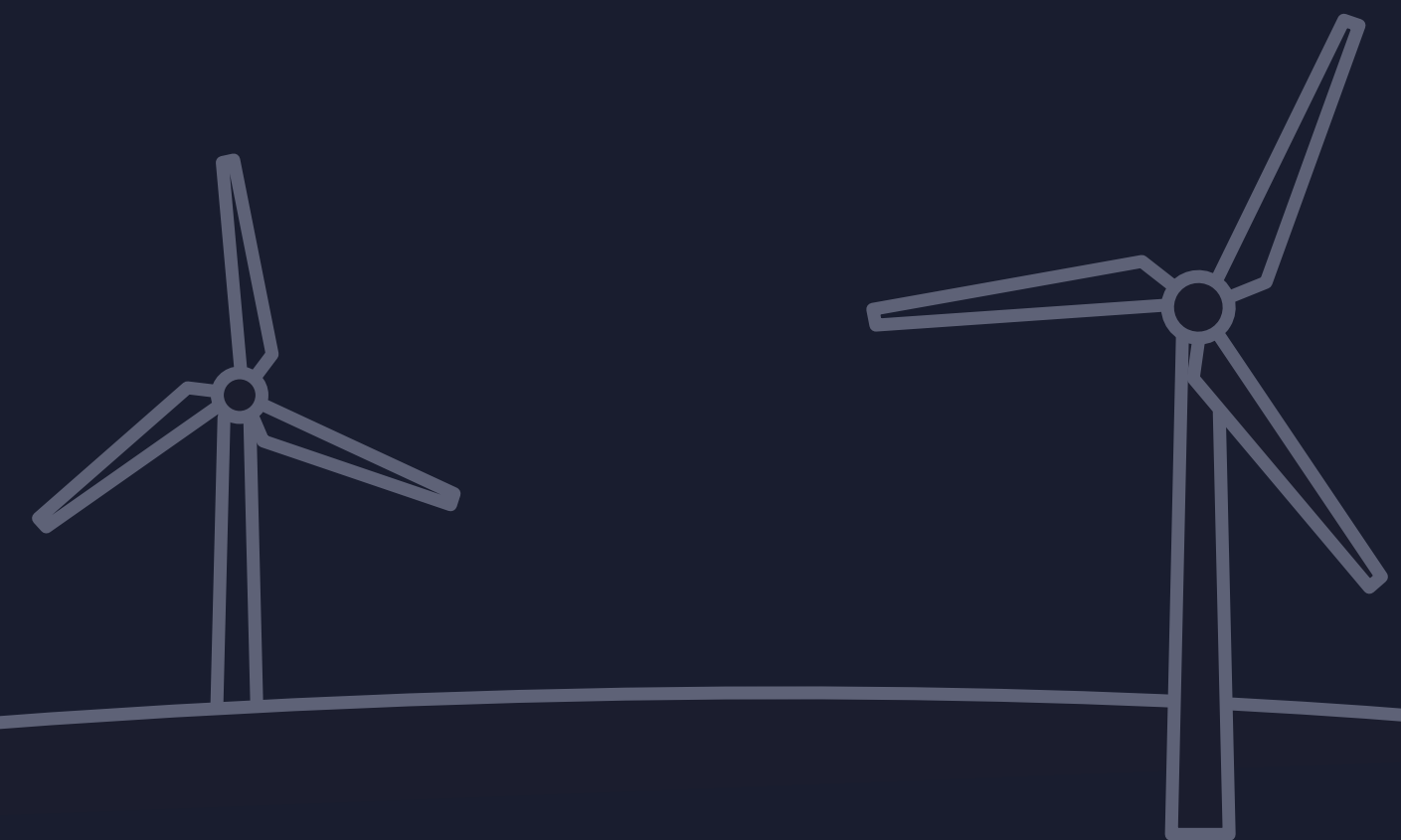
Write



Speak at events



Share on social media





**Climate  
Action  
.tech**

# w3.org/community/sustyweb



## COMMUNITY & BUSINESS GROUPS

  
CURRENT GROUPS

  
REPORTS

  
ABOUT

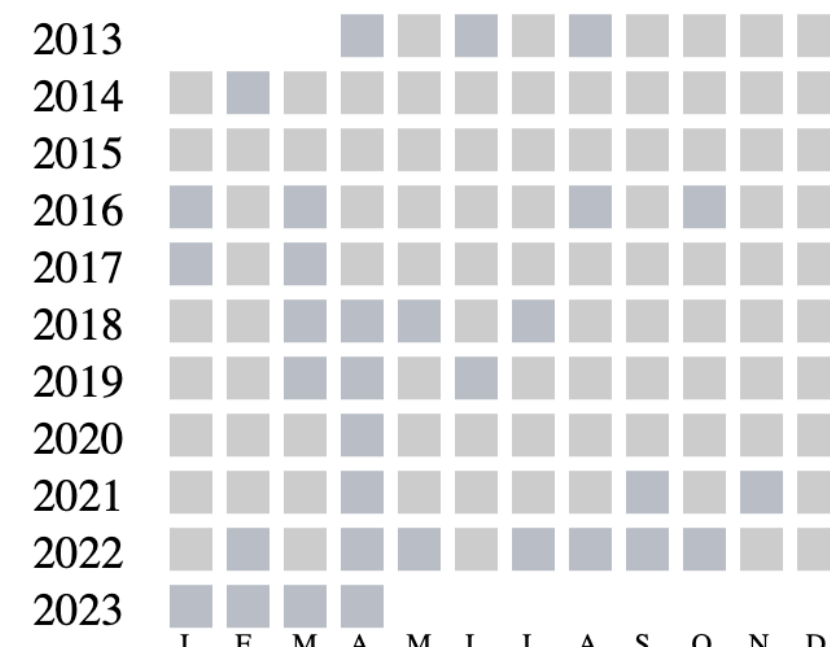
[Home](#) / Sustainable Web Design...

## SUSTAINABLE WEB DESIGN COMMUNITY GROUP







A community group dedicated to creating sustainable websites. This group will not publish specifications.

 [w3c/sustyweb](#)

Group's public email, repo and wiki activity over time



### Tools for this group

-  Mailing List
-  Wiki
-  Slack
-  GitHub
-  RSS
-  Contact This Group

### About the Group

- [About](#)
- [Charter](#)
- [Committees](#)



**Recognising our power  
+ privilege**





THIS IS FOR EVERYONE

THIS IS FOR EVERYONE

THIS IS FOR EVERYONE



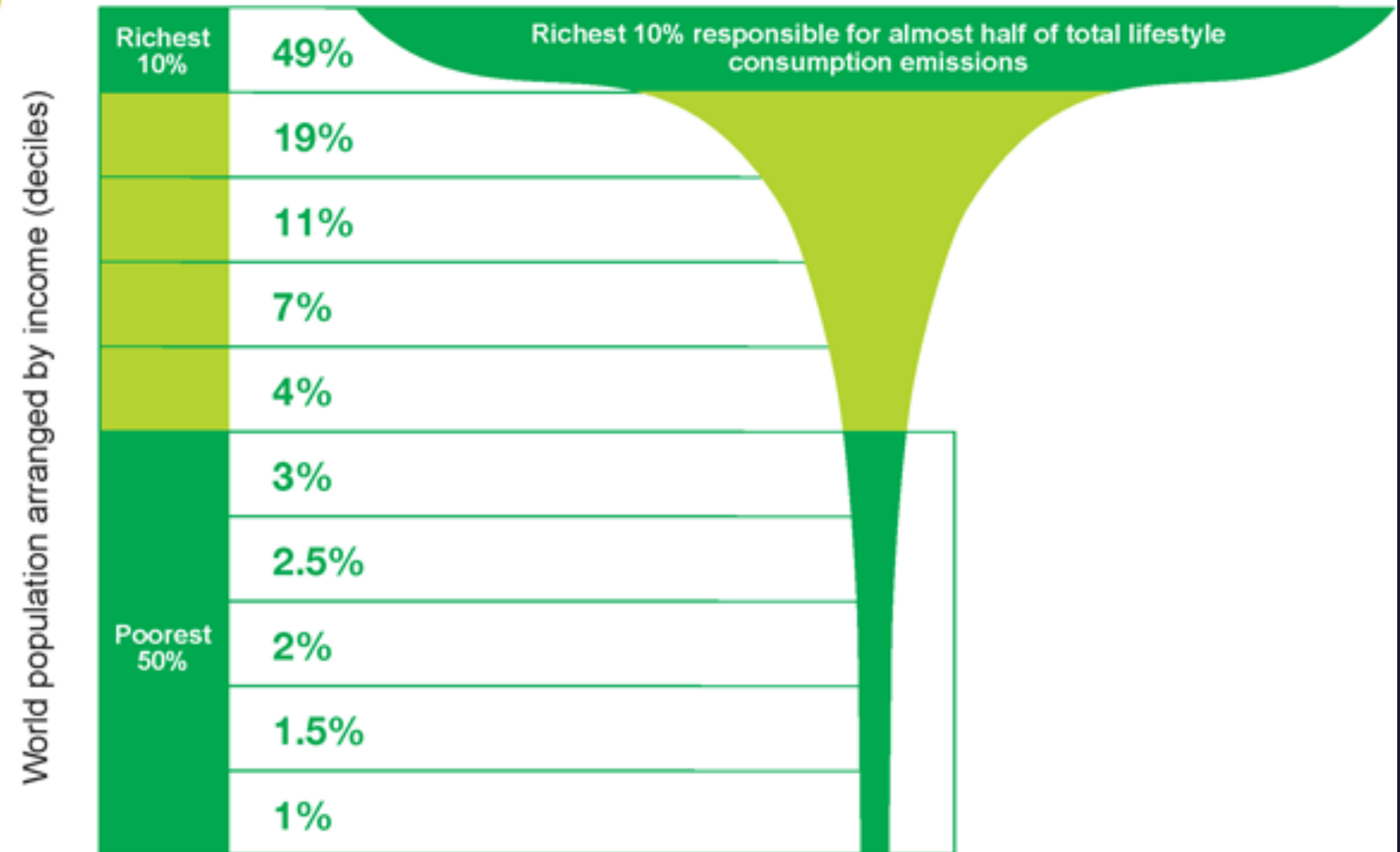


**OXFAM**

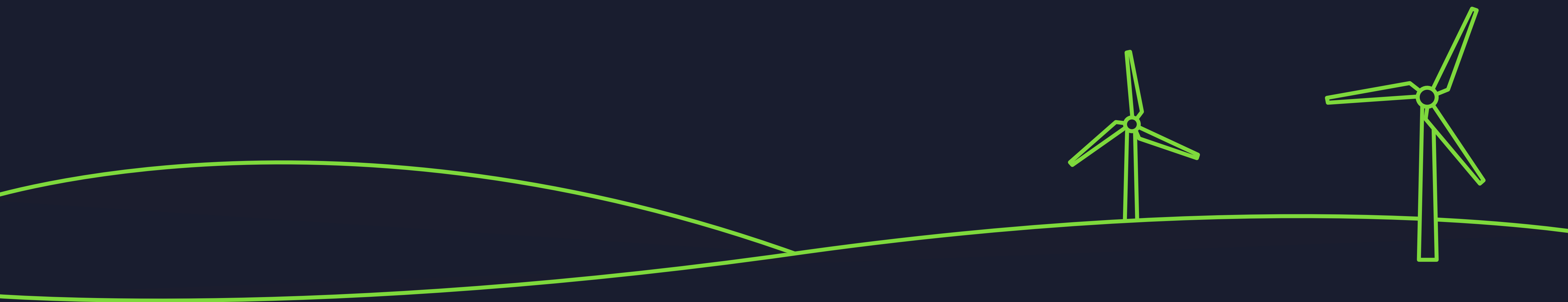
The poorest **50%** is only responsible for around **10%** of total lifestyle consumption emissions.

**OXFAM MEDIA BRIEFING:  
EXTREME CARBON INEQUALITY**

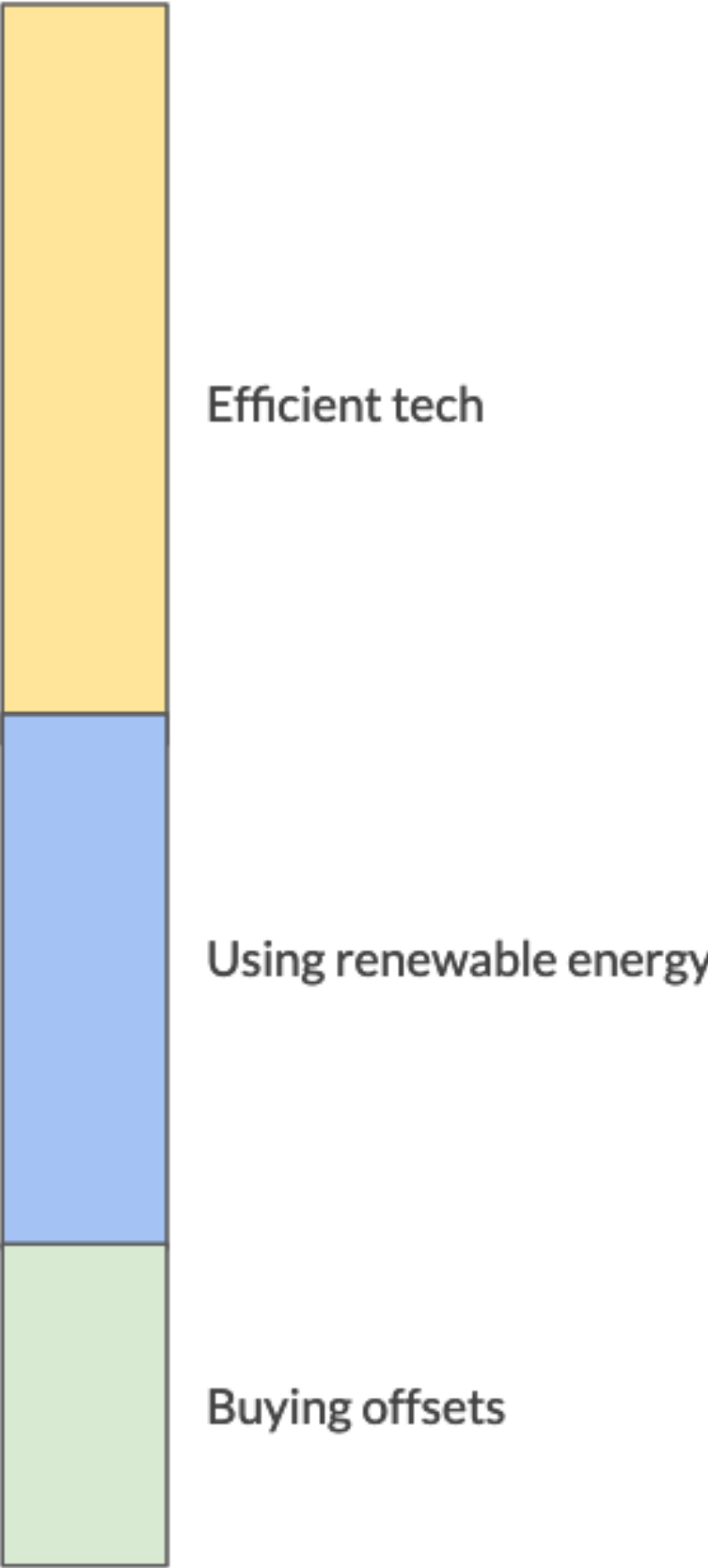
### Percentage of CO<sub>2</sub> emissions by world population



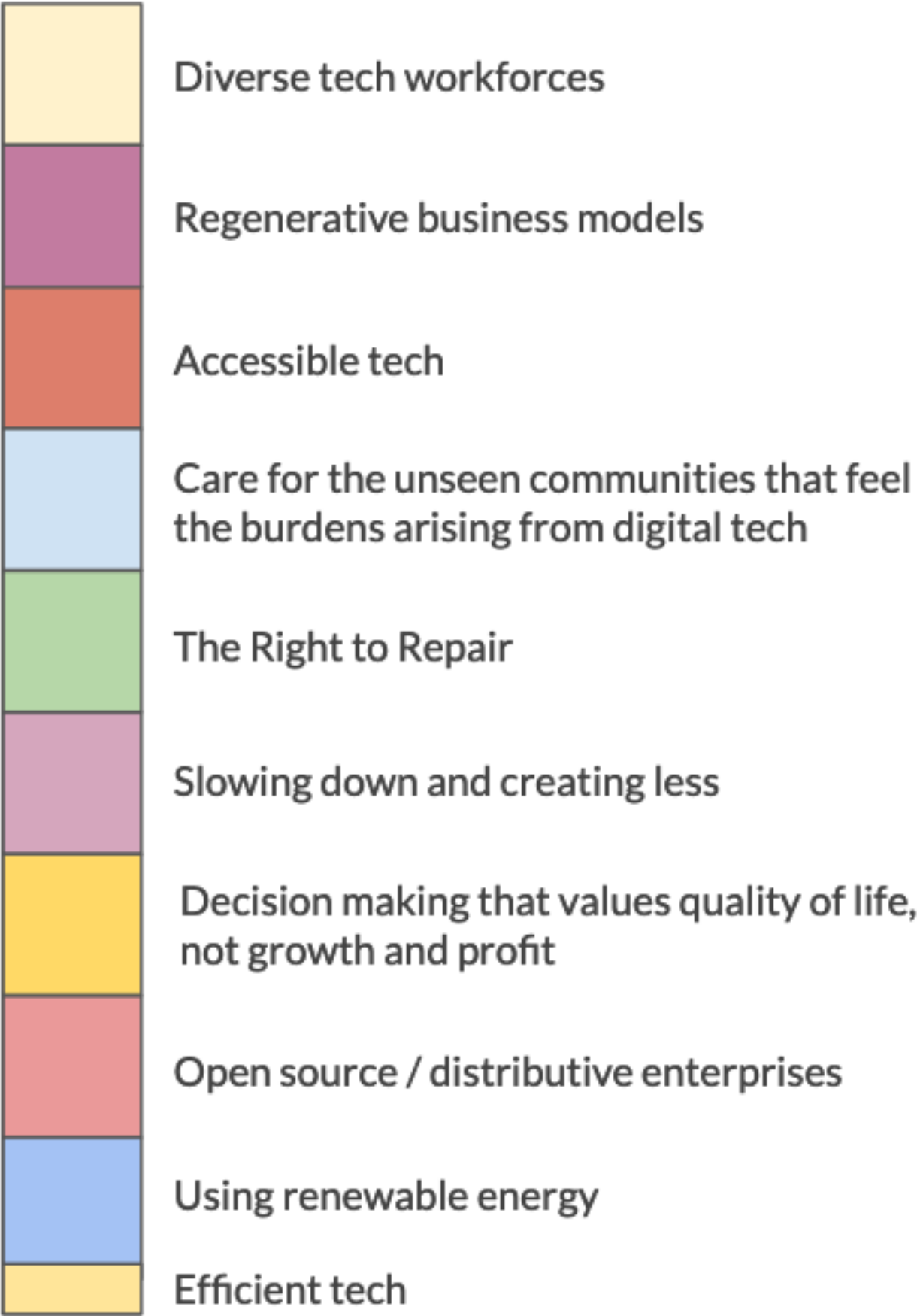
**Sometimes less is more**



# What people think building a sustainable internet means



# What it's more about





“

**Hope doesn't preclude feeling sadness or frustration or anger... Hope is not optimism. Hope is a discipline... we have to practice it every single day.**

**Mariame Kaba**

planet

THIS IS FOR EVERYONE





Thank you

[css-irl.info/tags/web-sustainability](https://css-irl.info/tags/web-sustainability)

