Decarbonising the planet, one Umbraco upgrade at a time

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Hi, I'm Rick 👋

Development Team Lead
at Nexer Digital

Umbraco Sustainability Community Team

Umbraco MVP

UMBRACO MVP

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A human-centred research, design and development company that designs digital products and services that help people live and work better.

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Sustainability

Sustainability is a big deal, right?

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3.7%

NEXXER

The carbon footprint of our gadgets, the internet and the systems supporting them account for about **3.7%** of global greenhouse emissions, according to some estimates. It is **similar to the amount produced by the airline industry globally**... and these emissions are predicted to **double by 2025**.

Source: https://www.bbc.com/future/article/20200305-why-your-internet-habits-are-not-as-clean-as-you-think

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”

If the Internet was a country, it would be the **4th largest polluter.**

Source: https://www.sustainablewebmanifesto.com

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Carbon emissions based on usage

52%
consumer device use

14%
network use

15%
data centre use

19%
hardware production

Source: https://sustainablewebdesign.org/calculating-digital-emissions/

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Carbon emissions based on usage

14%

network use

15%

data centre use

Source: https://sustainablewebdesign.org/calculating-digital-emissions/

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We started a **sustainability journey** as a company at the end of 2021, **launching our own sustainability strategy** in September 2022.

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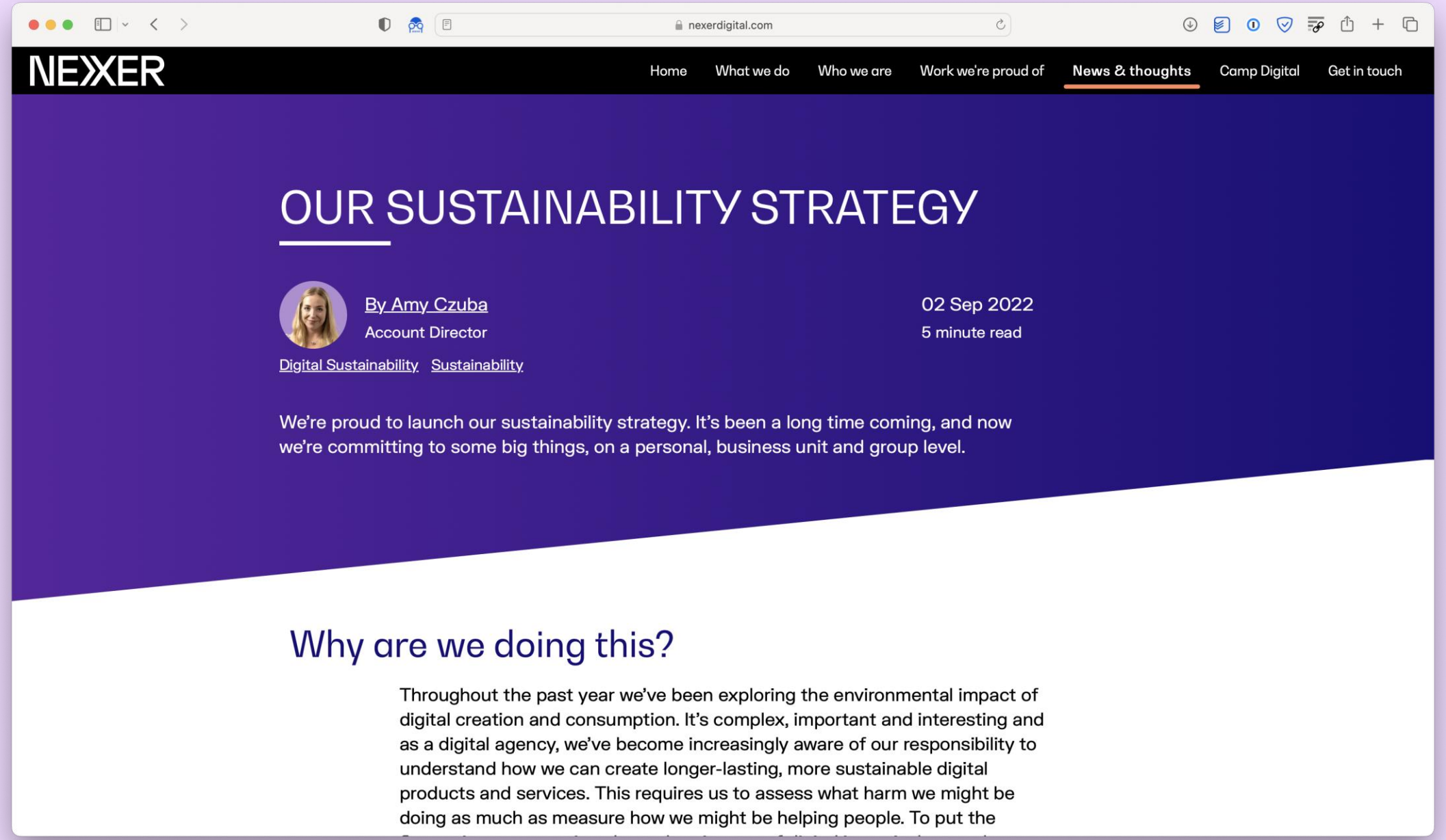
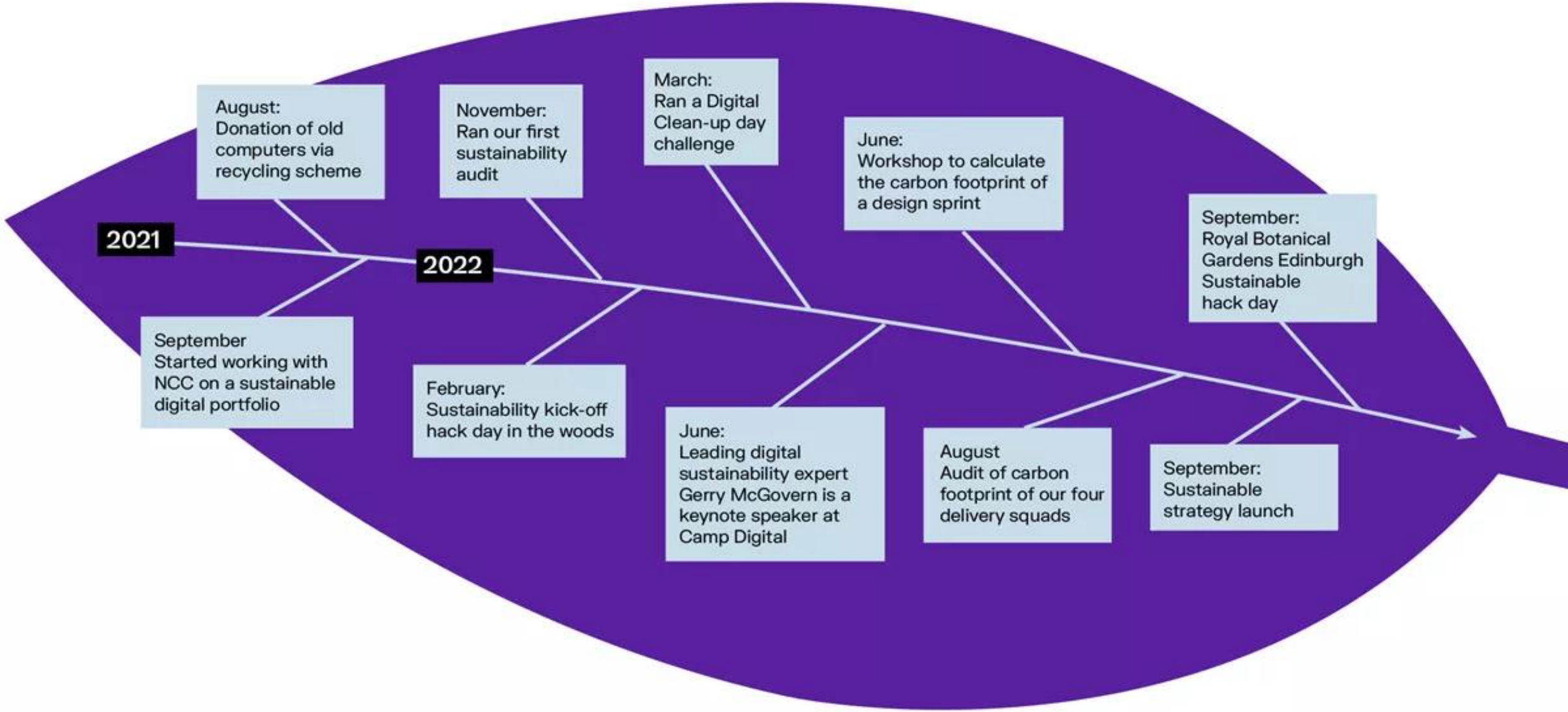


Source: https://www.nexerdigital.com/news-and-thoughts/our-sustainability-strategy/

NEXER


2021
2022
August:
Donation of old computers via recycling scheme
November:
Ran our first sustainability audit
March:
Ran a Digital Clean-up day challenge
June:
Workshop to calculate the carbon footprint of a design sprint
September:
Royal Botanical Gardens Edinburgh Sustainable hack day
September
Started working with NCC on a sustainable digital portfolio
February:
Sustainability kick-off hack day in the woods
June:
Leading digital sustainability expert Gerry McGovern is a keynote speaker at Camp Digital
August
Audit of carbon footprint of our four delivery squads
September:
Sustainable strategy launch

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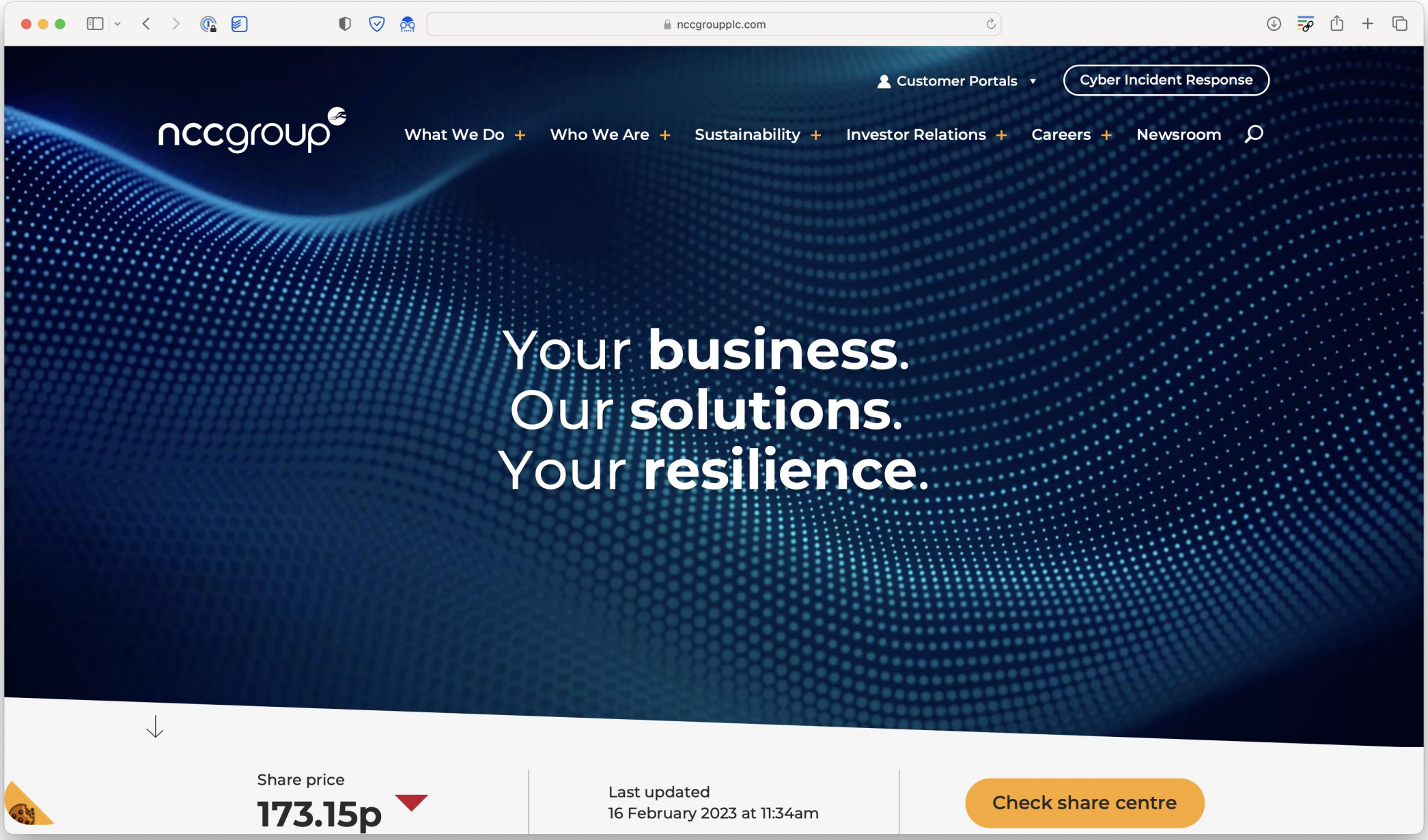

Source: https://www.nccgroupplc.com

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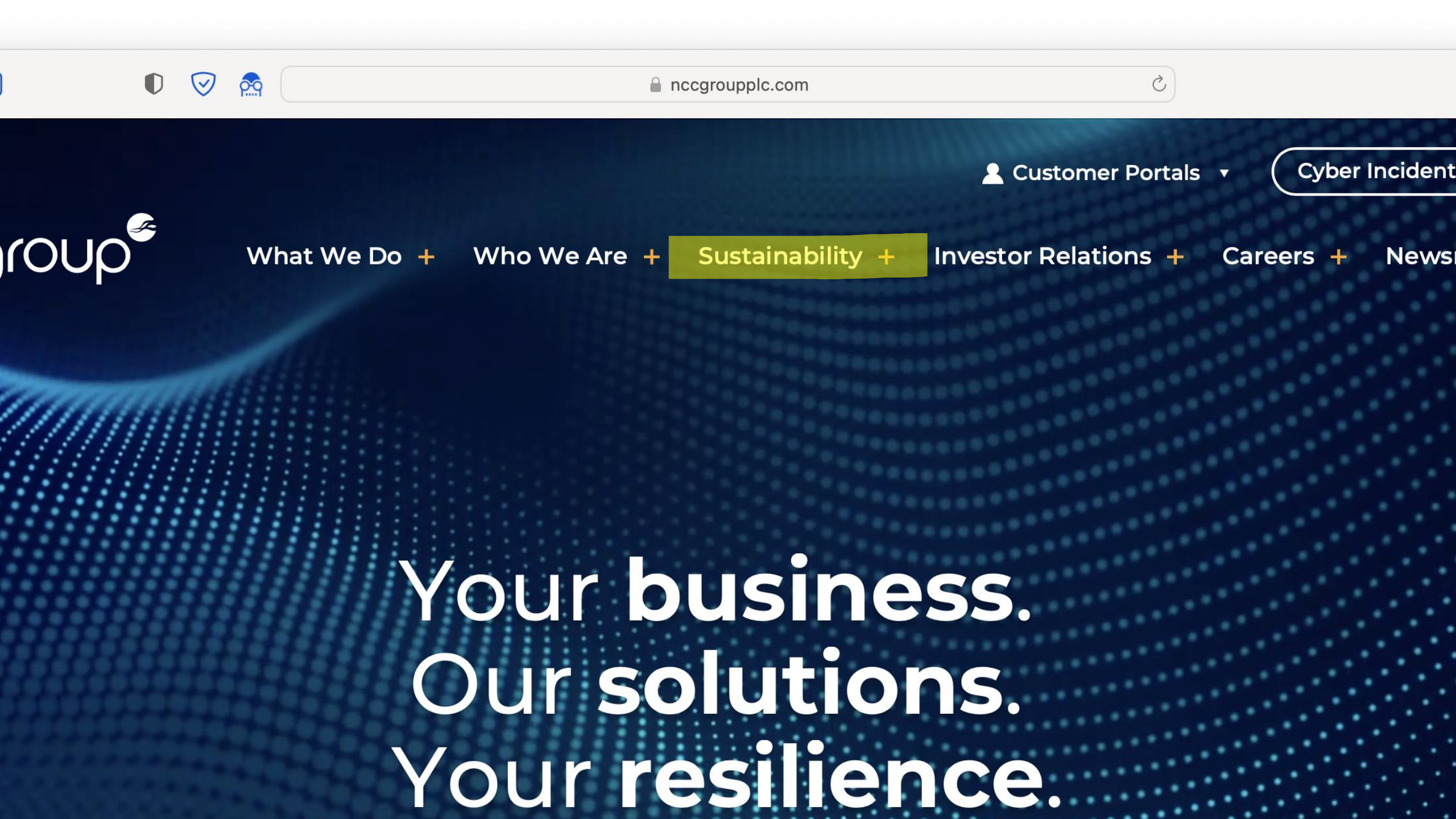
nccgroupplc.com
Customer Portals
Cyber Incident
What We Do +
Who We Are +
Sustainability +
Investor Relations +
Careers +
Your business.
Our solutions.
Your resilience.

At the beginning of 2022, we proposed a roadmap of **work focused on sustainability**.

umbraco

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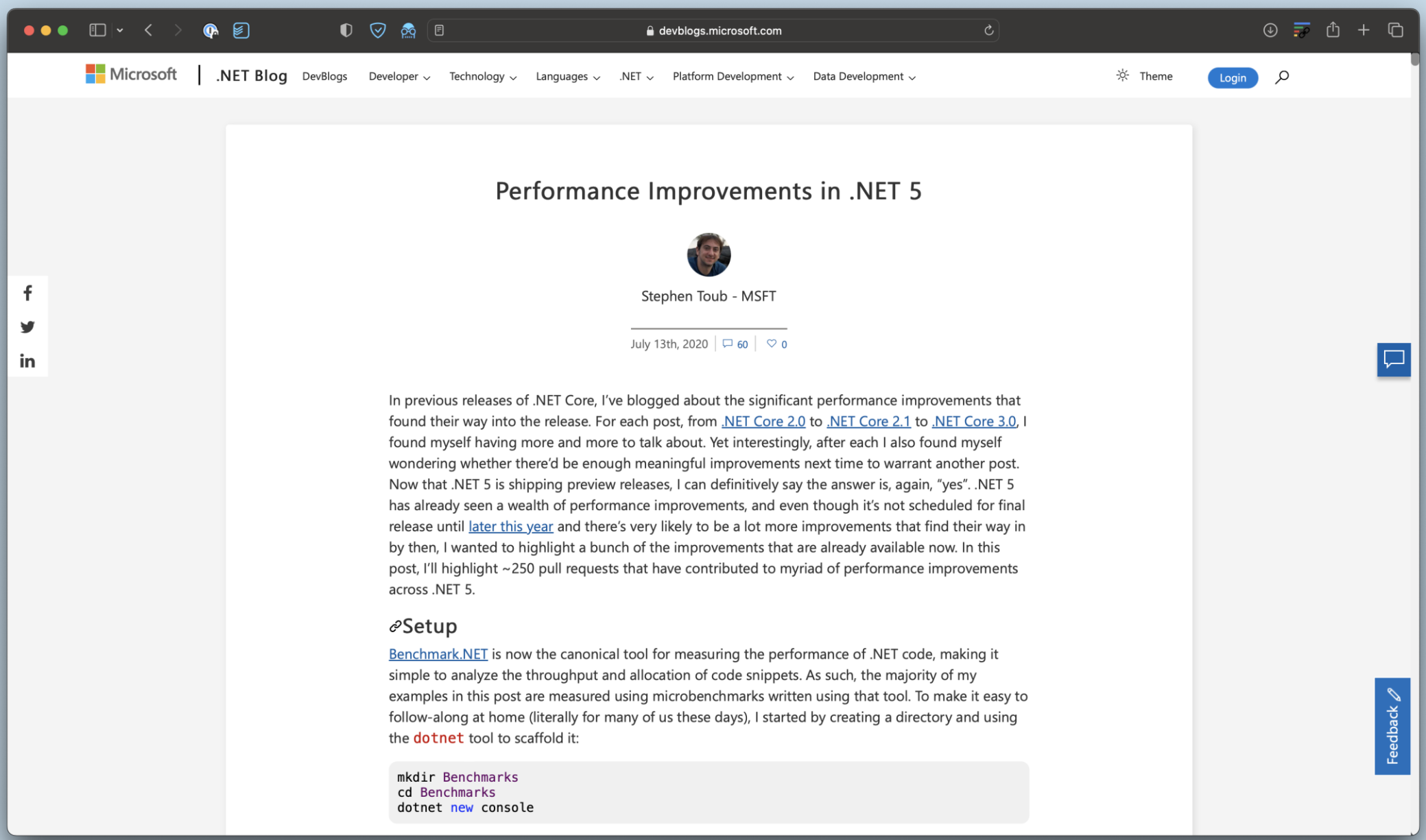

Source: https://devblogs.microsoft.com/dotnet/performance-improvements-in-net-5/

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rickbutterfield.dev

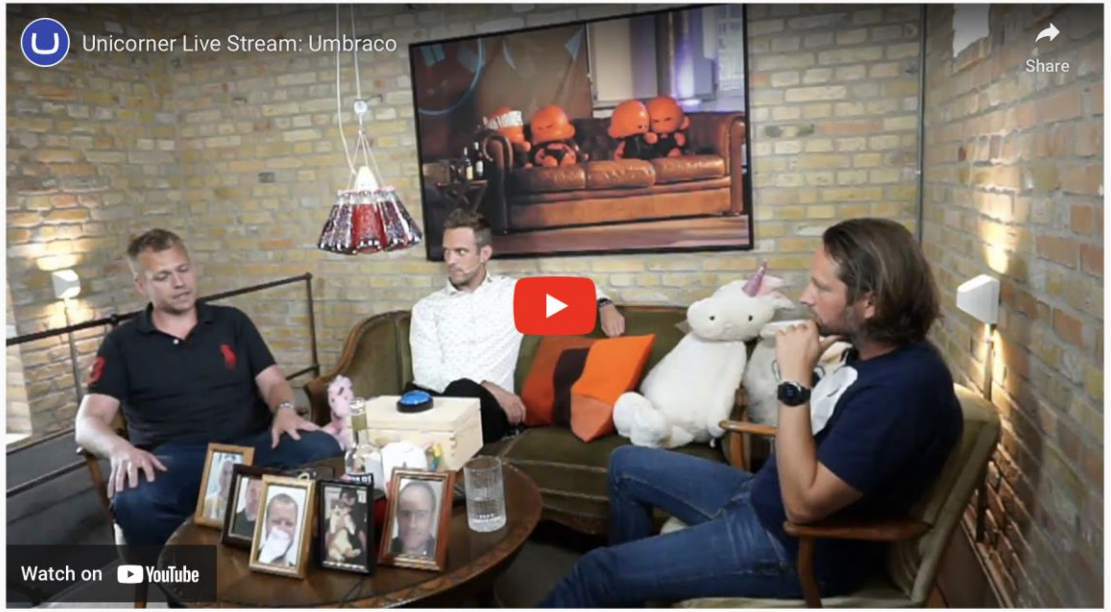
Rick Butterfield

About Blog Speaking

Umbraco Unicore first impressions

5 SEPT 2020 | 4 MINUTES TO READ

On Thursday 3rd September, Umbraco HQ announced the first alpha of Unicore, Umbraco v8 running on .NET Core!



What is Unicore?

Unicore is Umbraco's project to get the CMS running on .NET Core. As mentioned in the live stream, the first commits happened in November last year, and they reckon they're about half way through the project as a whole.

Source: https://rickbutterfield.dev/blog/umbraco-unicore-impressions/

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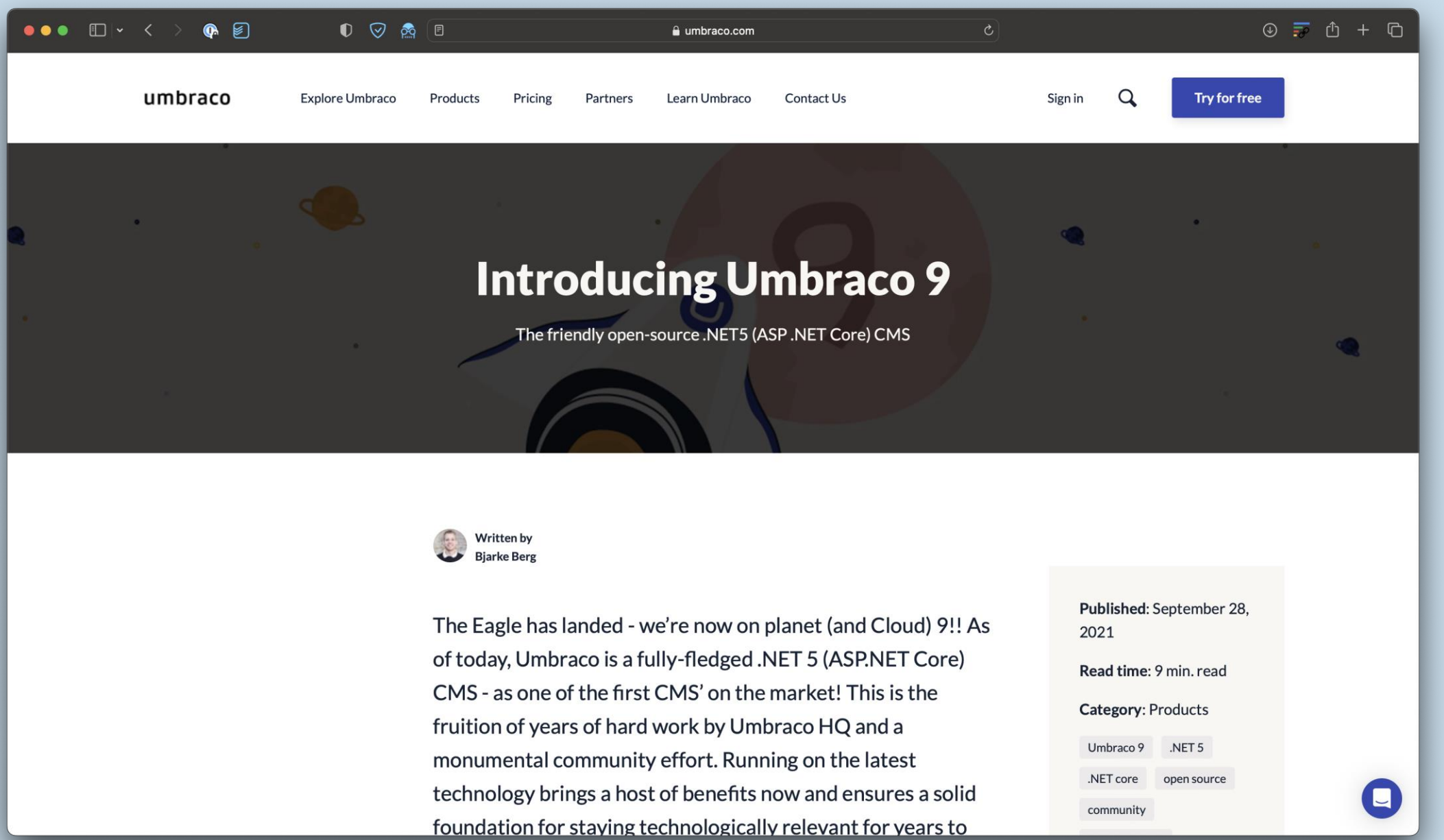

Source: https://umbraco.com/blog/umbraco-9-release/

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> Due to the noticeable performance gains in the new framework, you should see your new Umbraco projects be even faster, less resource-intensive, and more scalable.

Source: https://umbraco.com/blog/umbraco-9-release/

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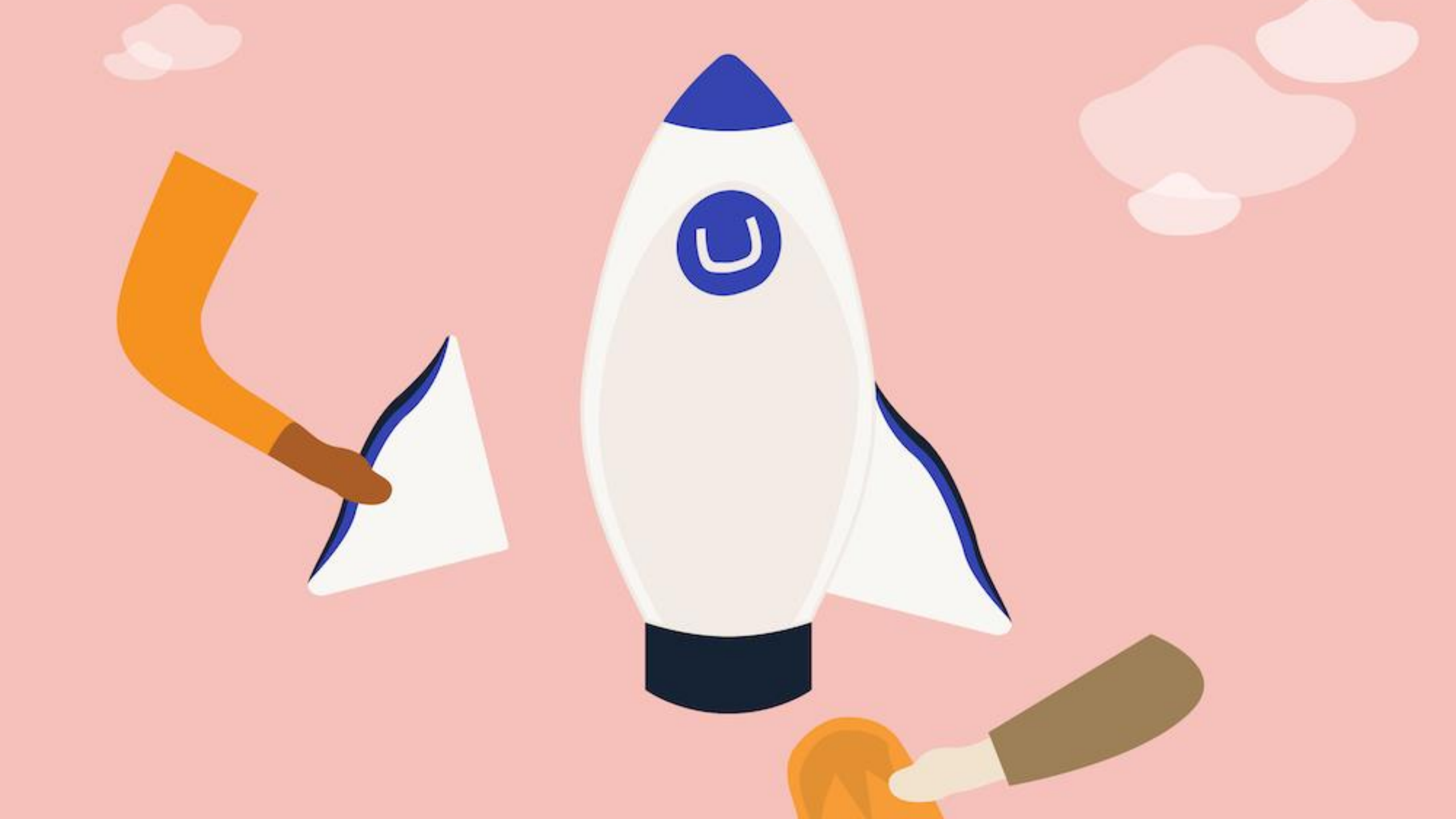

Around the same time other people were **benchmarking performance of Umbraco versions 8 and 9**.

P2V2 Test Results

P2V2	v8 Windows	v9 Windows	v9 Linux
Requests Made	1,095,495	1,493,398	1,441,666
HTTP Failures	0	0	0
Peak RPS	465.86	936.43	851.14
Avg Response Time (ms)	406	30	67
Estimated Price per month	£ 217.63	£ 217.63	£ 120.24

Source: https://www.youtube.com/watch?v=ITKF6S3zwqw

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Everything was pointing towards double the performance, so we posed the question...
what could this mean for carbon usage?

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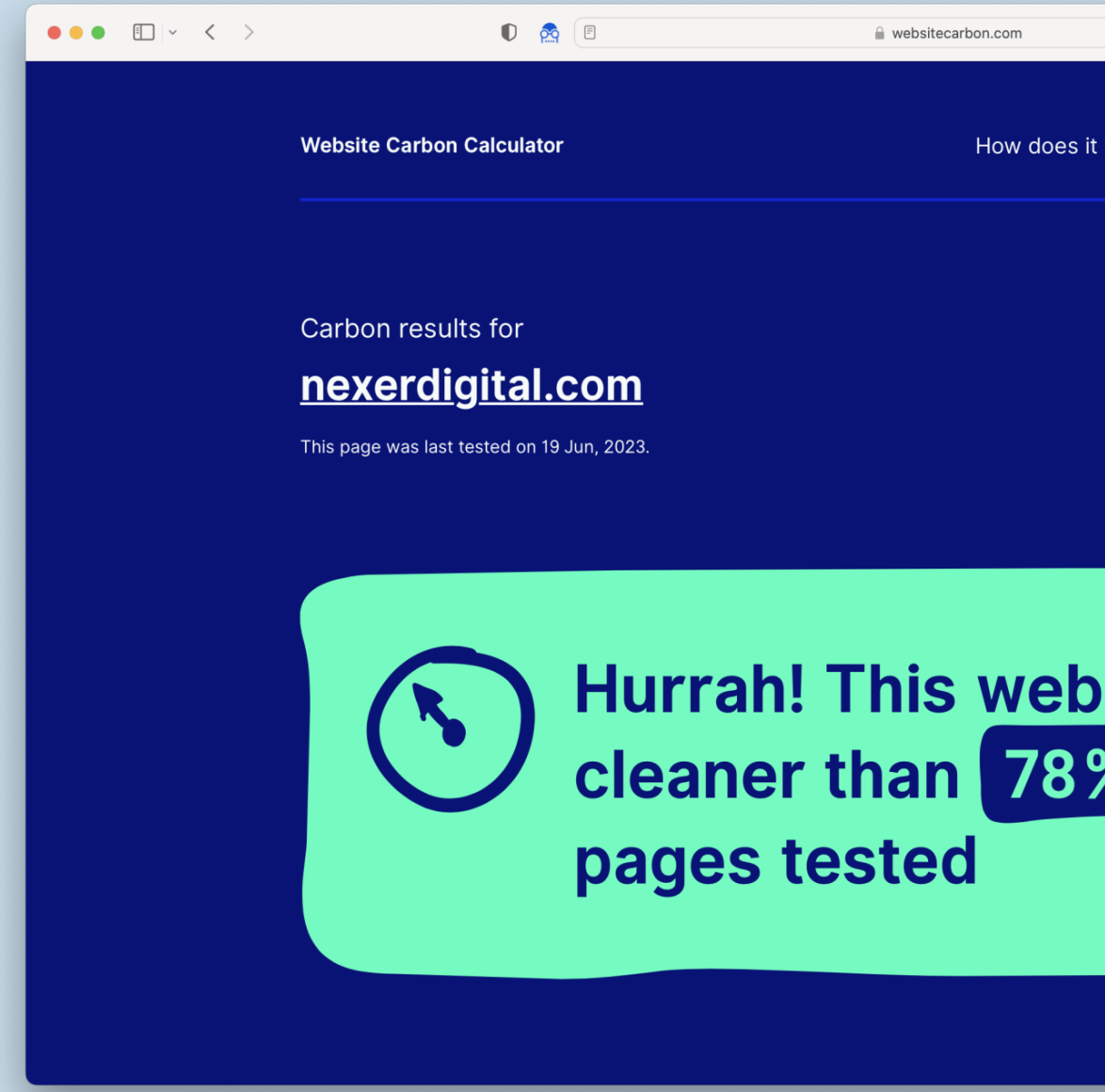
Using the **Website Carbon Calculator** tool by Wholegrain Digital, we reviewed 8 of the top landing pages and in page size, according to Google Analytics.



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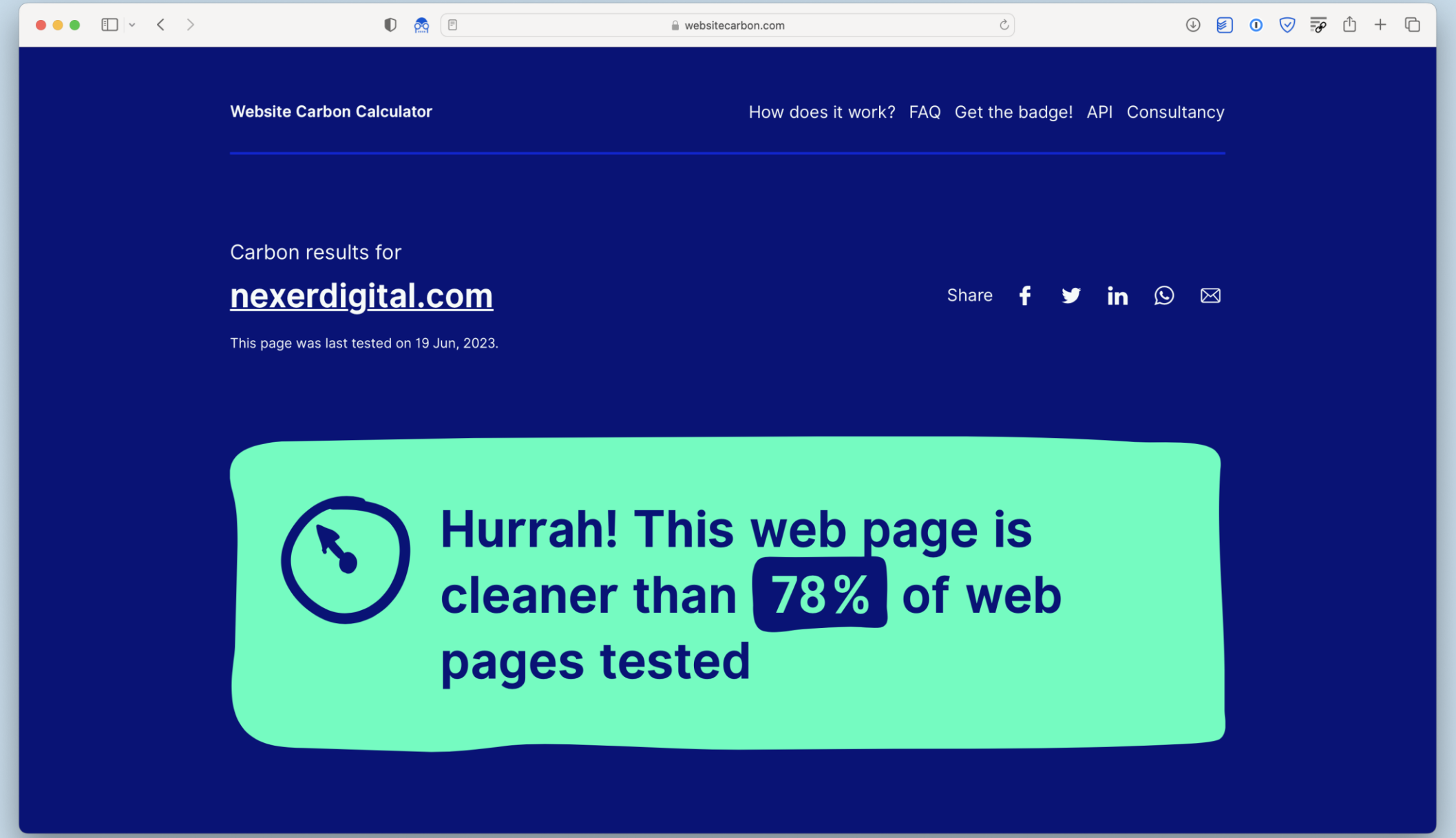

Source: https://www.websitecarbon.com/website/nexerdigital-com/

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Source: https://www.websitecarbon.com/website/nexerdigital-com/

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Our Approach

Umbraco upgrade

Azure resource decommissioning

Carbon usage tracking

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Easy, right?!

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1 UMBRACO 9 UPGRADE GUIDE

2 STEP BY STEP GUIDE

3 PREREQUISITES

4 CREATING A NEW SOLUTION

5 V8 TO V9 MIGRATION

6 UPGRADE THE DATABASE

UMBRACO 9 UPGRADE GUIDE

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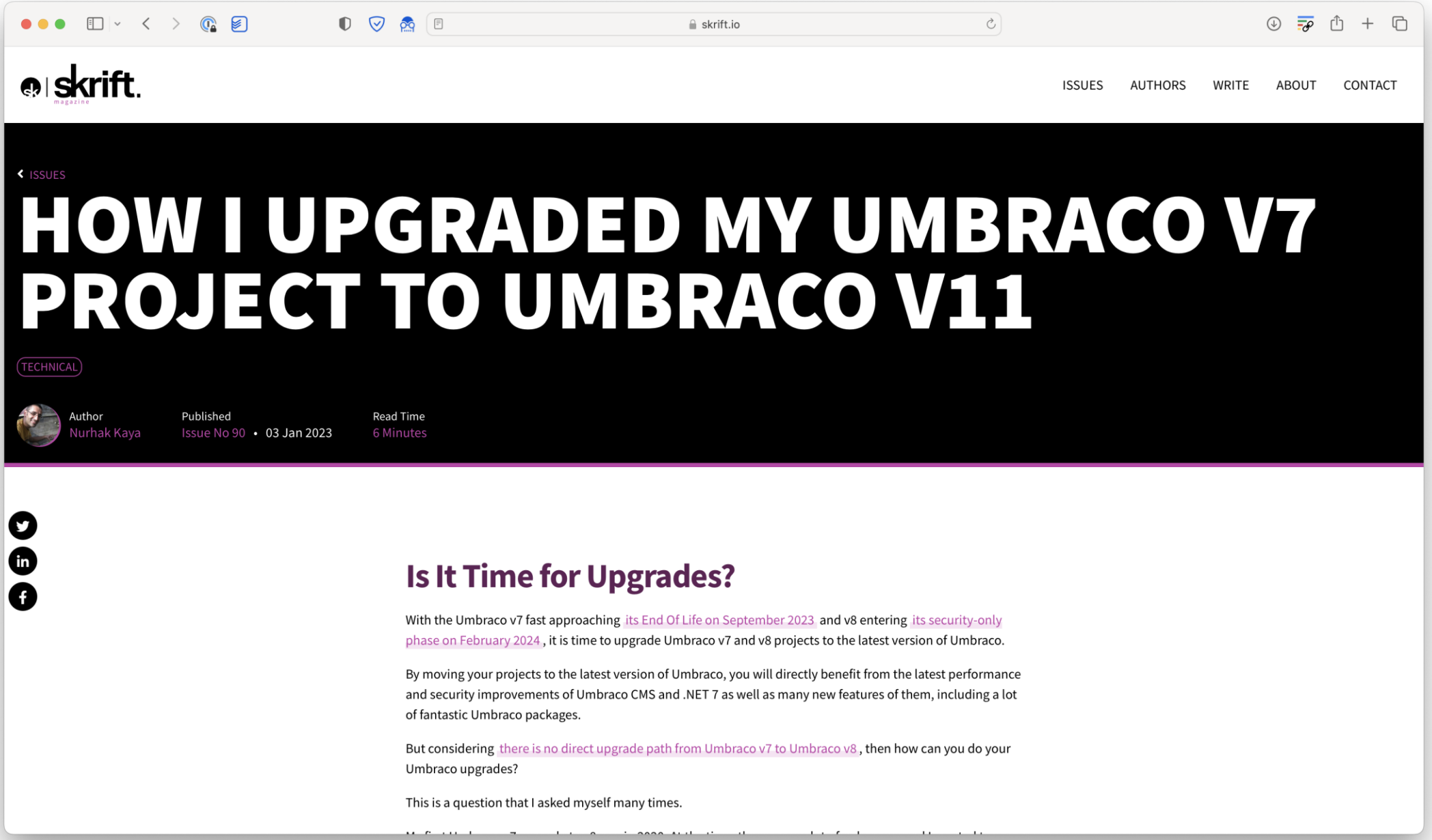

Source: https://skrift.io/issues/how-i-upgraded-my-umbraco-v7-project-to-umbraco-v11/

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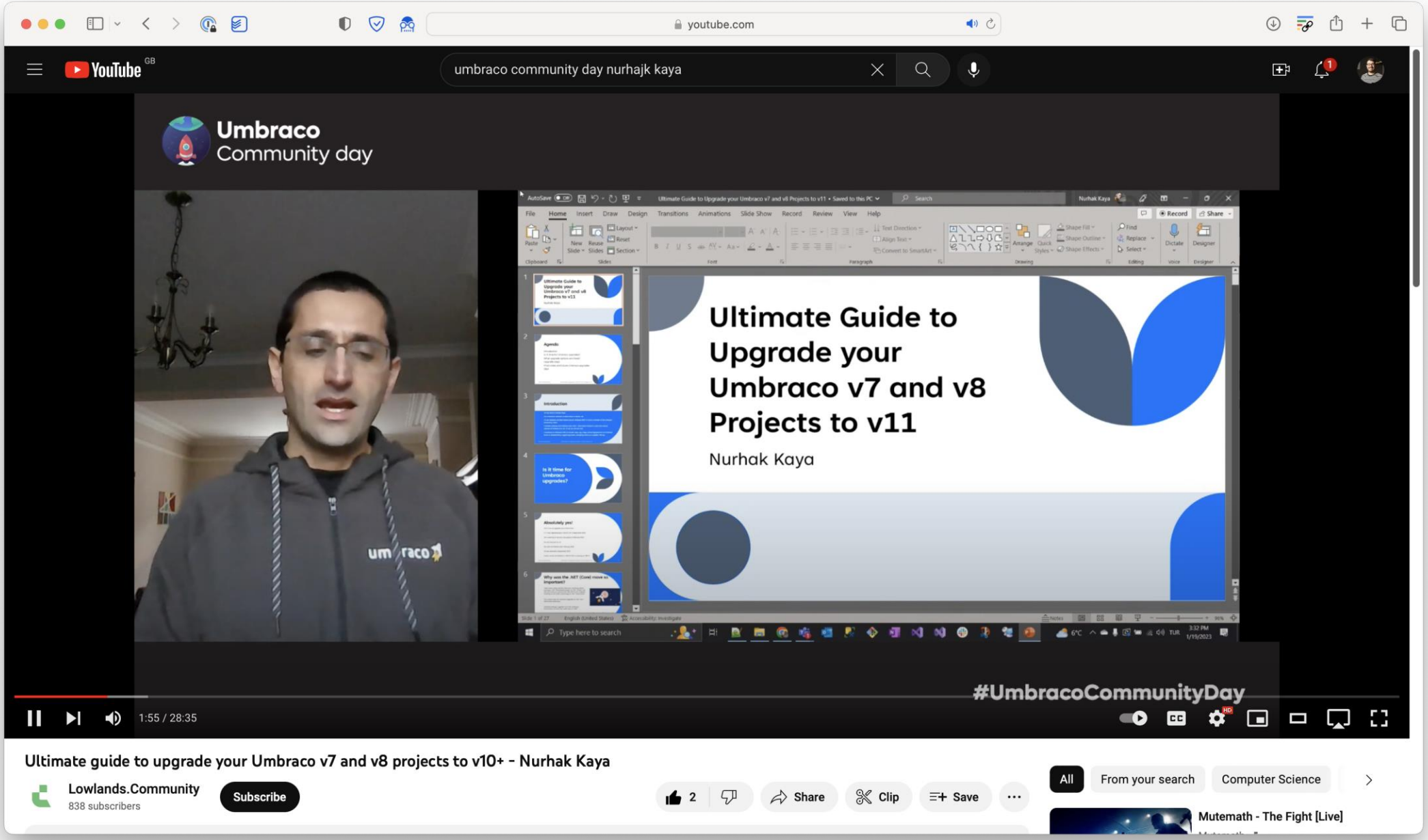

Source: https://www.youtube.com/watch?v=Ok9OaSwK3OI

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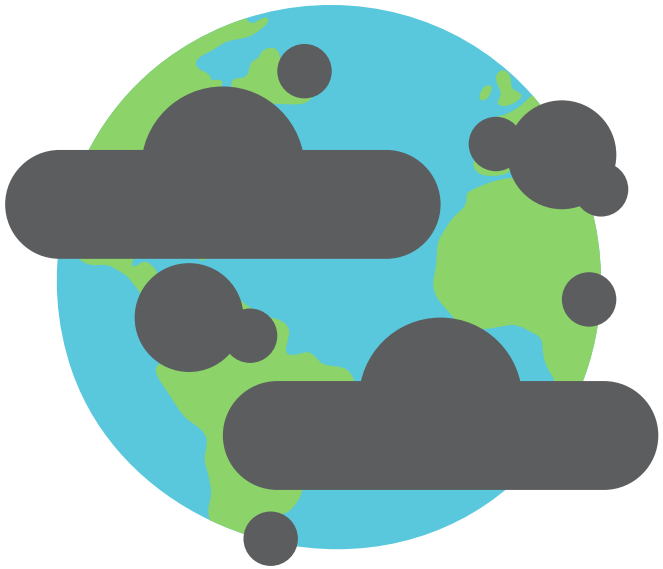
THE RESULTS
DRIVE
REVOLUTIONARY
MINDSHARE.
How to Lead a
Healthier Life
NEXER

NCC Group homepage

CO_2 produced per page view

April 2022

0.57g



September 2022

0.24g

Reduced by

58%

NEXER

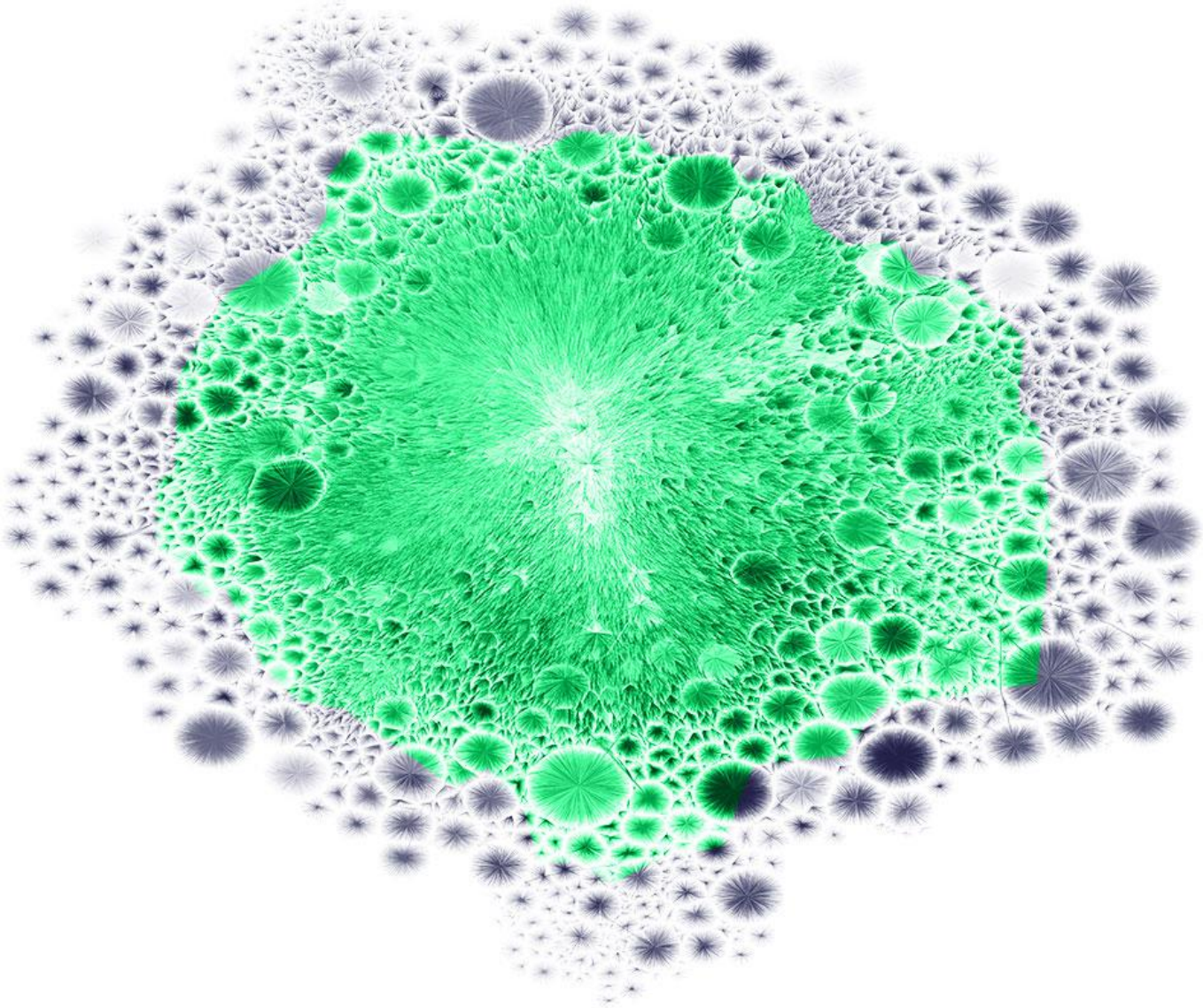
NCC Group homepage

Now cleaner than

74%

of all web pages tested
with the Carbon Calculator

66% cleaner in April 2022

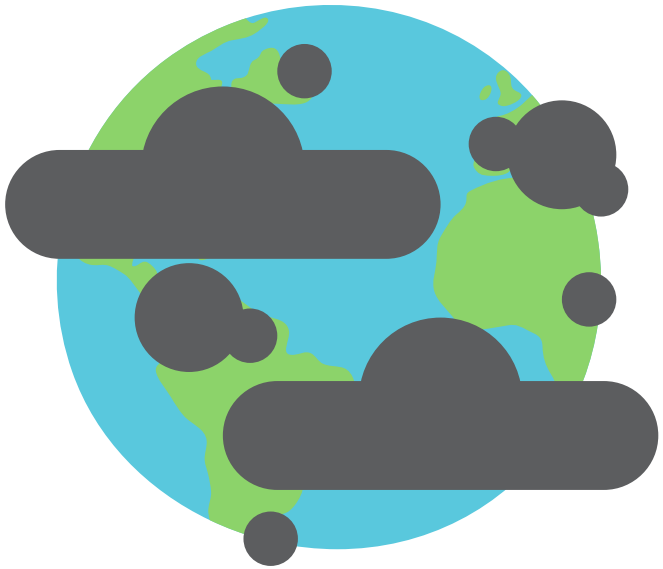


Visible landing page (Singapore)

CO_2 produced per page view

April 2022

3.5g



September 2022

1.75g

Reduced by

50%

NEXER

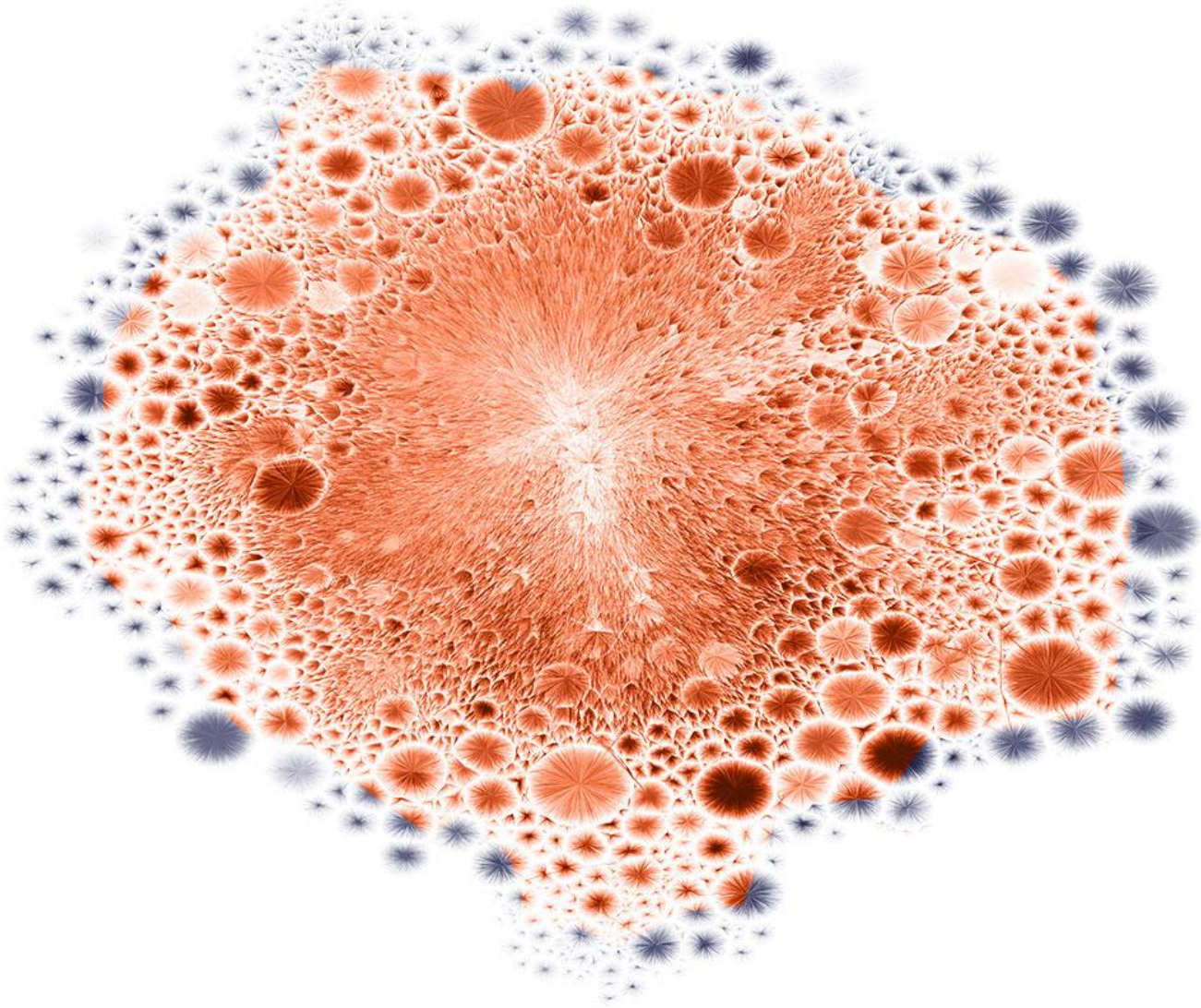
Visible landing page (Singapore)

Now dirtier than

87%

of all web pages tested
with the Carbon Calculator

89% dirtier in April 2022

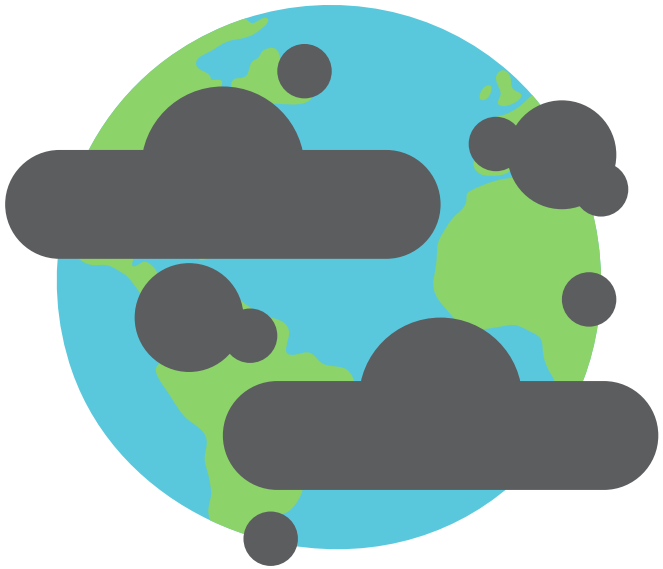


Remediate service page (UK)

CO_2 produced per page view

April 2022

1.77g



September 2022

0.98g

Reduced by

45%

NEXER

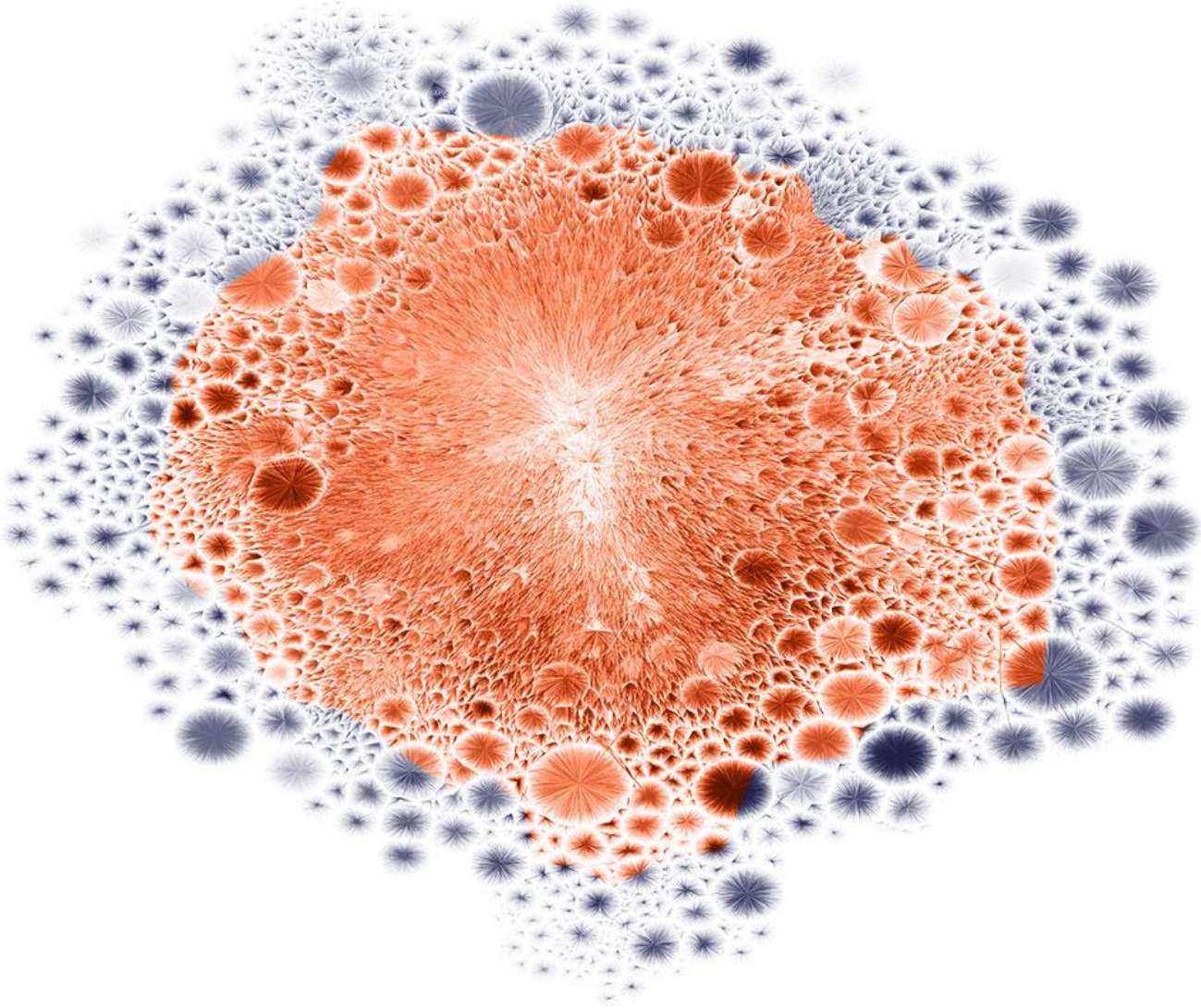
Remediate service page (UK)

Now dirtier than

75%

of all web pages tested
with the Carbon Calculator

72% dirtier in April 2022

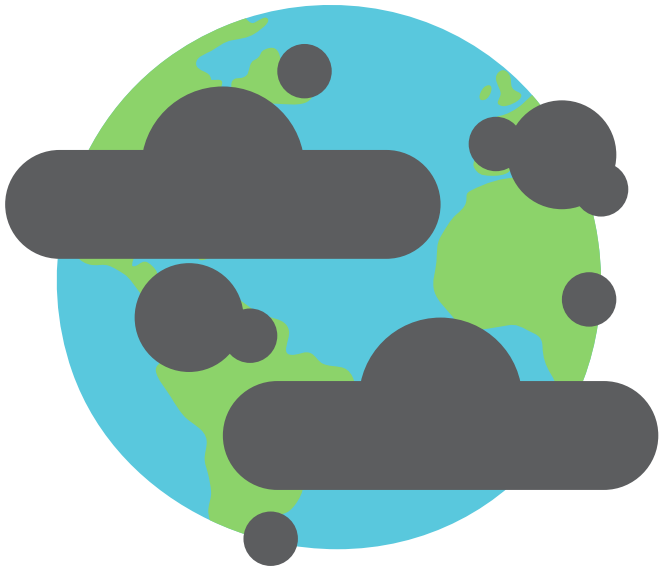


Finance and professional services (UK)

CO_2 produced per page view

April 2022

1.01g



September 2022

0.4g

Reduced by

61%

NEXER

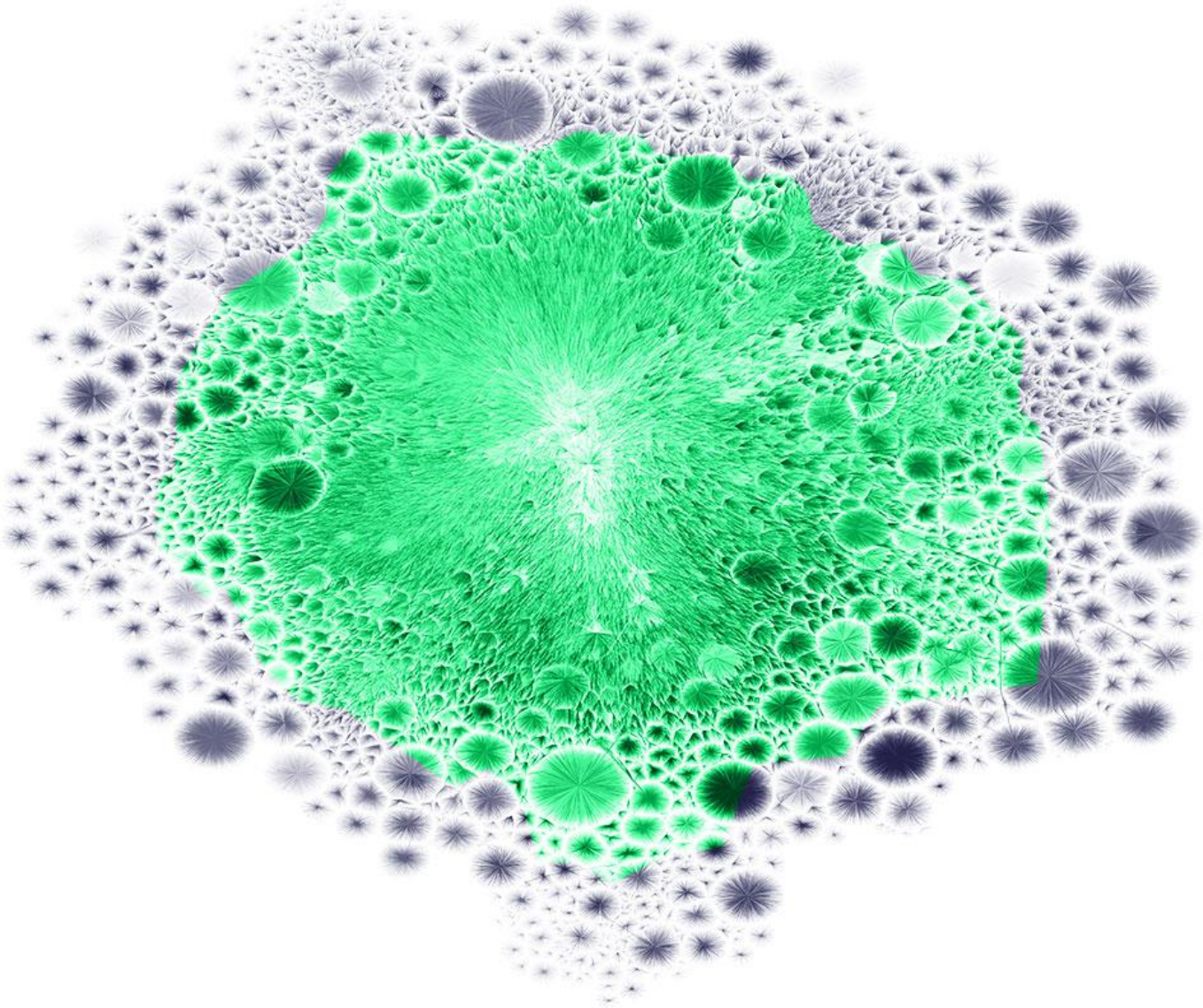
Finance and professional services (UK)

Now cleaner than

58%

of all web pages tested
with the Carbon Calculator

53% dirtier in April 2022

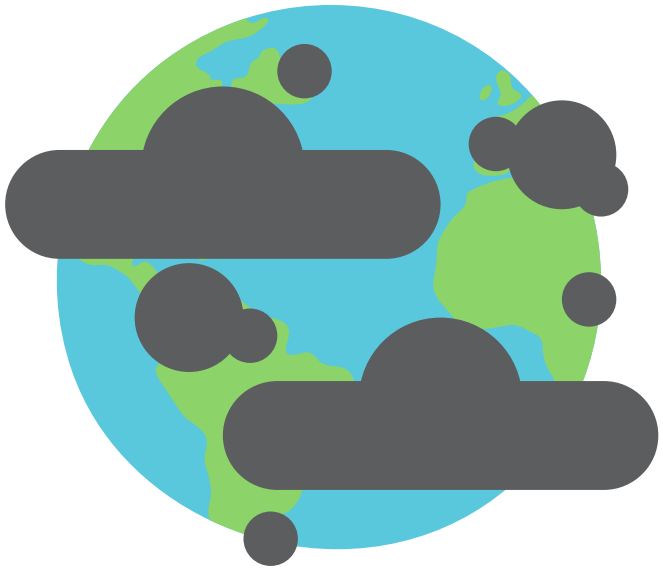


Webinar: Whitebox pentesting page (UK)

CO_2 produced per page view

April 2022

0.99g



September 2022

0.49g

Reduced by

51%

NEXER

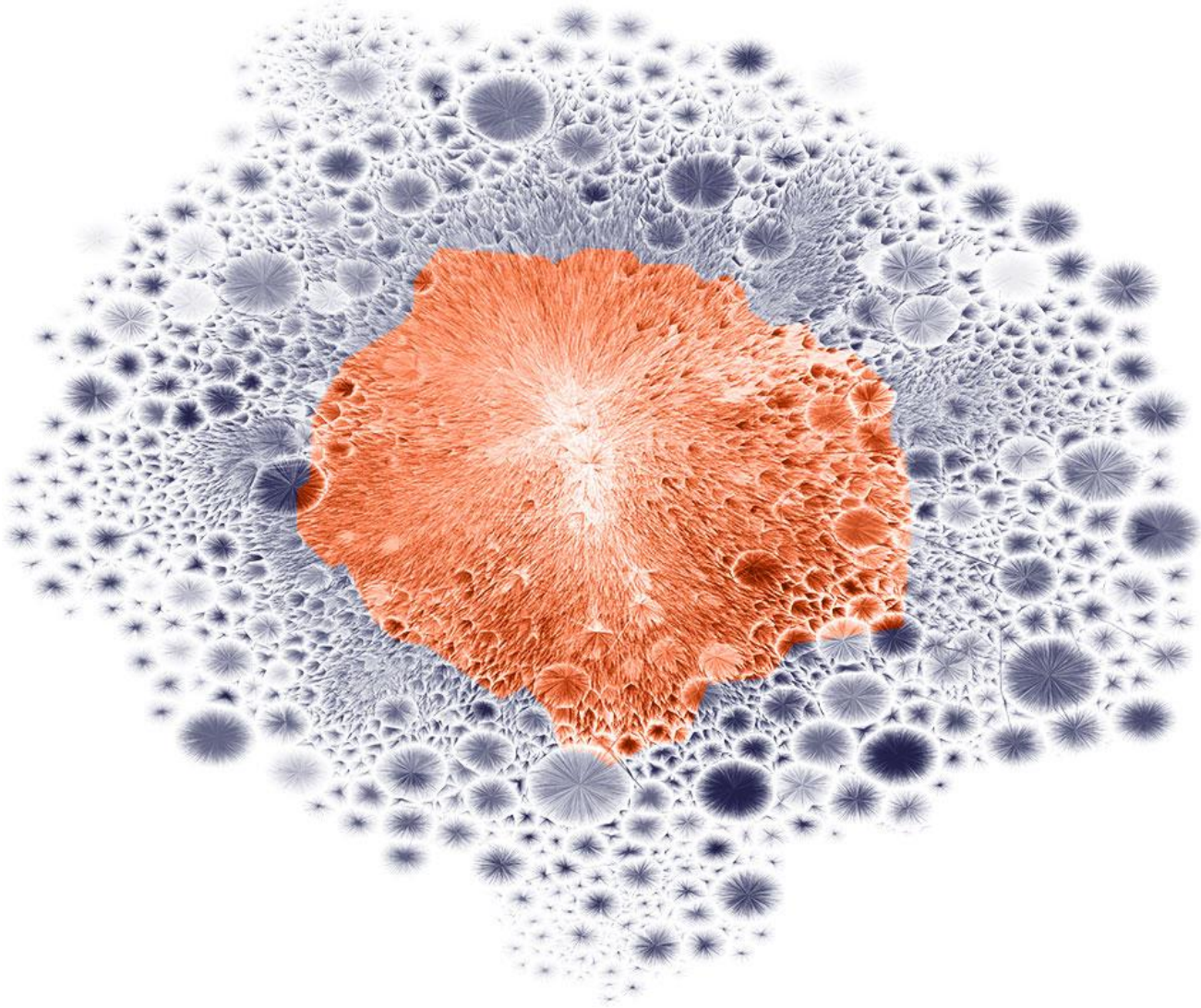
Webinar: Whitebox pentesting page (UK)

Now dirtier than

51%

of all web pages tested
with the Carbon Calculator

52% dirtier in April 2022

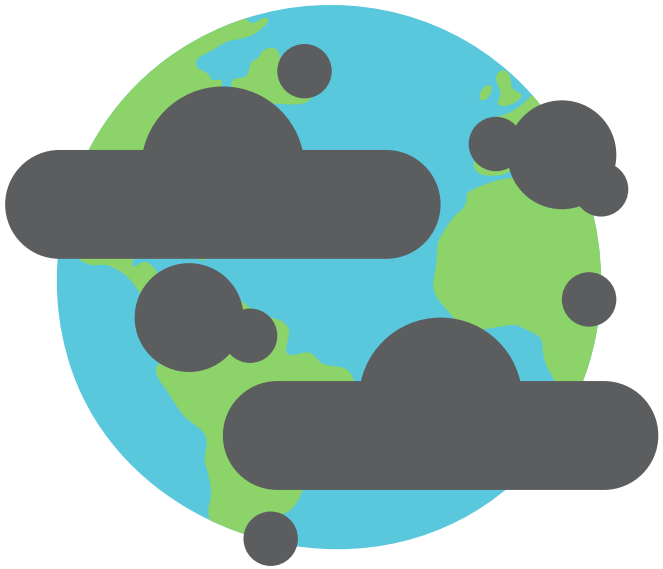


Training services page (UK)

CO_2 produced per page view

April 2022

0.53g



September 2022

0.24g

Reduced by

55%

NEXER

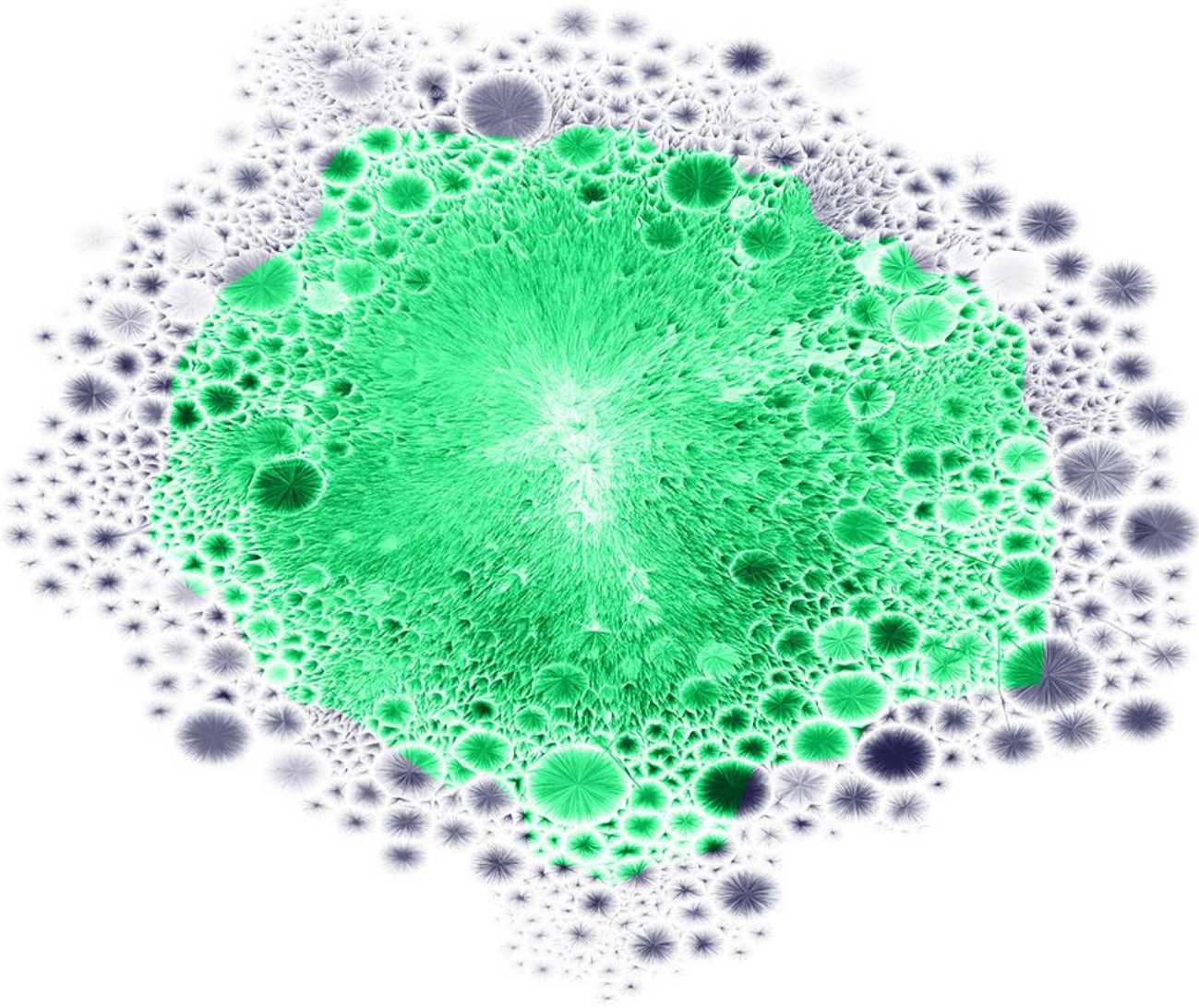
Training services page (UK)

Now cleaner than

75%

of all web pages tested
with the Carbon Calculator

68% cleaner in April 2022

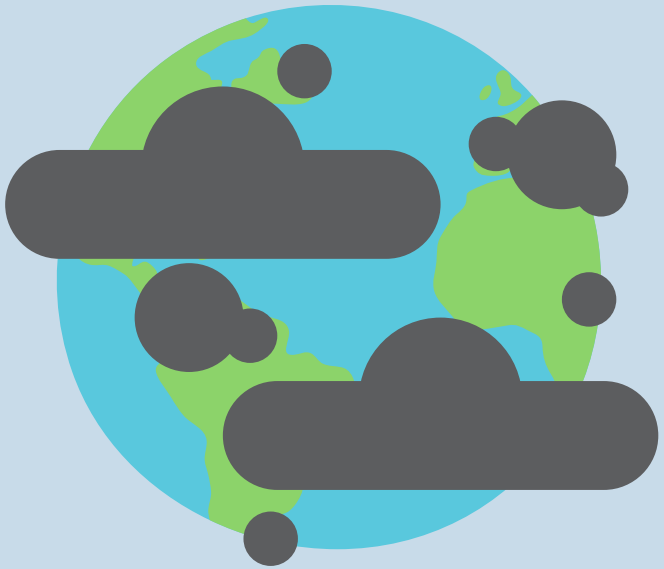


Site average

CO_2 produced per page view on average

April 2022

1.23g



September 2022

0.60g

Reduced by

51%

NEXER

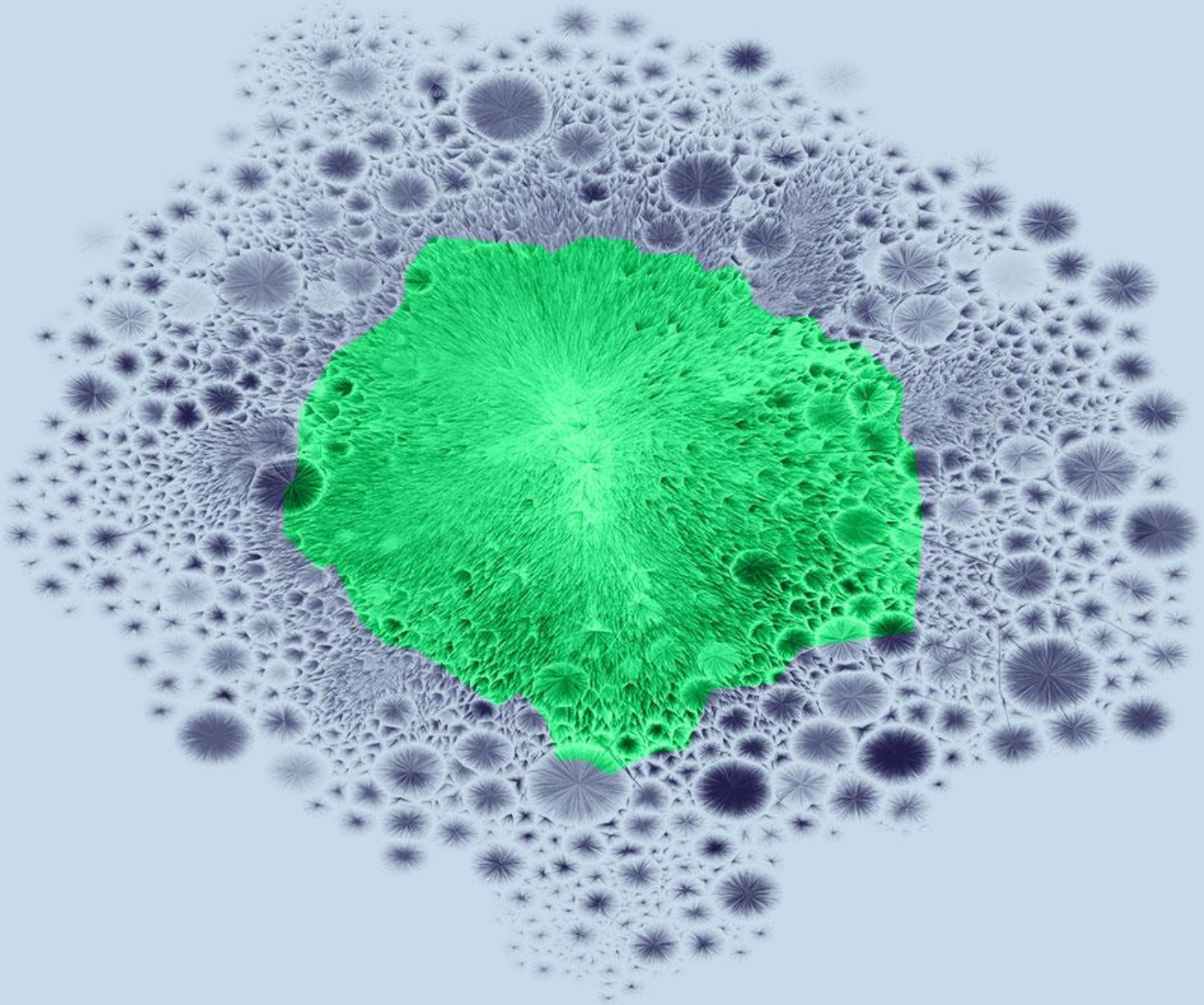
Site average

Now cleaner than

53%

of all web pages tested
with the Carbon Calculator

49% cleaner in April 2022

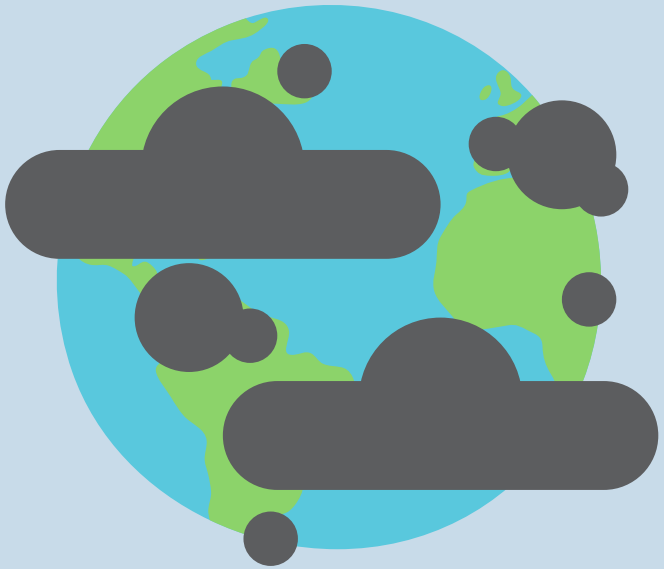


Site average

CO_2 produced per page view on average

April 2022

1.23g



March 2023

0.57g

Reduced by

56%

NEXER

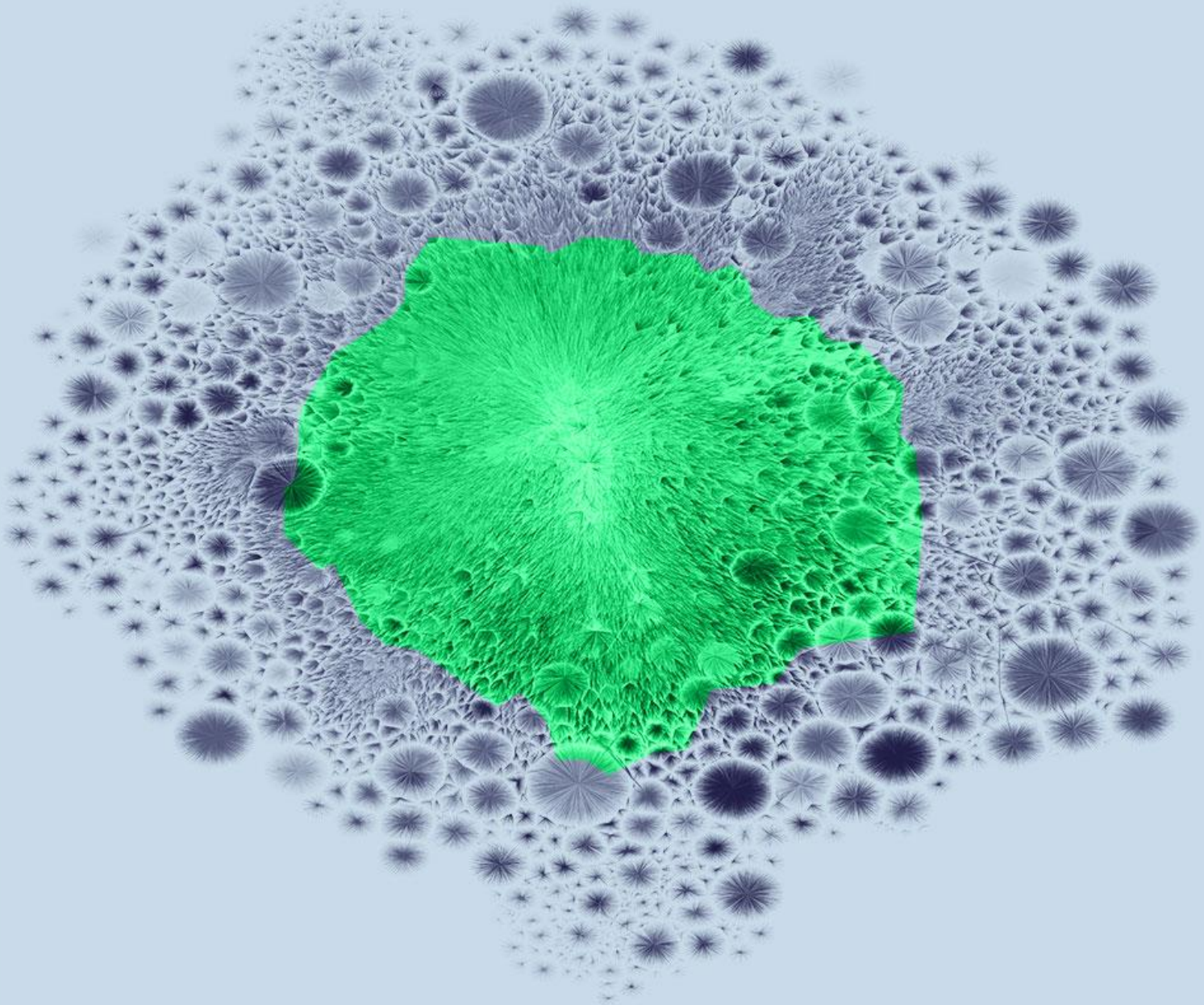
Site average

Now cleaner than

54%

of all web pages tested
with the Carbon Calculator

49% cleaner in April 2022



Environment continued

Eco-design in practice

We are building a network of climate change champions across our business and our aim is to empower colleagues to unleash their creativity and own our net zero journey. An example of this in action sits within the corporate affairs function, where our Global Head of Digital Communications, working with our digital partners Nexer, is leading the development of sustainable UX and development practices for our corporate and business websites.

This eco-design approach, anticipating and taking action to minimise negative environmental impacts, also contributes to our governance approach to security as well as improving our user experience and supporting our growth strategy through increased efficiencies.

Getting started

We performed a sustainability audit, which enabled us to set benchmarks for future improvement measures – this included capturing the carbon footprint of our eight key website pages, chosen by their size and number of visits.

We already use Microsoft Azure for hosting, which uses green powered servers, using c.50% renewable power to power its data centres. We've started to look at Microsoft's Emissions Impact Dashboard, so that we can scrutinise usage, and start to make some logical recommendations to reduce our impact, based on what the data is telling us, scaling down on resources where we can, in line with users' behaviours on the site.

This broader range of insights has enabled us to consider where to invest development and in FY23 we will:

- Upgrade our Umbraco Content Management System and hosting, which will run on less powerful hardware in Microsoft Azure with the same performance, leading to both cost and energy savings
- Redesign website pages and components, based on these broader data insights, so users can find content quicker, in fewer clicks. We'll also use this data to explore what devices people are using and whether there is an opportunity to make design decisions, such as device dark mode

> "Sustainability offers us the opportunity to be innovative and to challenge traditional design methods and thought processes that not only reduce our impact on the environment but create greater value for all our stakeholders."

Kai Kurihara
Global Head of Digital Communications

NEXER

12 July 2022

Rick Butterfield 12/07/2022 08:50

Cheers to everyone who's been involved in the NCC Consolidation project over the many months it's been happening. We've gone live this morning in possibly the most pain free release I've ever been involved in (trying not to jinx it here 🤗) and Kai is very happy!

💗 15 👍 1

2 replies from Amy and Mar

↩ Reply

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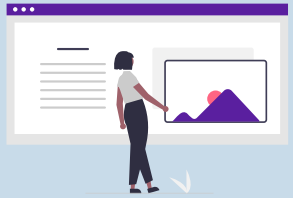
umbraco
Modern Umbraco is at least
50%
more efficient
https://twitter.com/Nexer_Dig
1587804731203780608

What’s next?

Dark mode

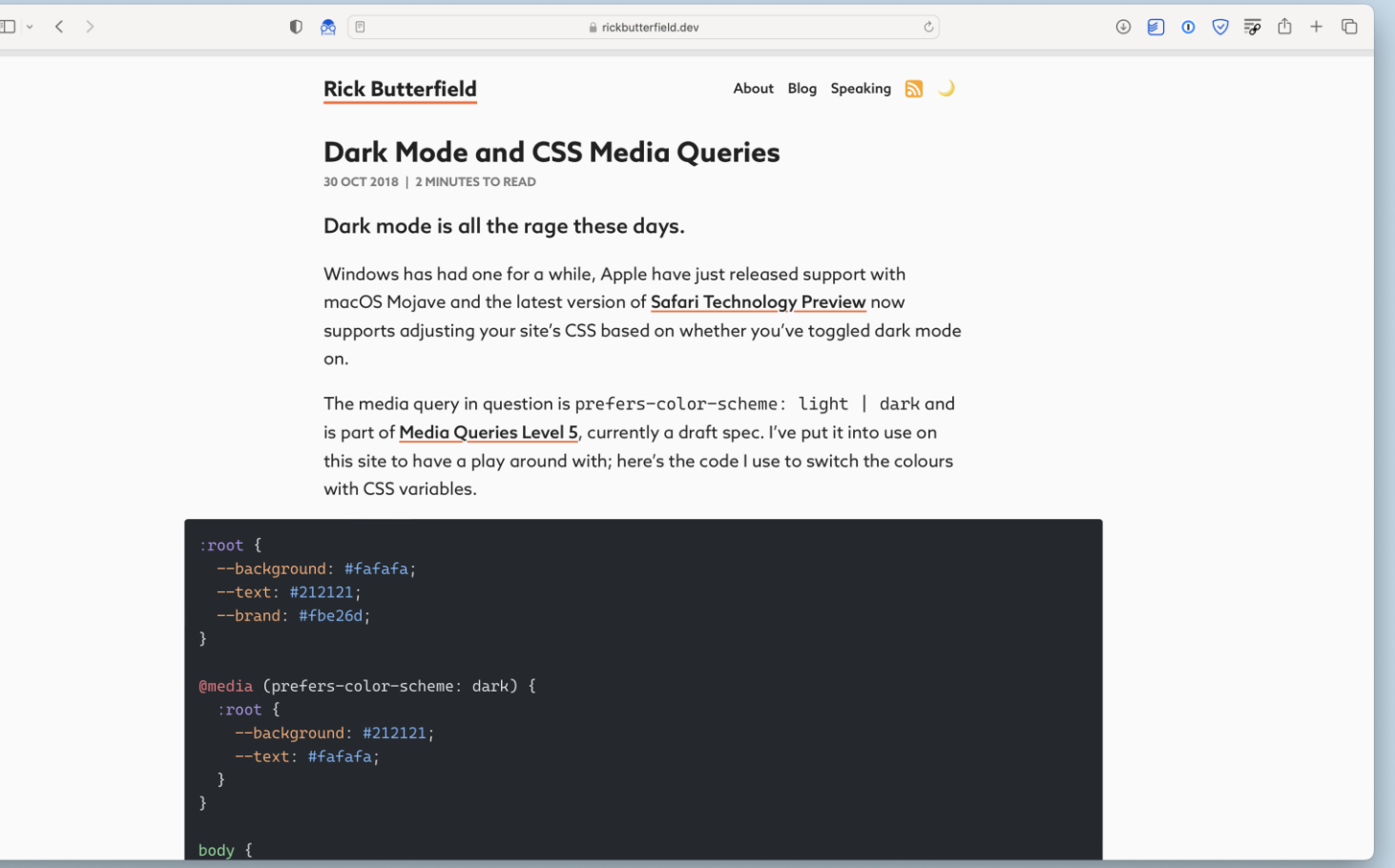
Keep tracking our carbon usage



Building carbon aware websites

NEXER

Dark mode

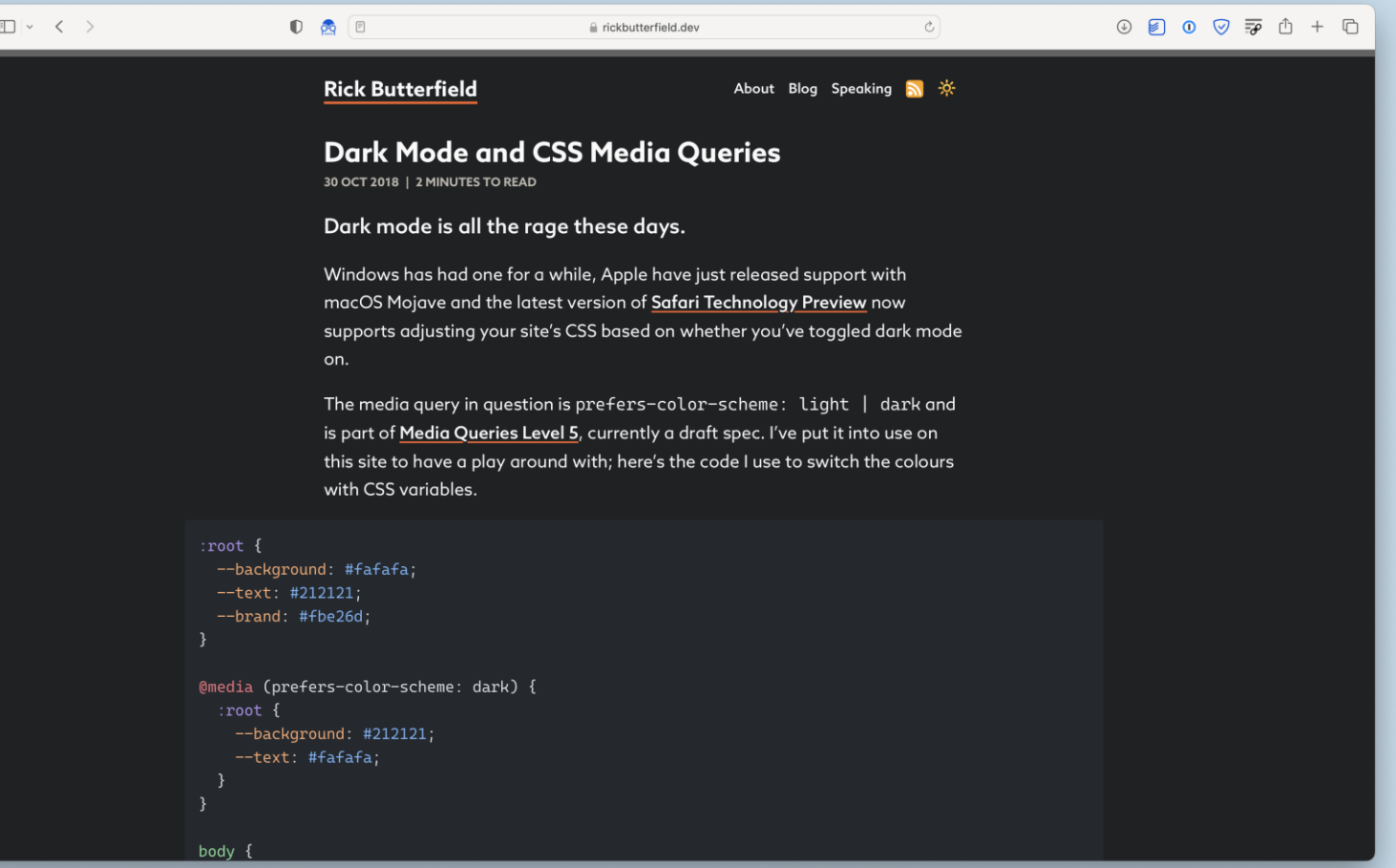


Source: https://rickbutterfield.dev/blog/dark-mode-css-media-queries/

"Switching from light mode to dark mode at 100% brightness saves an average of 39%-47% battery power"

Purdue University study

Dark mode

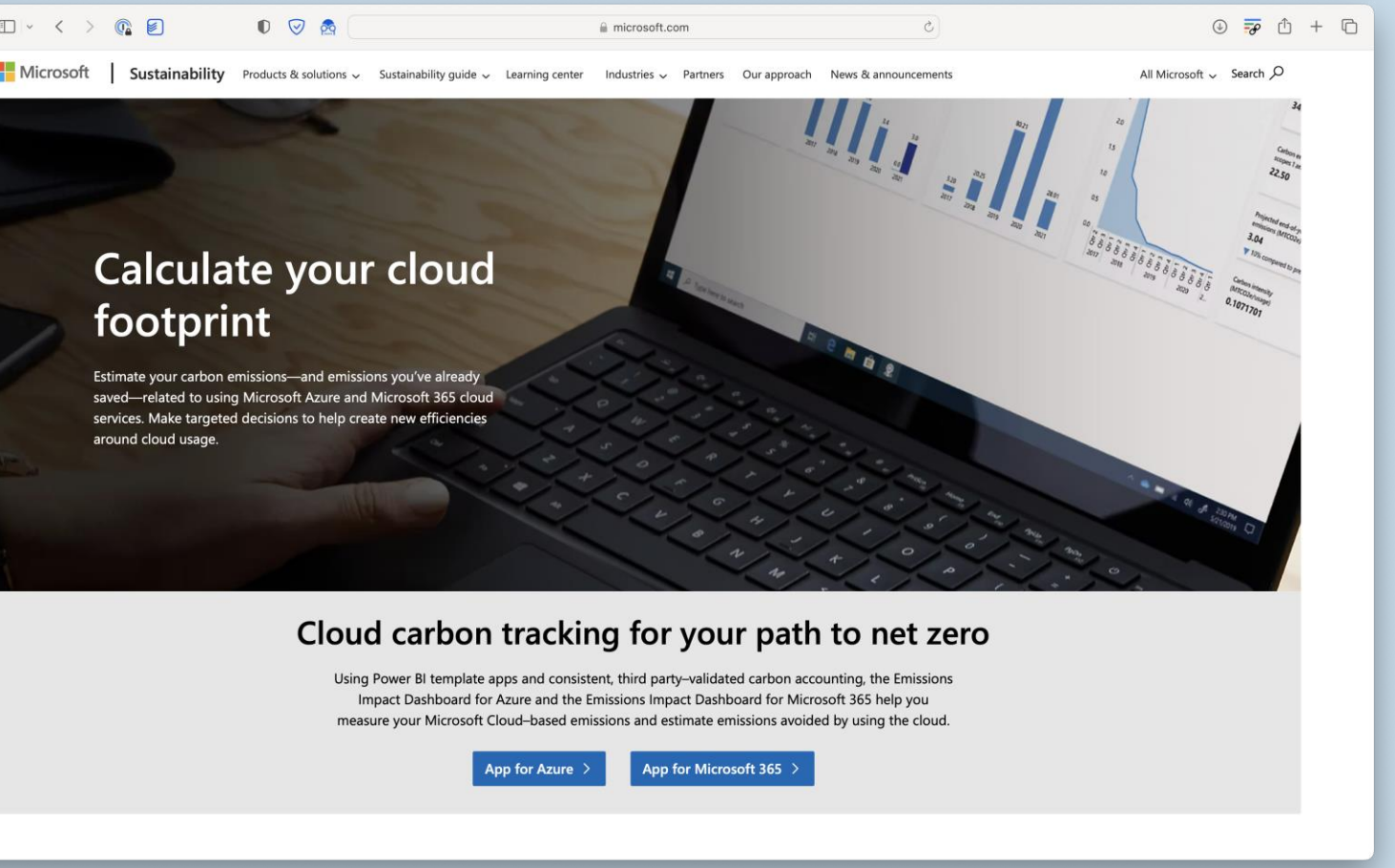


Source: https://rickbutterfield.dev/blog/dark-mode-css-media-queries/

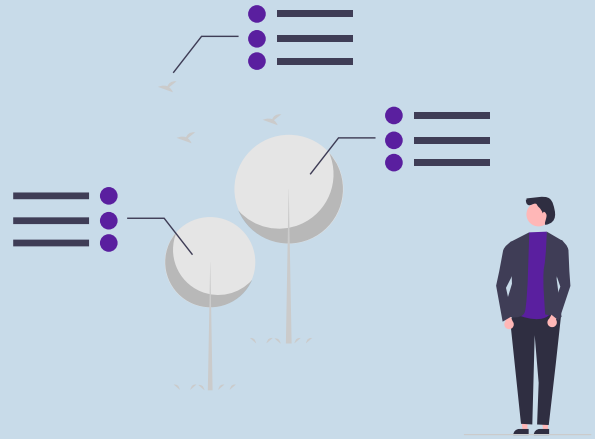
"Switching from light mode to dark mode at 100% brightness saves an average of 39%-47% battery power"

Purdue University study

Keep tracking our carbon usage



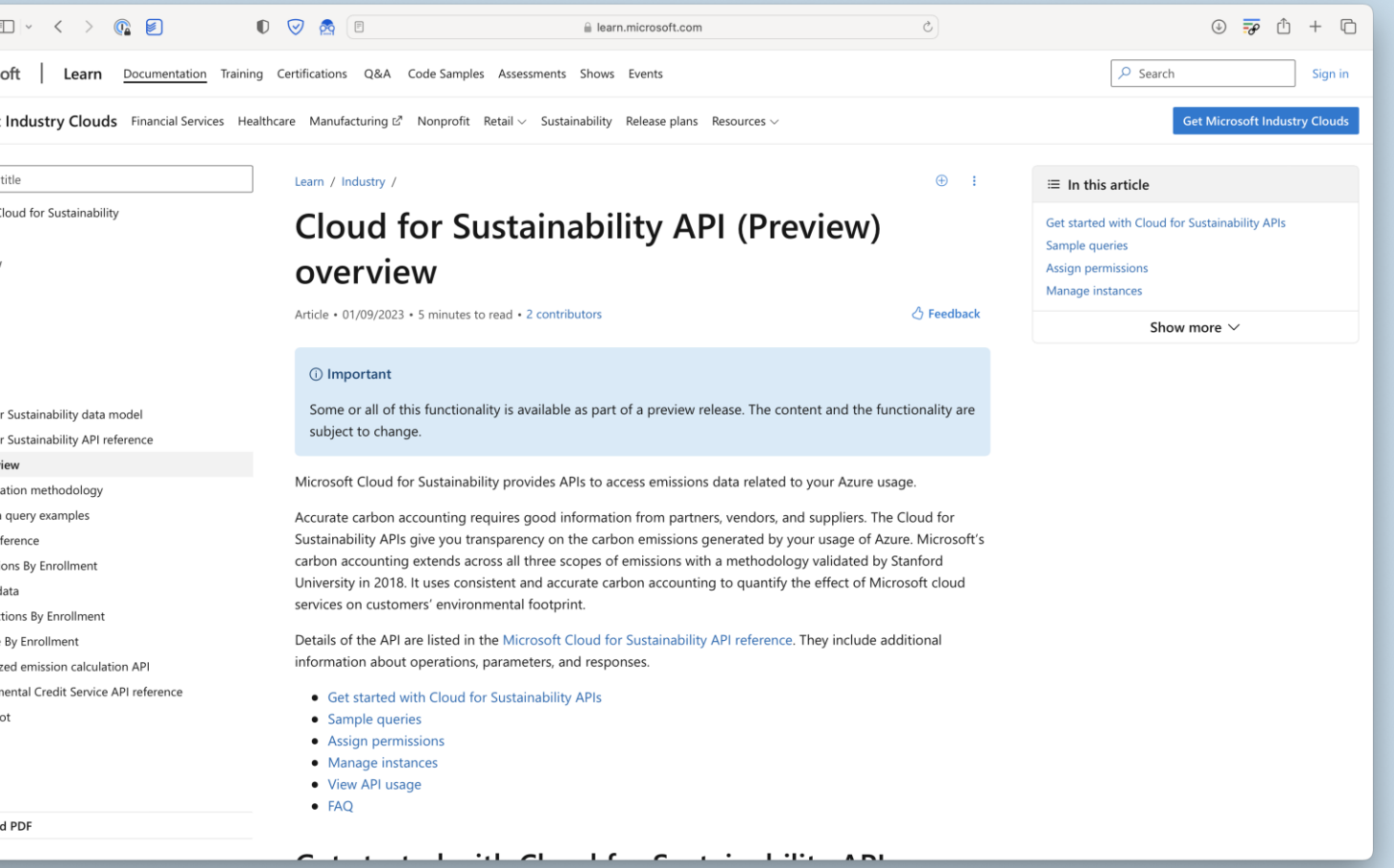
Source: https://www.microsoft.com/en-us/sustainability/emissions-impact-dashboard



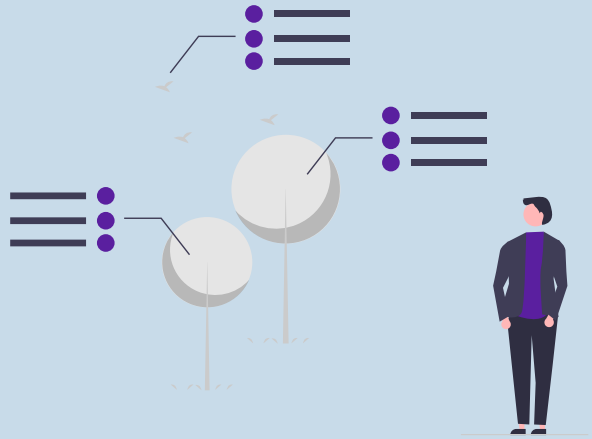
The Emissions Impact Dashboard for Azure gives you transparency on the carbon emissions generated by your usage

Microsoft

Keep tracking our carbon usage



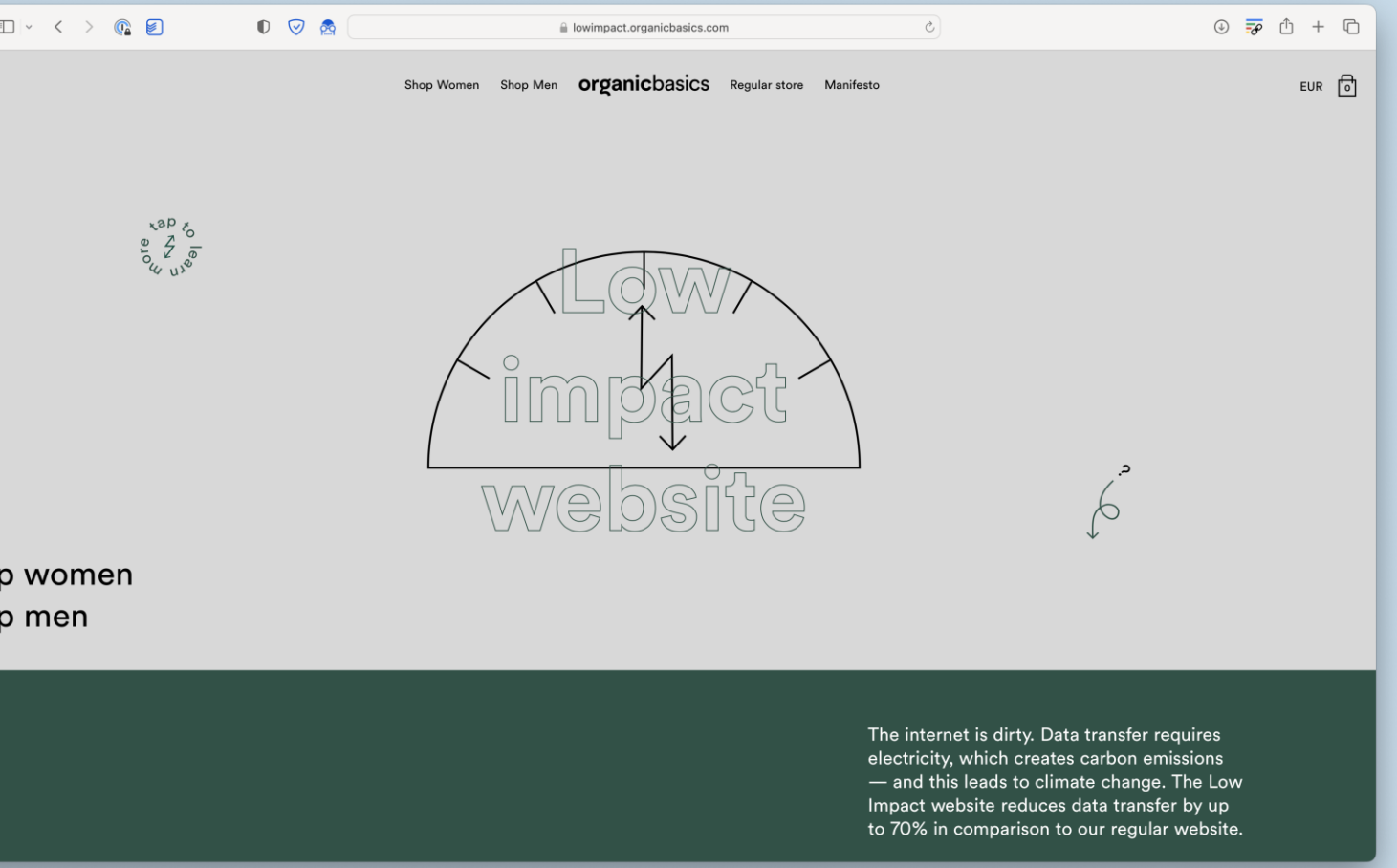
Source: https://learn.microsoft.com/en-us/industry/sustainability/api-overview



Consistent and accurate carbon accounting to quantify the effect of Microsoft cloud services on customers' environmental footprint.

Microsoft

Building carbon aware websites

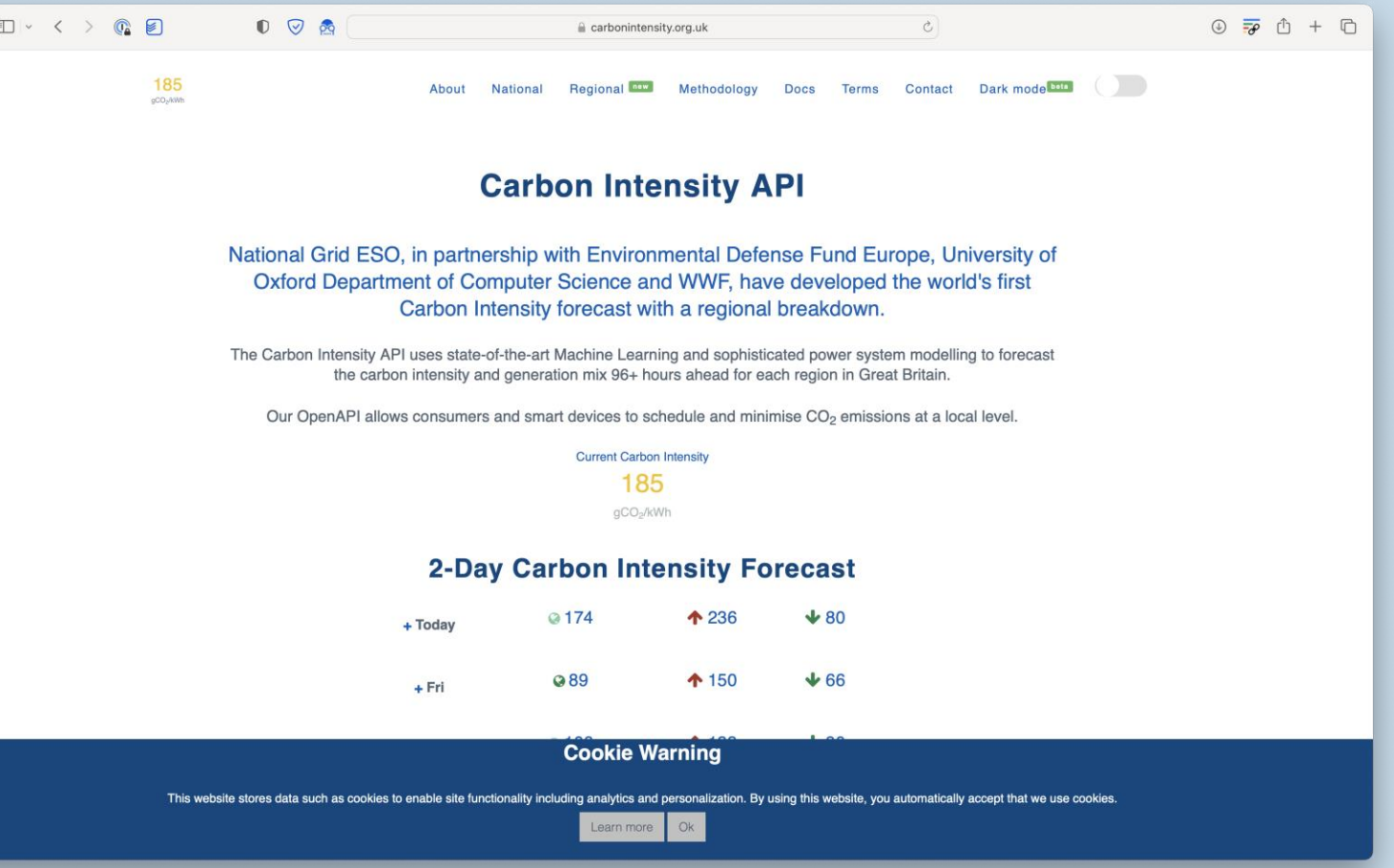


Source: https://lowimpact.organicbasics.com/gbp

The Low Impact version of our website reduces the carbon emissions associated with online shopping by up to 70% in comparison to our regular site. This is done by getting rid of most of the data-heavy elements like images and videos.

The Low Impact Website

Building carbon aware websites

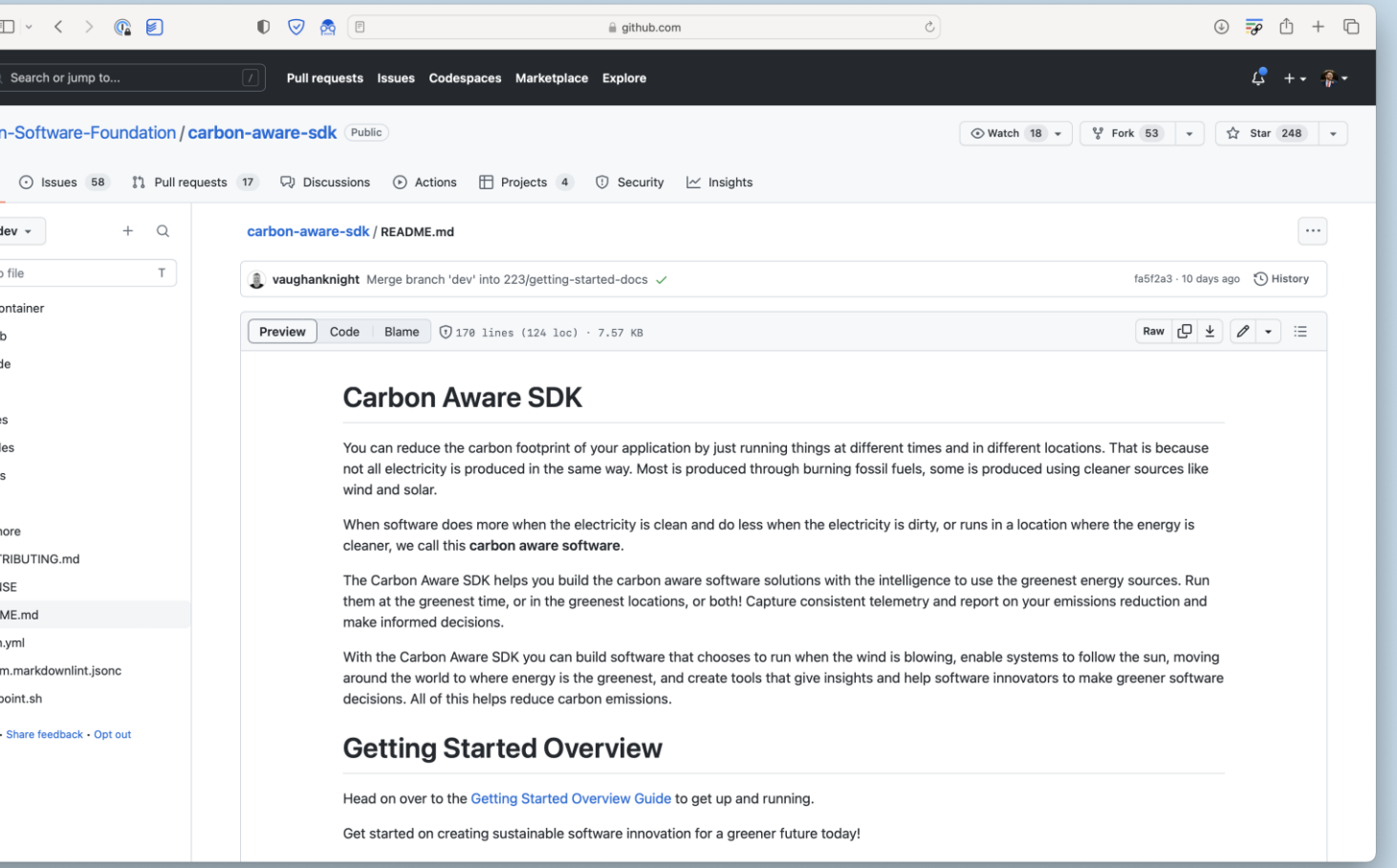


Source: https://www.carbonintensity.org.uk

"Our OpenAPI allows consumers and smart devices to schedule and minimise CO_2 emissions at a local level."

National Grid

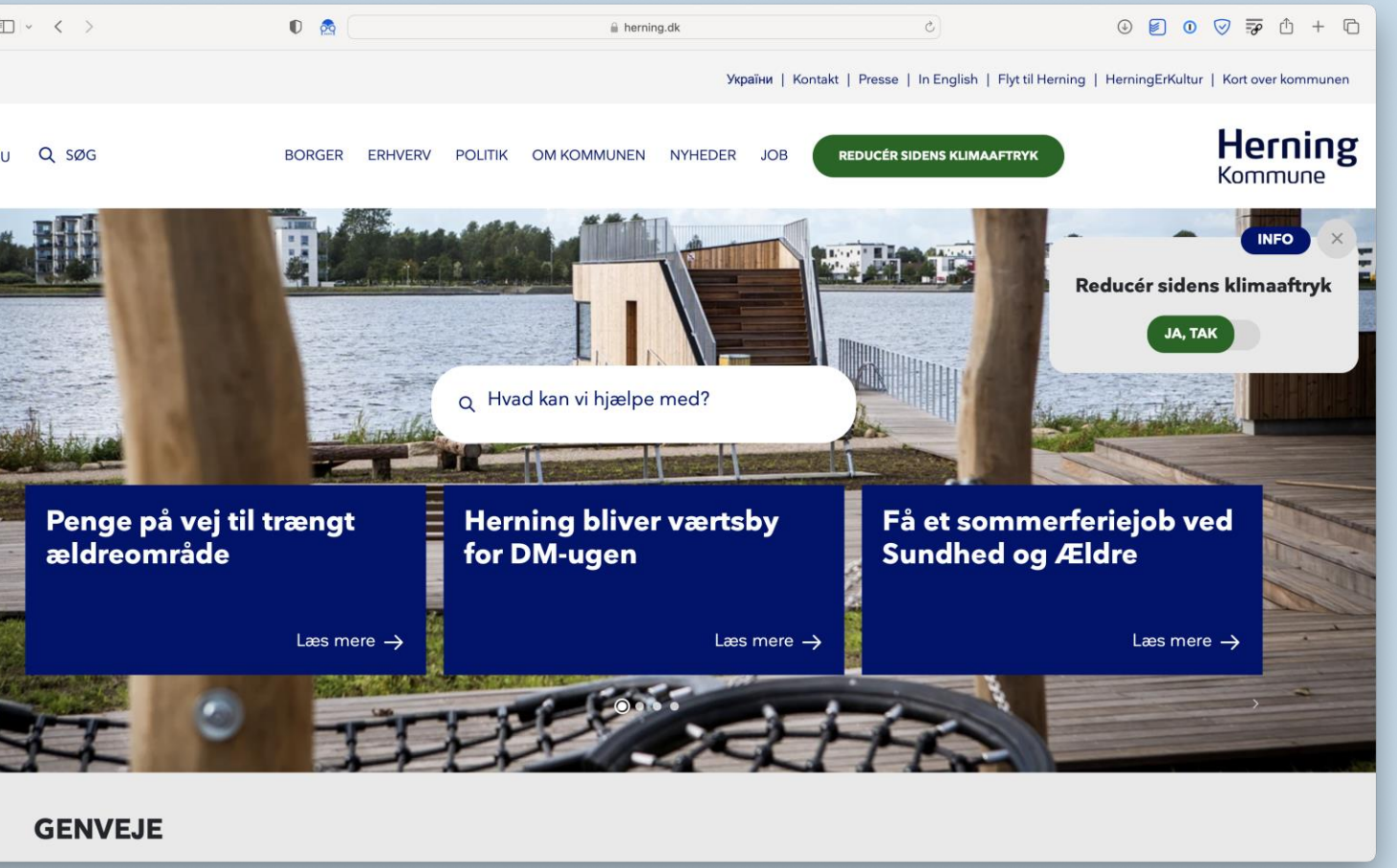
Building carbon aware websites



Source: https://github.com/Green-Software-Foundation/carbon-aware-sdk

> **"When software does more when the electricity is clean and do less when the electricity is dirty, or runs in a location where the energy is cleaner, we call this carbon aware software."**
>
> *National Grid*

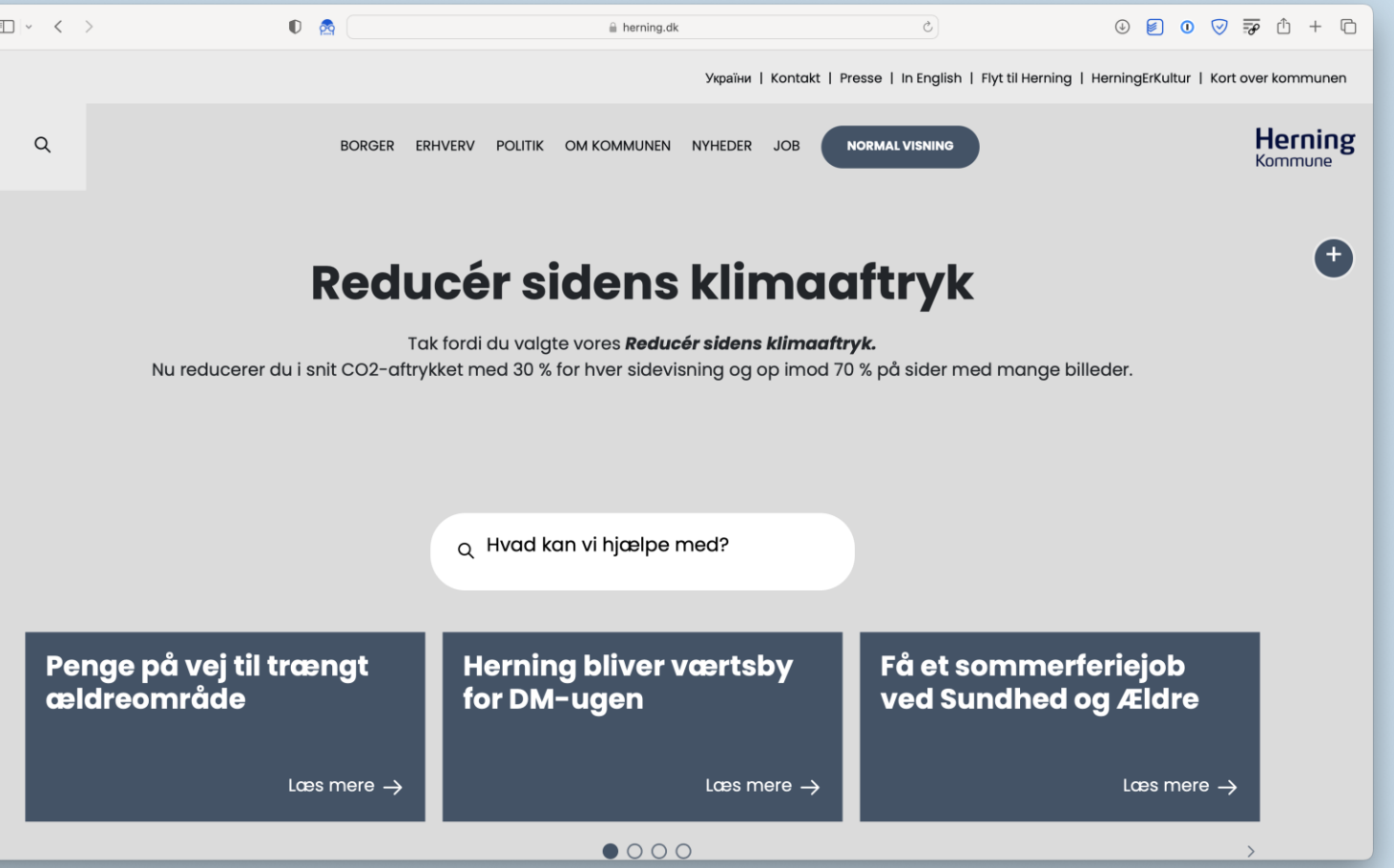
Building carbon aware websites



Source: https://www.herning.dk

"On average, the CO2 footprint is reduced by approximately 30% when a website user presses the button Reduce the page's climate footprint , and up to 70% on very data-heavy pages."

Building carbon aware websites



Source: https://www.herning.dk

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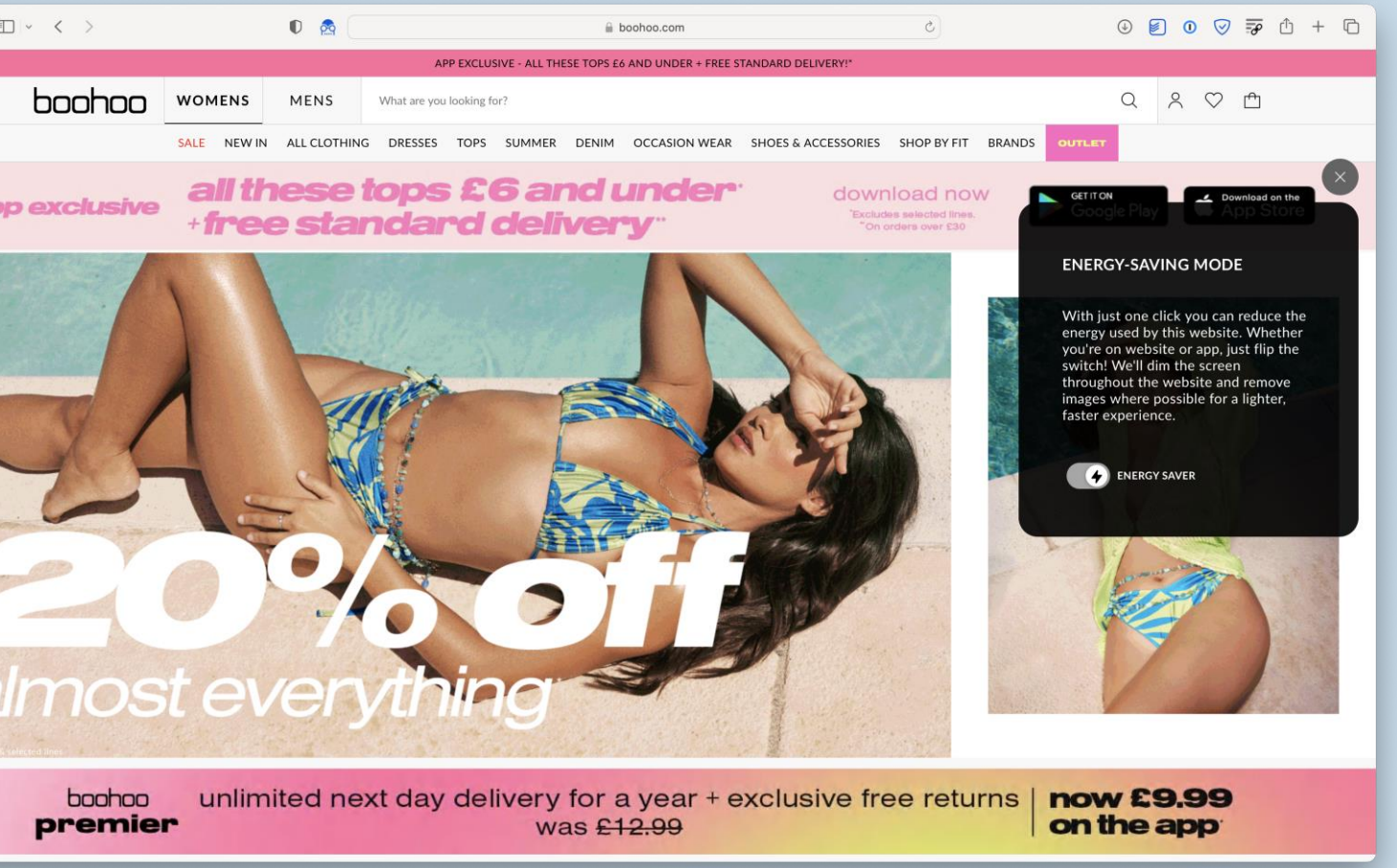
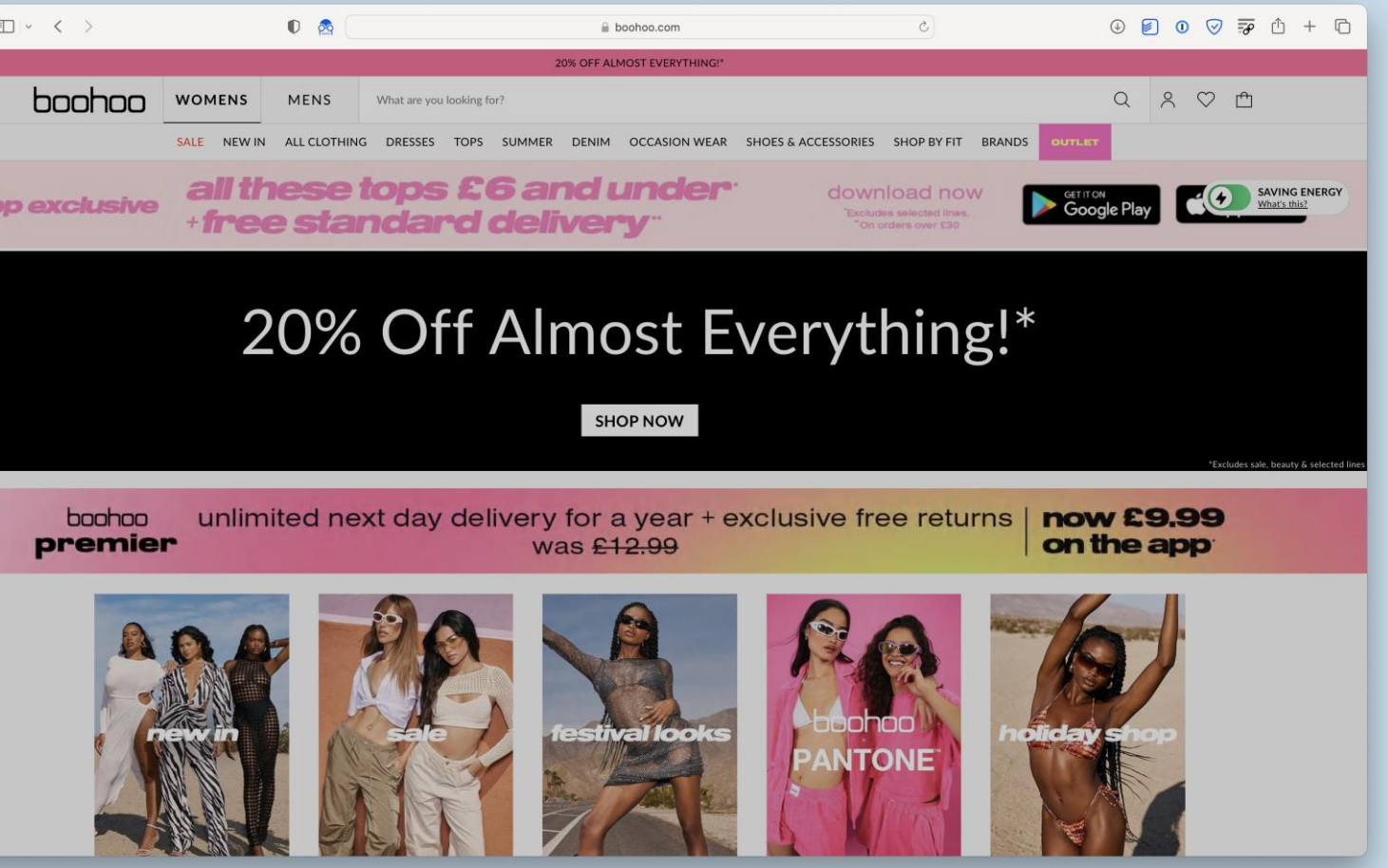
Building carbon aware websites



Source: https://www.boohoo.com

“With just one click you can reduce the energy used by this website. Whether you’re on website or app, just flip the switch! We’ll dim the screen throughout the website and remove images where possible for a lighter, faster experience.”

Building carbon aware websites



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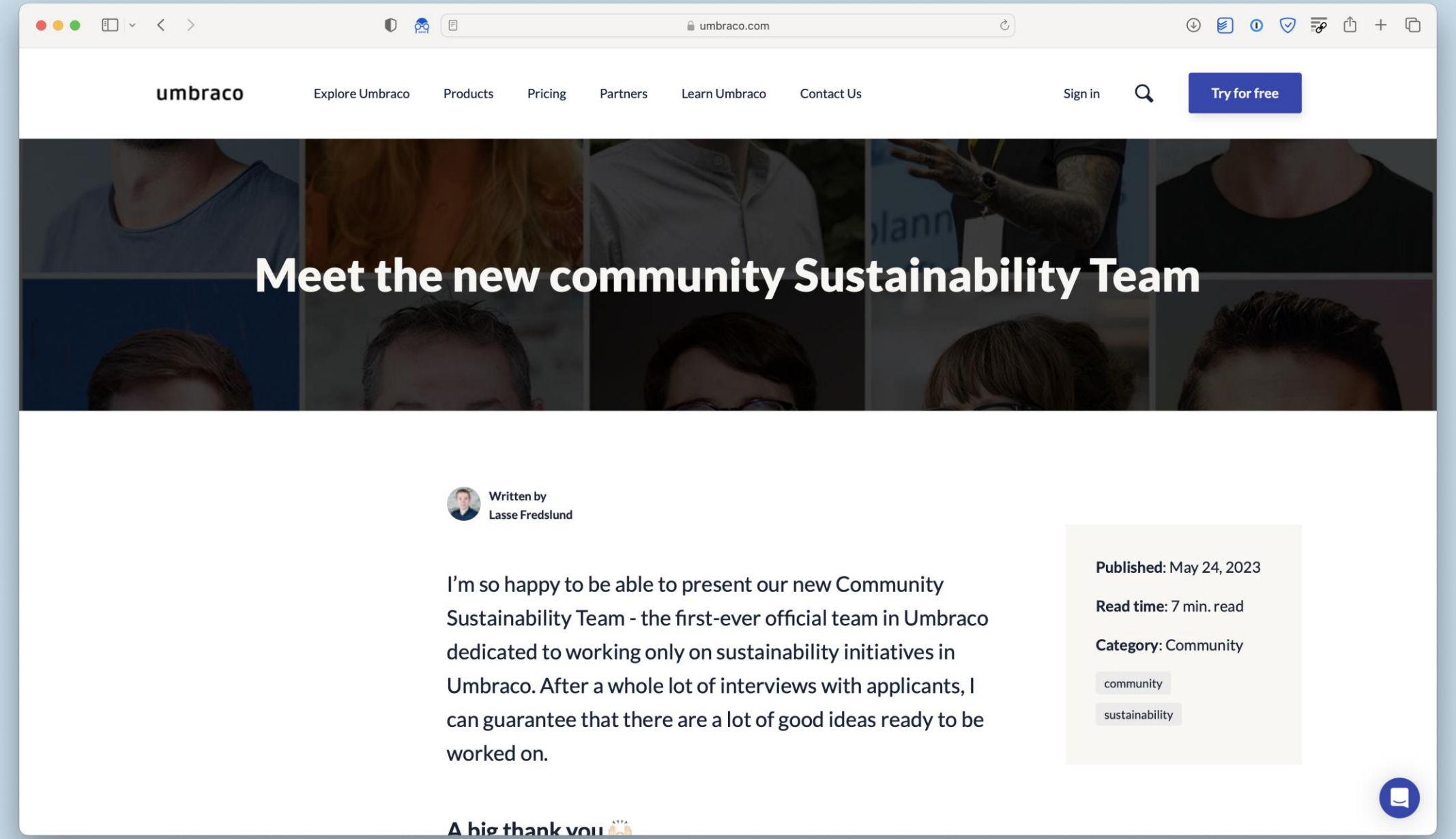
How can we decarbonise the planet, one Umbraco upgrade at a time?

NEXER



Source: https://umbraco.com/blog/meet-the-new-community-sustainability-team/

NEXER

CO2

THANK YOU
@nexergroup
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