

*Abstrakt*

# Website Carbon Impact Study. An Industry Comparison.

Assessing the digital carbon footprint of websites across 10 industries and recommending improvements for better environmental responsibility online.

In partnership with:



## About this report.

The internet as a whole emits a huge amount of carbon into the atmosphere. This presents a major environmental challenge, but also an opportunity for change. As businesses work to reduce their environmental impact, focusing on the often-overlooked digital carbon footprint of websites is becoming increasingly crucial.

### Why Abstrakt completed this study.

As an agency and Certified B Corp, we work with clients across many industries and notice that sustainability goals and digital carbon footprint knowledge differ immensely. We were keen to understand which industries are already following sustainability best practices and which need more support in the education of their website's impact.

We hope this study aids your understanding and informs you on how you can start to make incremental improvements to your website's carbon footprint. Although your industry may not have been assessed, best practices in digital sustainability apply to all websites across all industries.

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## Purpose of this study.

This study aims to highlight how businesses can improve their digital carbon footprint by lowering their website emissions.

In this study, we report on the average carbon emissions produced by different industry websites, using real data to identify trends and factors that impact their carbon ratings.

It doesn't aim to call out any specific businesses or industries whose websites are less sustainable but rather, highlight and educate where improvements can be considered to take more environmental responsibility for the content hosted and shared online.

We understand that, whilst sustainability is on the agenda of most businesses worldwide, it's not always the primary goal for their website, with brand and conversion often needing to take priority. However, there are actions we can take to reduce carbon emissions whilst still having engaging sites, without sacrificing great experiences.

We want to support understanding, share knowledge, and offer actionable tips on how to lessen digital carbon footprints.

# Methodology.

## Choosing the industries and businesses to analyse.

Choosing industries was based on Abstrakt's want to understand the differences among the industries we work with—past and present—to gain a broader perspective on their digital sustainability practices. We chose 10 industries and assessed 30 businesses within each based on factors such as market recognition, industry influence, reach, and reputation.

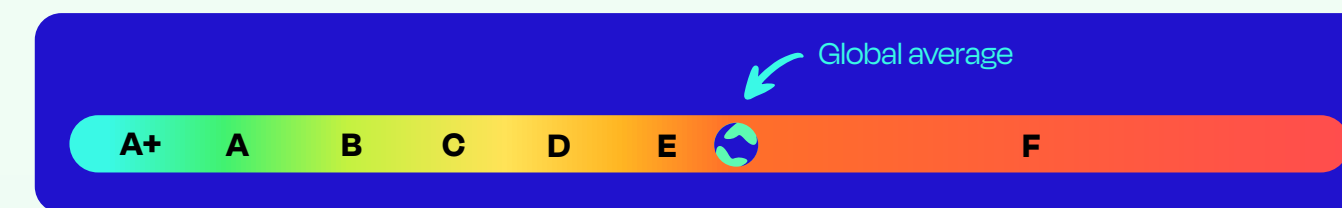
### Industries in this report:

- Apparel & accessories
- Banks
- Construction
- Eco brands
- Food & beverage
- Healthcare
- Higher education
- Insurance
- Supermarkets
- Utilities

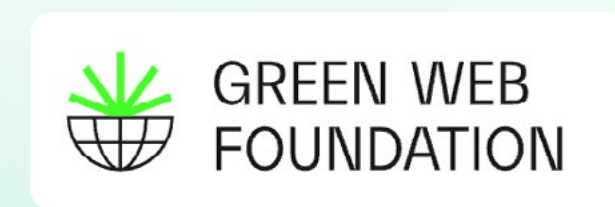
## Summary of tools used.



Average webpage CO2 emissions



Carbon rating score from A+ to F



Dataset of websites that run on green electricity



## Achieving an average CO2 figure per website.

Abstrakt have partnered with Digital Carbon Online<sup>1</sup>, a tool that assesses the full carbon impact of a website to understand the CO2 emissions of entire websites, not just a single webpage.

Starting at each sites homepage the tool followed up to 50 pages that were publicly linked to from the homepage<sup>2</sup>, leveraging the nascent webpage carbon calculation standard as being defined by the Green Web Foundation<sup>3</sup>, to measure the CO2 weight of each page<sup>4</sup>. The data was manually reviewed and any anomalies (such as sites which prevented our crawler from accessing their pages) were removed.

The CO2 weight of each page measured for each website was averaged to create the average CO2 figure per website. This figure is the one used as the 'average emissions per page view across industry' recorded in this study.

<sup>1</sup> <https://www.digitalcarbon.online/>

<sup>2</sup> It is most likely that the first 50 pages from the homepage will be higher traffic pages, having direct links from the homepage—not always true due to SEO strategies—but a good place to start when exact traffic metrics aren't available to us through GA4.

<sup>3</sup> Digital Carbon Online's methodology implements the same methodology as other well known website carbon assessment tools, and follows the best practices as defined by the Green Web Foundation.

<sup>4</sup> The process of determining the carbon dioxide emissions of a web page is a complex affair that is based on the energy required to transfer data, and involves assumptions about where energy is used during the transmission of data required to deliver a web page. The methodology defined by the Green Web Foundation, splits these assumptions across energy used by the end user device, the networks and the server.

All data was collected By Digital Carbon Online between 6th September and 1st October 2024.



## Scoring each website with a carbon rating.

We used the Website Carbon Calculator<sup>1</sup> benchmark rating system to assign a carbon score, based on the average figures we received from Digital Carbon Online.

Ratings go from A+ (very efficient) to E (still better than the global average). Any website with emissions that exceed the global average receives an F rating.

Rating	Grams CO2e per page view
A+	0.095
A	0.186
B	0.341
C	0.493
D	0.656
E	0.846
F	≥ 0.847

<sup>1</sup> <https://www.websitecarbon.com/introducing-the-website-carbon-rating-system/>

## Checking green hosting.

The internet is the world’s largest coal-powered machine and hosting a website on green energy is one of the best ways to begin to reduce your business’s digital carbon footprint and help make the internet fossil-free.

We checked all 300 websites using the Green Web Foundation<sup>2</sup> tool to see if each website ran on green energy. Though this is not wholly accurate, it is the leading and most broadly used Green Web Dataset at the time of this study.

## Limitations to the data.

There are always limitations to publicly accessible data and this data is only relevant to the time we scraped it in 2024. Our data does not take into consideration the volume of traffic to a website. Businesses may have since made improvements to their website and hosting.

<sup>2</sup> <https://www.thegreenwebfoundation.org/tools/green-web-dataset/>

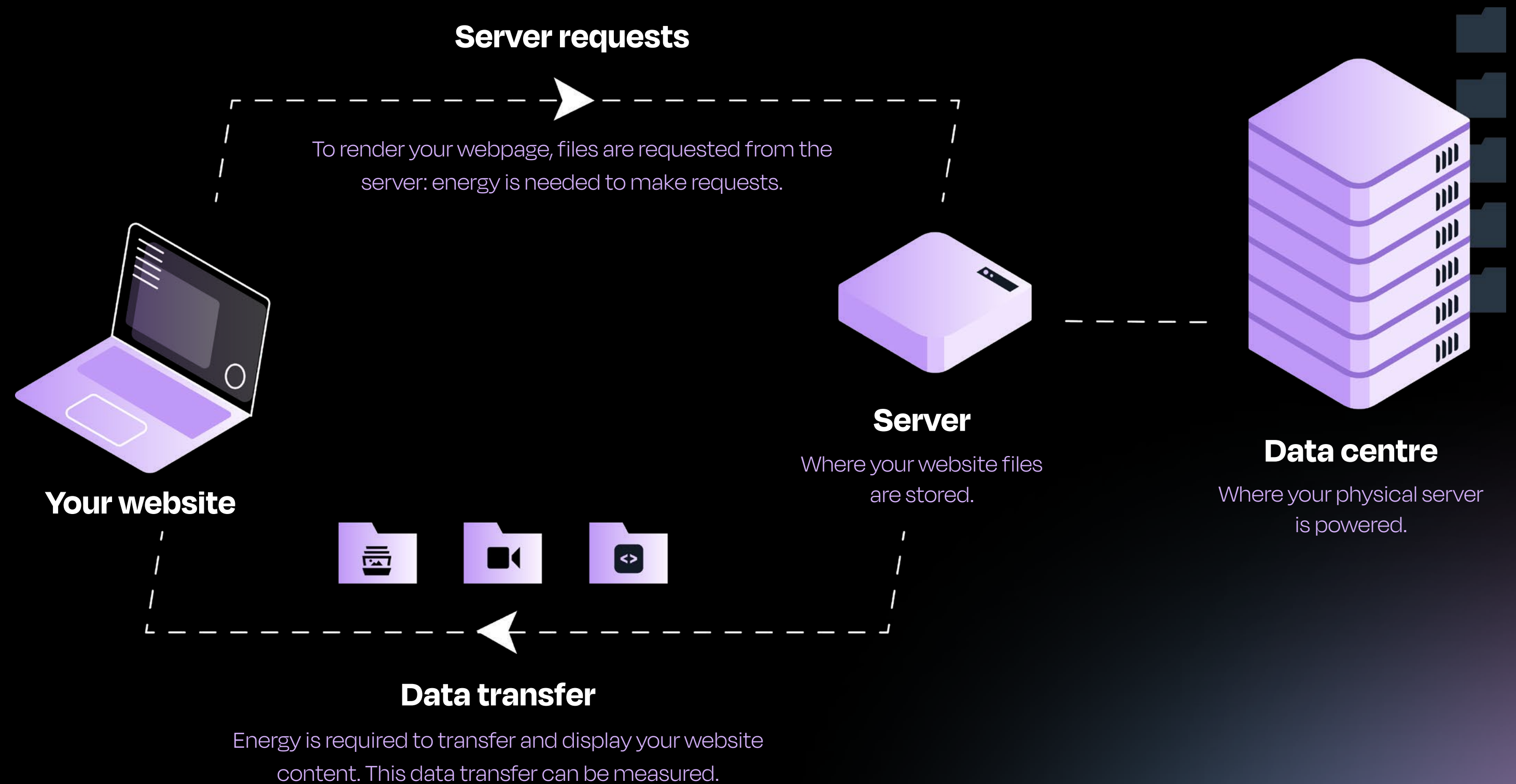
# The digital carbon problem.

Every website has an impact on the environment, including yours.

Every visit to a website and every page view adds to a business's digital carbon footprint. Often these websites are viewed hundreds of times, if not thousands every day, which creates a big impact on its carbon emissions.

According to Website Carbon<sup>1</sup>, the average web page produces approximately 0.8 grams CO2 equivalent per page view globally. For a website with 10,000 monthly page views, that's 102 kg CO2e yearly.

If every website owner collectively reduces their carbon emissions, even slightly, this will improve the internet's overall carbon footprint.



<sup>1</sup> <https://www.websitecarbon.com>

# How the industries performed collectively.

The following metrics collate all industry data to offer an average across 10 industries and 300 websites.

**0.68g CO<sub>2</sub>**

Average emissions per page view across all industry websites included in the study

**E**

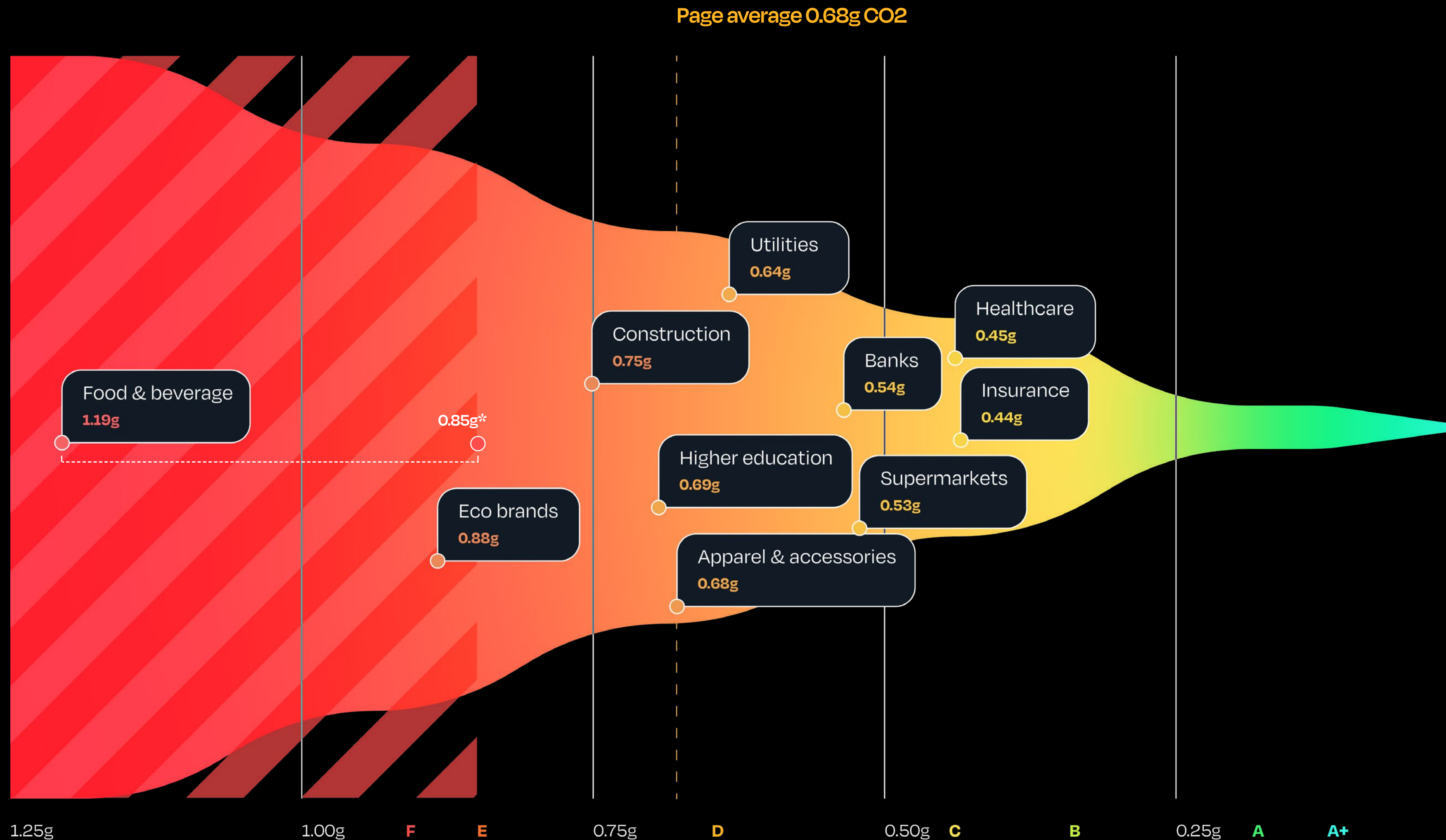
Collectively industries averaged an 'E' rating

**50.3%**

Of websites are using green hosting providers



# Average CO2 per page view.



The websites in this study produce an average 0.68g CO2 / page view.

Healthcare and Insurance websites both average a carbon score rating of C. Insurance only takes the lead with slightly lower carbon emissions per page (0.44g vs 0.45g CO2).

Food & beverage has the largest\* carbon emissions of all the industries included in the study at 1.19g CO2 / page view.

Notably, Eco brands are among the highest scoring websites that were analysed.

\* It's worth noting that one Food & beverage website had very heavy carbon emissions which brings this average down from 0.85g to 1.19g.

# Average carbon ratings.



An illustration of the proportion of carbon ratings when analysing all 300 websites across 10 industries.

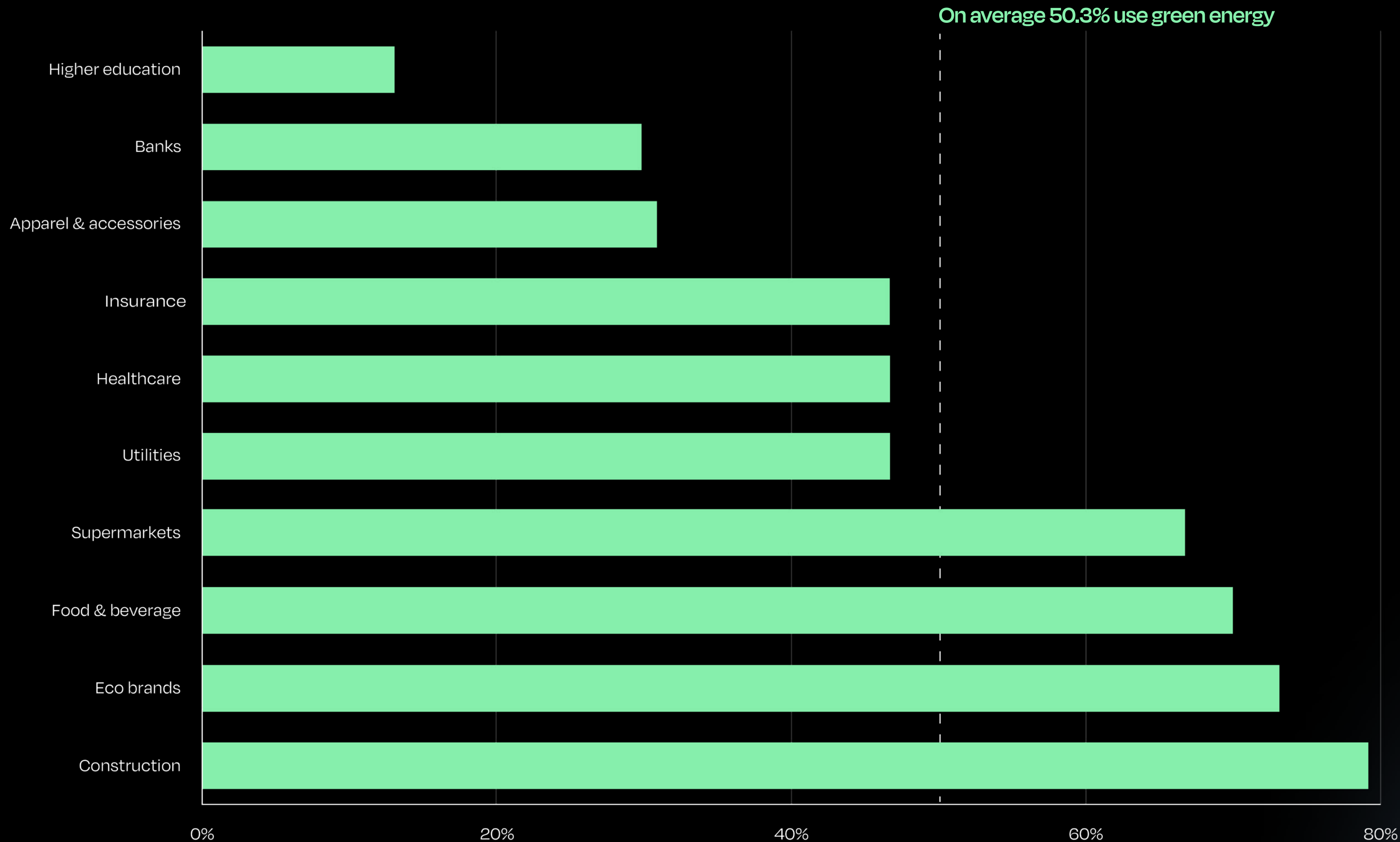
**1.3% = A+**

4 of 300 websites achieved the website carbon rating of A+ (very efficient)

**24.6% = F**

74 of 300 websites achieved the website carbon rating of F (exceeds the global average)

# Green hosting industry comparison.



On average, 50.3% of websites across all industries are using green energy.

The Construction industry leads in green hosting with 79.3% of websites using hosting providers powered by renewable energy. Eco brands, Food & beverage, and Supermarkets also rank well in their use of green hosting.

In contrast, only 13% of Higher education websites are powered by green energy. However, 40% of the tested sites appear to be self-hosted by universities, which may explain why the Green Web Foundation's dataset lacks evidence that these websites run on renewable energy.

# Industries.

The following pages dive into the performance of each industry, uncovering key observations and patterns that influence website CO2 emissions.

We explore the factors at play and provide actionable, impactful solutions for improvement, offering opportunities to reduce carbon footprints and enhance digital sustainability.

- Apparel & accessories
- Banks
- Construction
- Eco brands
- Food & beverage
- Healthcare
- Higher education
- Insurance
- Supermarkets
- Utilities

# Apparel & accessories.

The websites we assessed range from eco-conscious brands alongside fast fashion businesses, covering both clothing and footwear. While most have a physical high street presence, we also included online-only retailers.

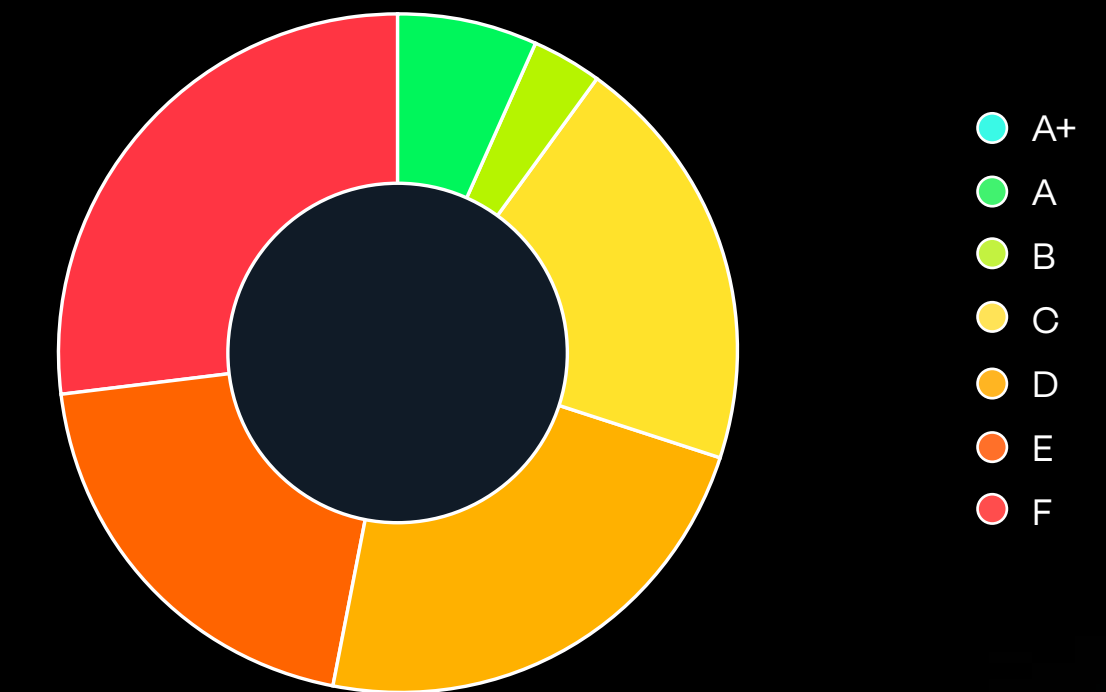
- + These sites are mostly static, relying on photography to sell rather than advanced motion or video.
- + While these types of sites are ecommerce with lots of product imagery, best practices media optimisations are being followed.
- Large page weights, high server requests and third party code seem to be the significant reason for poor load performance and higher carbon impact.
- Ecommerce platforms often come with built in libraries and integrations which are weighty.
- Vast marketing efforts to convert sales can mean the inclusion of analytics code, tag managers, ad tracking, webchats, and social media feeds.

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## 0.68g CO<sub>2</sub>

Average webpage emissions

**E** = Average carbon rating



## Green hosting

Yes **31%**

No **69%**

# Banks.

We assessed a range of banks from challengers in the market to more traditionally known banks. A blend of high street and digital only lenders were included.

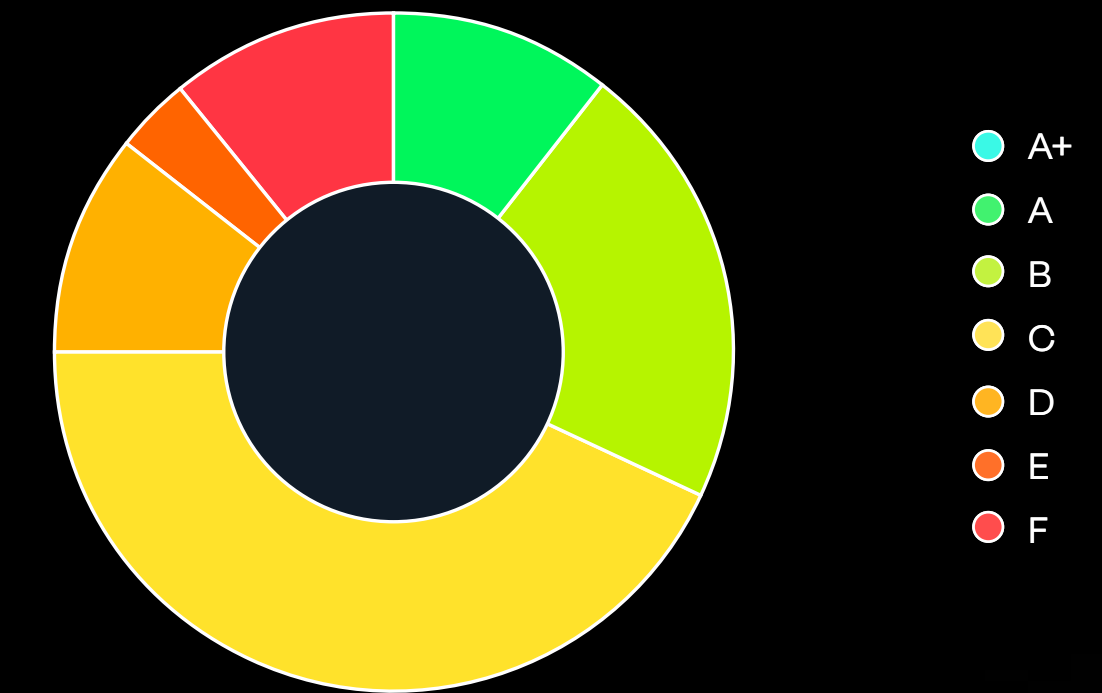
- + Banking websites are mostly static, clean and functional.
- + They have well-considered site structures to support users and website indexing.
- + Mega menus are common, allowing users to make quick decisions on their onward journey.
- + Little use of video and only where relevant.
- Light screen designs are prevalent which are more energy intensive. Although this is more suitable for reading long-form text on screen.
- Content-heavy pages exist as typically these sites have lots of products and services, split user flows and account areas, which increases the sitemap size.
- Blue, a colour associated with trust and loyalty, is commonly used with bank brands, though it is more energy-intensive on screens.

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## 0.54g CO2

Average webpage emissions

**D** = Average carbon rating



### Green hosting



# Construction.

Our analysis focused on websites in the construction space that offer construction services and property development across various sectors.

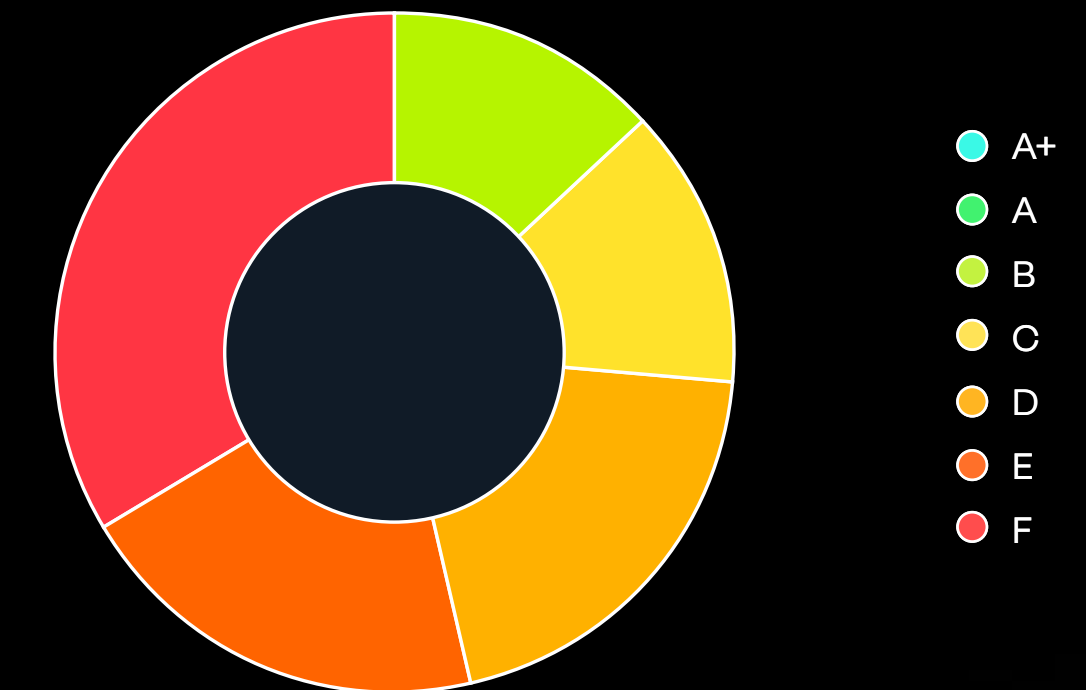
- + With almost 80% of construction businesses powering their websites with renewable energy, the construction industry is the best performing for green hosting. The industry's focus on environmental regulations and sustainability likely drives this trend.
- This industry commonly uses video throughout their webpages. This is to demonstrate skills and expertise by showcasing project builds and talking head interviews from specialists. Minimising large media files is critical to reducing page weight and server load.
- Web carousels are popular among these websites to display multiple pieces of content in a rotating format. These sliders increase data load and can contribute to a larger carbon impact.

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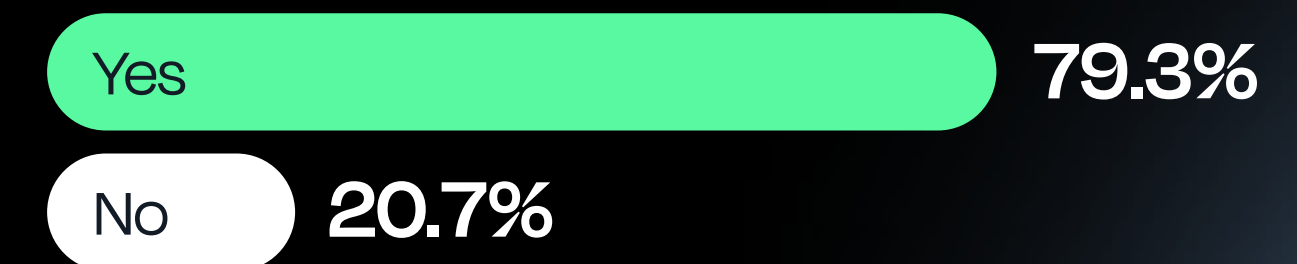
# 0.75g CO2

Average webpage emissions

**E** = Average carbon rating



## Green hosting



# Eco brands.

We wanted to look at brands who champion their environmental and social responsibility. We assessed a mix of products such as reusable water bottles, organic skincare, conscious clothing, cleaning refills, and so on.

Despite being eco-conscious, many of the brands assessed fall short in adopting good digital sustainability practices. While eco brands ranked second for green hosting, they were the second worst industry for average webpage emissions.

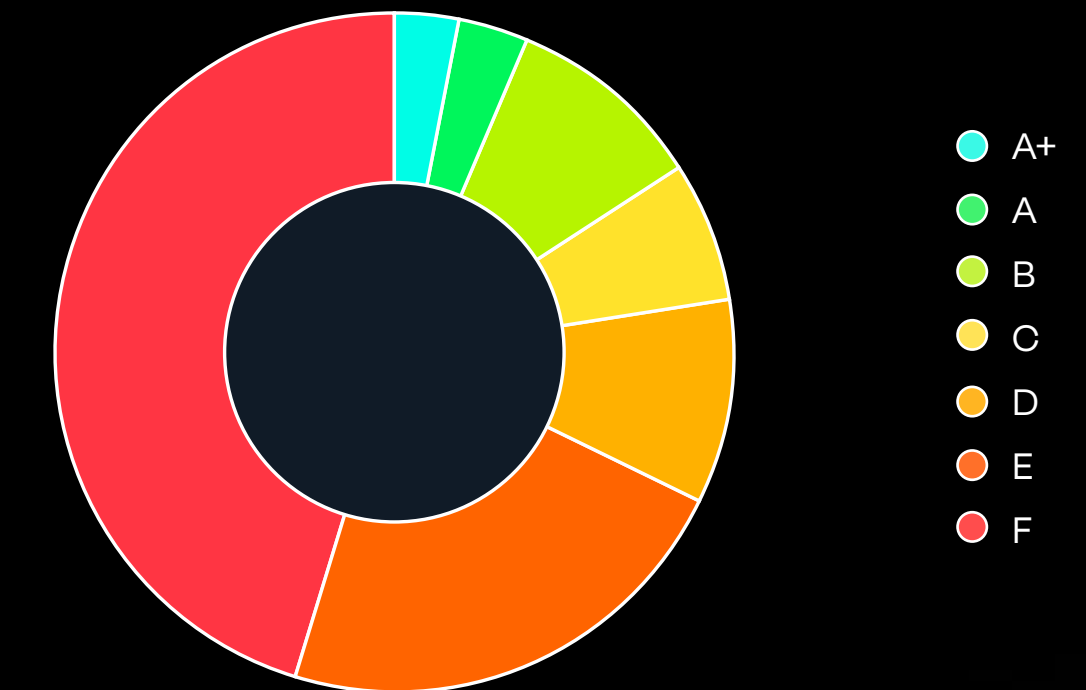
- + The majority of Eco brand websites use green hosting providers.
- Often very brand focused websites which rely on high quality imagery and rich graphics. Even with optimisations, the more images loaded means more server requests. Consider if every product needs multiple images to effectively show and sell the item.
- Lots of product pages add to the website size.
- Many of these eco products are about building brand loyalty and a community of advocates which sees them utilising video embeds, newsletter signup forms, review feeds and social media integrations.

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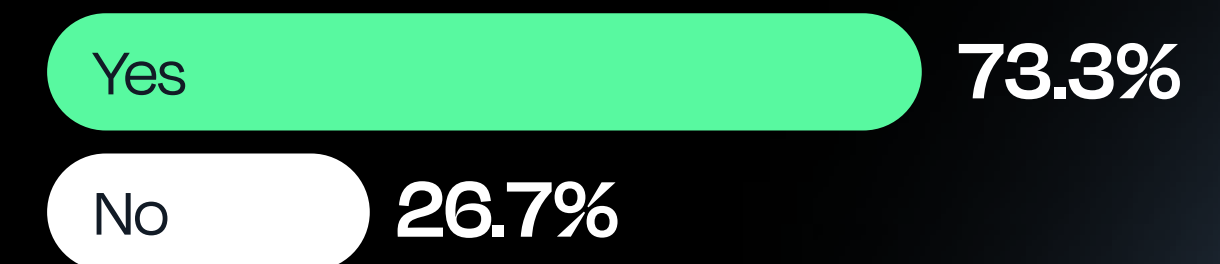
# 0.88g CO2

Average webpage emissions

**F** = Average carbon rating



## Green hosting





# Food & beverage.

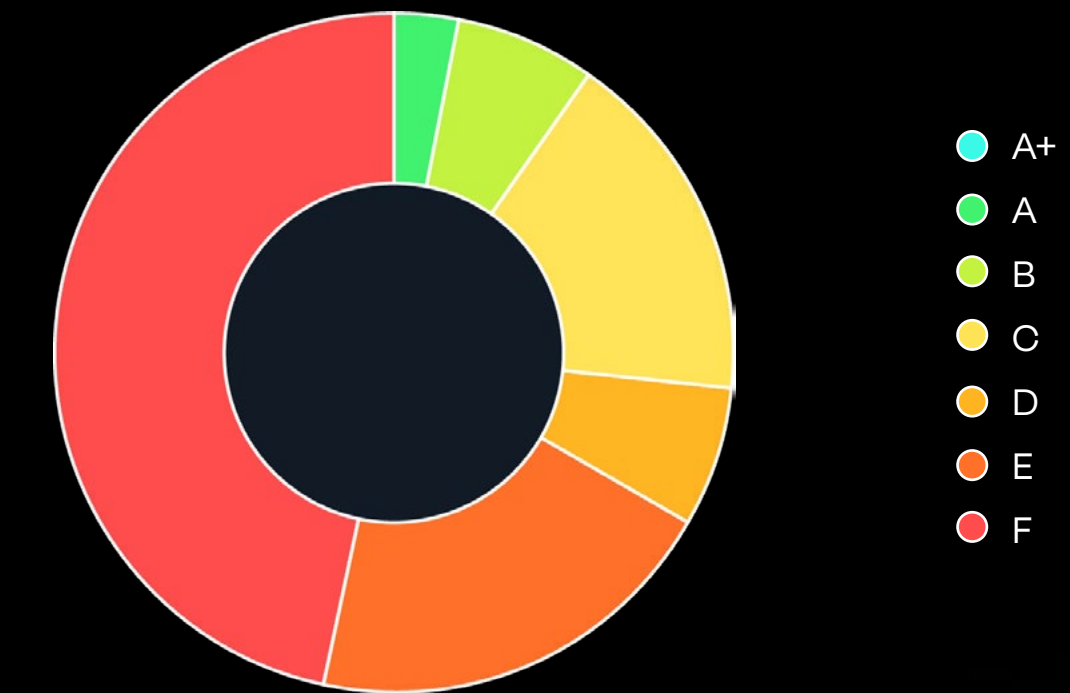
Our study measured websites across fresh food, freezer food, store cupboard staples, soft drinks and alcoholic beverages. Of the sites reviewed, 30% were ecommerce, while the rest often followed a similar structure, minus the store functionality.

- + The majority of websites in this industry are using green hosting providers.
- These types of businesses are brand-first and so the aesthetic of their websites are visually richer, with more motion and interactions. These extra movements and transitions require JavaScript and libraries that significantly add to page weight and performance.
- Review feeds and social media embeds are vital for trust building and social proof with new customers, but these third-party scripts add to page weight and impact the carbon emissions produced.

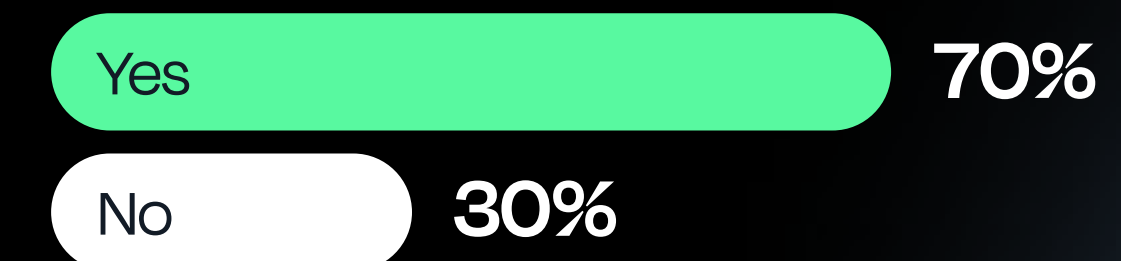
## 1.19g CO<sub>2</sub>

Average webpage emissions

**F** = Average carbon rating



## Green hosting



# Healthcare.

Our research examined websites across private healthcare, insurance, hospitals, cosmetic and dental healthcare. This is the second best industry found in our study, with only 13% of websites receiving an E or F rating.

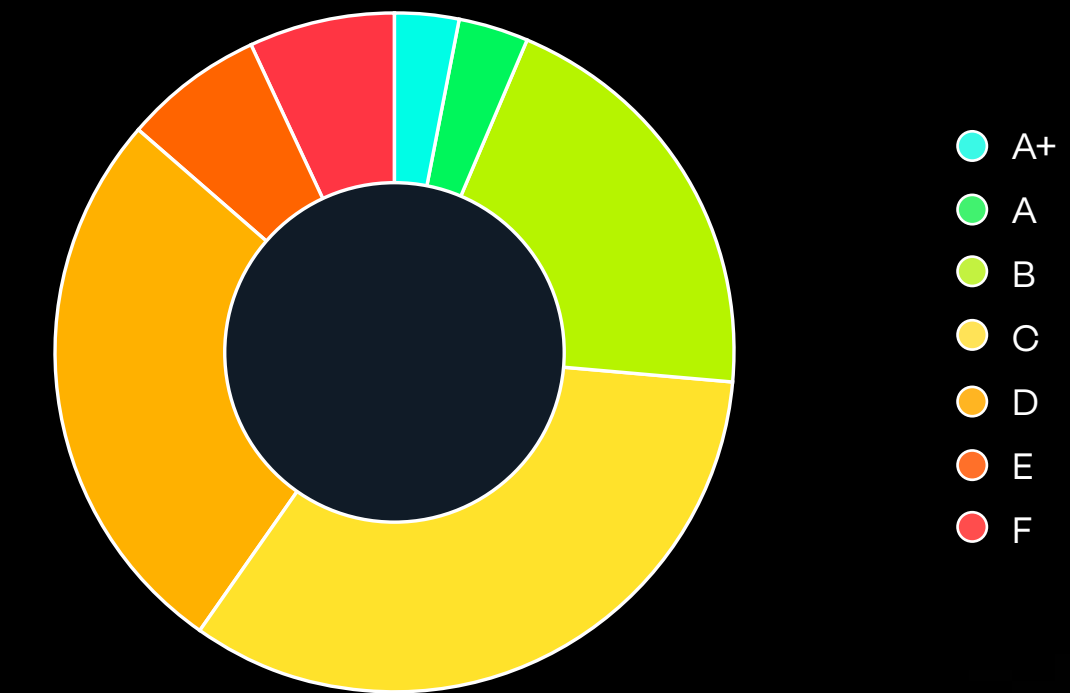
- + There is little functionality among healthcare websites which keeps them lightweight.
- + Page layouts are simple and information-led. They commonly rely on text, colour and icons to create content groupings and directional CTAs as opposed to heavy graphics and imagery.
- Almost every healthcare website in this study has a light colour palette with few dark page elements. White pixels require the most screen energy to render.
- Considering a 'dark mode' option allows visitors to switch to a darker palette. This can help reduce power consumption and extend battery life on user devices.

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## 0.45g CO2

Average webpage emissions

**C** = Average carbon rating



### Green hosting



# Higher education.

When it came to higher education, we assessed universities in the United Kingdom.

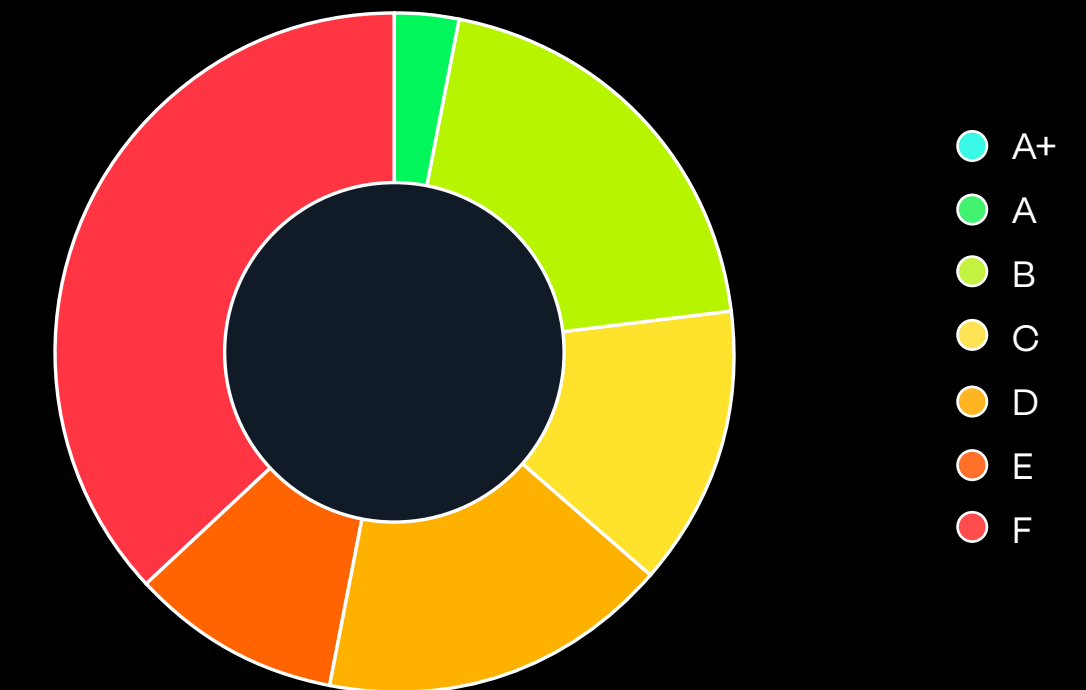
- + Higher education websites typically use simple, static pages without movement or transitions, resulting in less data transfer and lower energy consumption.
- These websites often have large sitemaps to serve diverse user groups, including applicants, students, alumni, parents, and staff. This results in extensive content and complex navigation, often leading to overcrowded layouts and bloated menus. Streamlining user journeys can reduce unnecessary page loads and improve navigation efficiency.
- Our research shows that only 13% of websites are hosted using green energy. However, 40% appear to be self-hosted by universities, which may explain why the Green Web Foundation's dataset lacks evidence that these sites run on renewable energy.

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## 0.69g CO<sub>2</sub>

Average webpage emissions

**E** = Average carbon rating



### Green hosting



# Insurance.

We assessed businesses offering various insurance types, including car, home, travel, legal, pet, life, and health. Some specialised in one area, while others provided multiple insurance options. This industry has the most efficient carbon rating overall in our study.

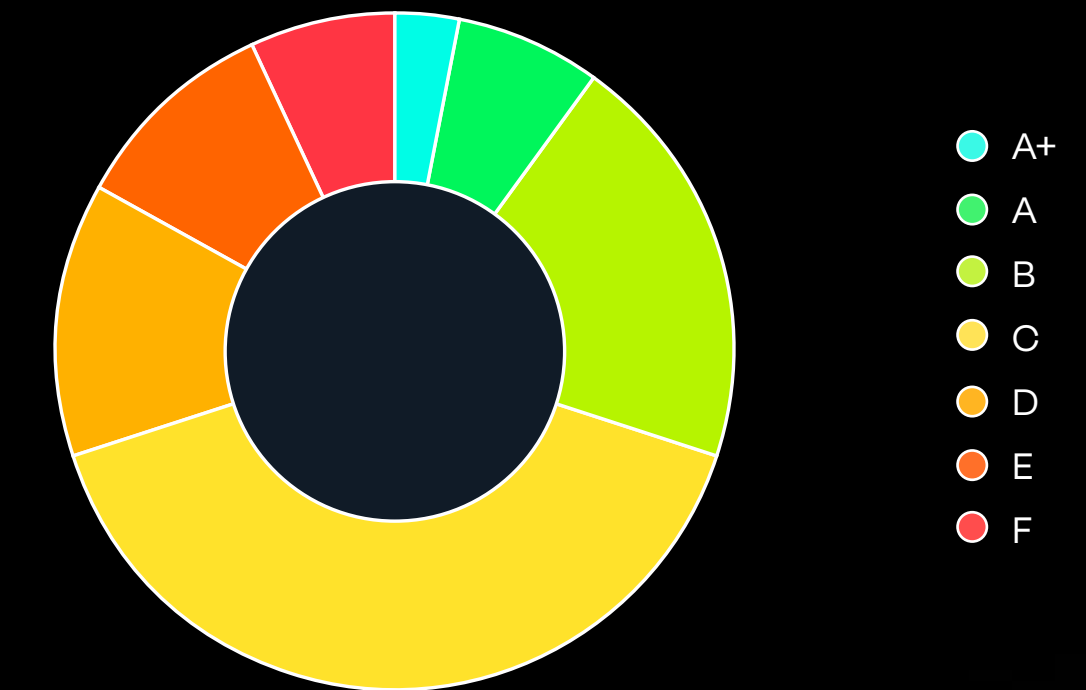
- + These information-focused sites avoid motion and interactions, resulting in simpler codebases that require less data transfer.
- + Vector illustrations and icons are commonly used which are a lightweight way to add engaging graphics to a webpage.
- This industry often has large sitemaps due to the volume of products and information. A simpler site with fewer pages reduces server load, leading to lower energy consumption.
- High use of stock photography exists on insurance websites. Evaluate whether this type of image supports the reader's understanding or if it is unnecessary data to host and load.

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## 0.44g CO<sub>2</sub>

Average webpage emissions

**C** = Average carbon rating



## Green hosting

Yes **46.7%**

No **53.3%**

# Supermarkets.

We assessed a range of supermarket chains, from local convenience stores and budget options to more premium food choices. Some websites were ecommerce, while others directed visitors to find a store.

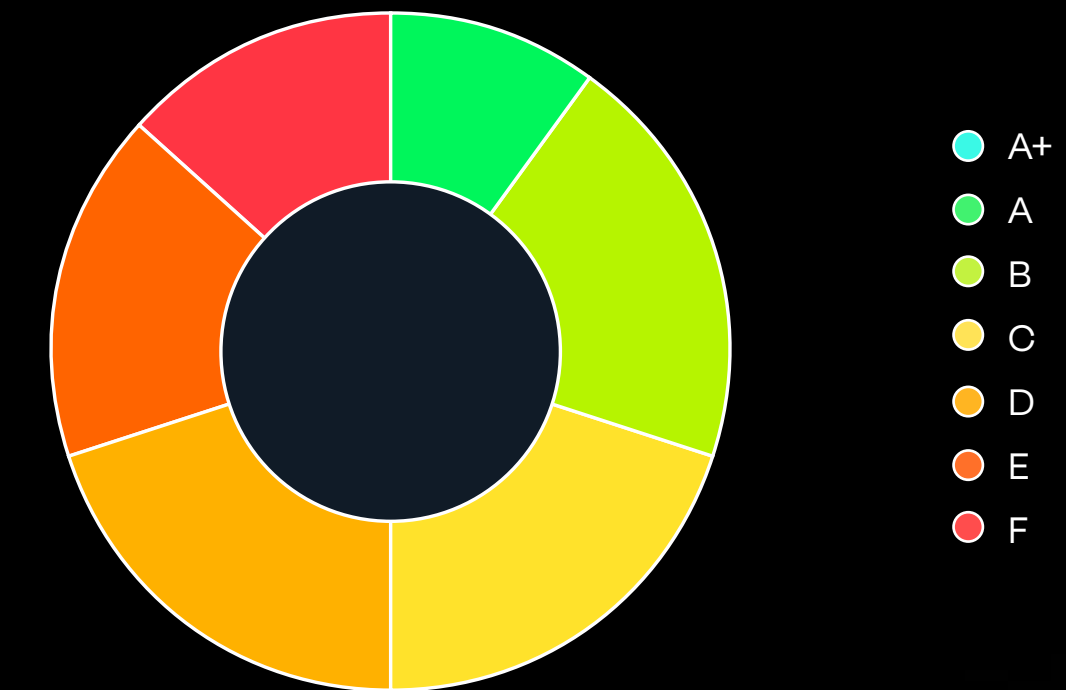
- + The better-performing supermarket websites tend to look dated and more basic in design. Their simpler code and fewer scripts result in lighter, more efficient builds.
- + Supermarket websites are task-oriented, designed to help users complete specific actions like buying products or finding a store. As a result, these sites focus on functionality rather than branding, leading to simpler designs that prioritise technical performance over rich graphics and videos.
- Carousel banner sliders are common among supermarket websites, and are often auto-animated and pre-loaded with large images, which adds extra page weight.
- Many pages display multiple deals and products, often using images to convey this written information. This approach is neither accessible nor lightweight.

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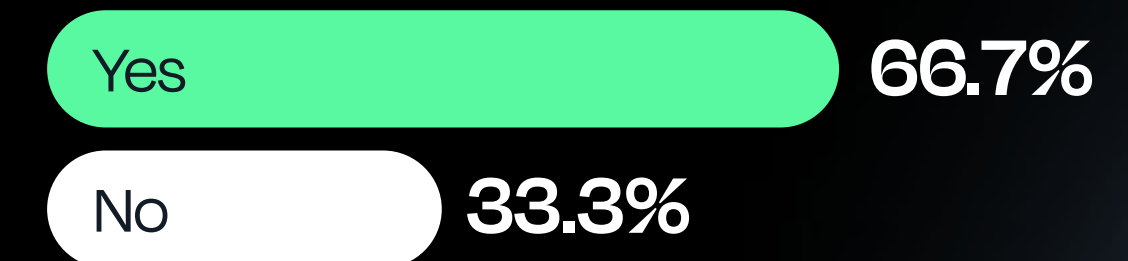
## 0.53g CO2

Average webpage emissions

**D** = Average carbon rating



### Green hosting



# Utilities.

We assessed a range of businesses across electricity, gas and water utilities. Our study includes some renewable energy companies too.

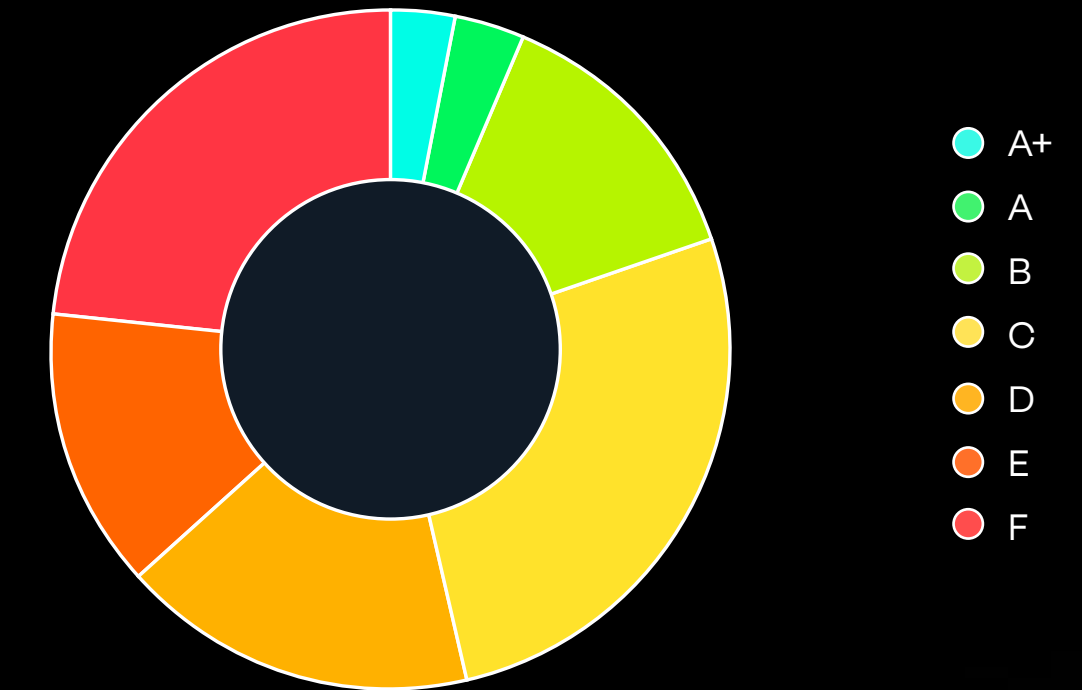
- + The use of video, images and movement is kept to a minimum on these websites, opting for cleaner and more functional designs.
- + Minimalist designs often mean less on the page, less data to load and less time spent viewing it.
- Utility websites commonly have large help sections, account areas, accessibility tools, quote tools, personal and business content, and live updates. This extensive content and functionality contributes to larger page loads and higher CO2 impact.
- Less than half the websites tested use green hosting providers. Considering that many utility companies offer green tariffs you might expect this to be higher.

[→ Explore best practices for digital carbon reduction](#)

## 0.64g CO2

Average webpage emissions

**D** = Average carbon rating



### Green hosting



# Conclusion.

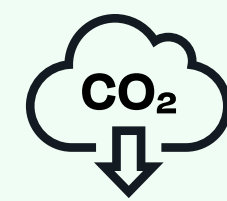
By taking a more considered approach to web design and development, we can make some serious reductions to the digital carbon footprint of our websites.

Let's look at  
why and how...

# Why improve website sustainability.

By designing with sustainability in mind, we're able to create carbon-conscious websites that reduce energy consumption but also improve performance, speed, and accessibility.

This means more people of diverse abilities, cultures, and backgrounds can access and use your website worldwide. For example, optimising web pages for faster loading times can improve accessibility for users with slower internet connections or limited data plans.



Reduced carbon emissions



Faster page speeds and performance



More accessible and inclusive to all



Higher search rankings



Better user experience



Improved conversion rates



# Best practices.

Tools and techniques to impact a website's carbon footprint.

## Take a minimalist approach

If in doubt, leave it out. Thinking minimally about what deserves to be on the page. Does a piece of content serve a purpose? Does it help your readers understand? Remember that less on the page means less data to load and less time spent viewing it.

## Streamline user journeys

Helping users find the information they need more quickly and avoiding unnecessary back-and-forth navigation reduces needless page loads and time spent on a website.

## Optimise web typography

Small changes with typography create incremental improvements. Using fewer fonts and weights, converting files to WOFF, removing unnecessary characters, and self-hosting fonts all contribute to better optimisation.

Continued...

## Tools and techniques to impact a website's carbon footprint.

### Colour and screen energy

When it comes to colour palettes, dark colours are more energy-efficient, while popular shades like blue consume more energy than green or red. Limiting colour variation in images helps reduce file size, page load time and overall page weight.

### Media optimisation

To speed up your site, use fewer images when possible and choose vector illustrations or icons instead of photos. Make sure images are properly sized and compressed, and choose web-friendly formats like WebP and AVIF. Developers can set up automatic image conversion to keep things optimised.

### Mindful motion and less video

Motion brings brands to life beyond static experiences. Use it intentionally, avoiding autoplay so videos play only when visible or interacted with. Opt for lightweight frameworks like Vanilla JS, Alpine.js, LottieFiles or Rive for lightweight, scalable animations.

### Static page caching

Pre-generate static versions of your website so that each page doesn't have to be transferred and rendered from scratch each time it is loaded.

### Reduced server requests

Every time your page makes a server request, energy is required to transfer and display data. Using HTTP/2 allows browsers to issue parallel requests.

### Green hosting

Choosing a hosting provider that powers its servers and data centres with renewable energy is one of the most important choices you can make to reduce your website's environmental impact.



## We're proud partners of Digital Carbon Online.

Every web page generates carbon emissions. Individually, these might be small, yet across an entire website, they add up to something much more significant that grows with your online traffic.

Designed to help organisations understand and reduce the environmental impact of their websites, Digital Carbon Online's unique methodology provides a carbon footprint range for each page and an entire website over time.

### This helps to:

- Automatically map the carbon footprint of every viewed page on your website.
- Assess which pages emit the most carbon and prioritise optimisation for CO2 reductions.
- Easily sponsor trusted, effective and near-term carbon removal projects to offset emissions.
- Collect data to fulfil regulatory and customer-driven carbon and Scope 3 reporting obligations.

For a more sustainable digital future.

[digitalcarbon.online](https://digitalcarbon.online)



# Abstrakt

Abstrakt is a web design and development agency with a purposeful approach to crafting websites.

As a Certified B Corporation, we're counted among businesses that are leading a global movement for an inclusive, equitable, and regenerative economy. It's important to us as professionals and as people, to use our business as a force for good and to leave the planet and future generations better off.

We're committed to reducing our carbon footprint, working toward net zero and implementing change business-wide. It's a journey and an education, but we're all on board for a new era in responsible business.

Digital sustainability is one piece of the puzzle. As a digital agency, it's our responsibility to help create a greener web, by raising awareness and educating businesses about the impact of their online presence, and providing actionable strategies they can implement to lower their digital carbon footprint.

Small changes make a big difference when they happen at scale, and we're excited to be part of the charge of creating an equitable and sustainable future for everyone.

Let's make an impact together.

[weareabstrakt.com](https://weareabstrakt.com)



## Data & Due Diligence Statement.

This report has been prepared with due diligence to ensure accuracy, clarity, and completeness. All data was collated between 6th September and 1st October 2024, using the best available methodologies at the time of analysis.

To further enhance the reliability of this report, it has been peer-reviewed by Digital Carbon Online, a leading professional in understanding the CO2 emissions of entire websites. Their expert feedback was considered and incorporated where applicable to strengthen the findings presented.

While every effort has been made to validate the information provided, the views and conclusions expressed remain those of the team at Abstrakt and were believed to be true at the time of creation. However, as data sources, methodologies, and industry standards continue to evolve, the accuracy and relevance of the findings may be subject to change.

Abstrakt acknowledges that all research is subject to inherent biases, including but not limited to data availability, methodology selection, and interpretation of findings. While steps have been taken to minimise bias, complete objectivity cannot be guaranteed. Readers are encouraged to conduct their own due diligence, consider alternative perspectives, and consult additional sources where necessary.

Abstrakt assumes no liability for any decisions or actions taken based on the contents of this report.