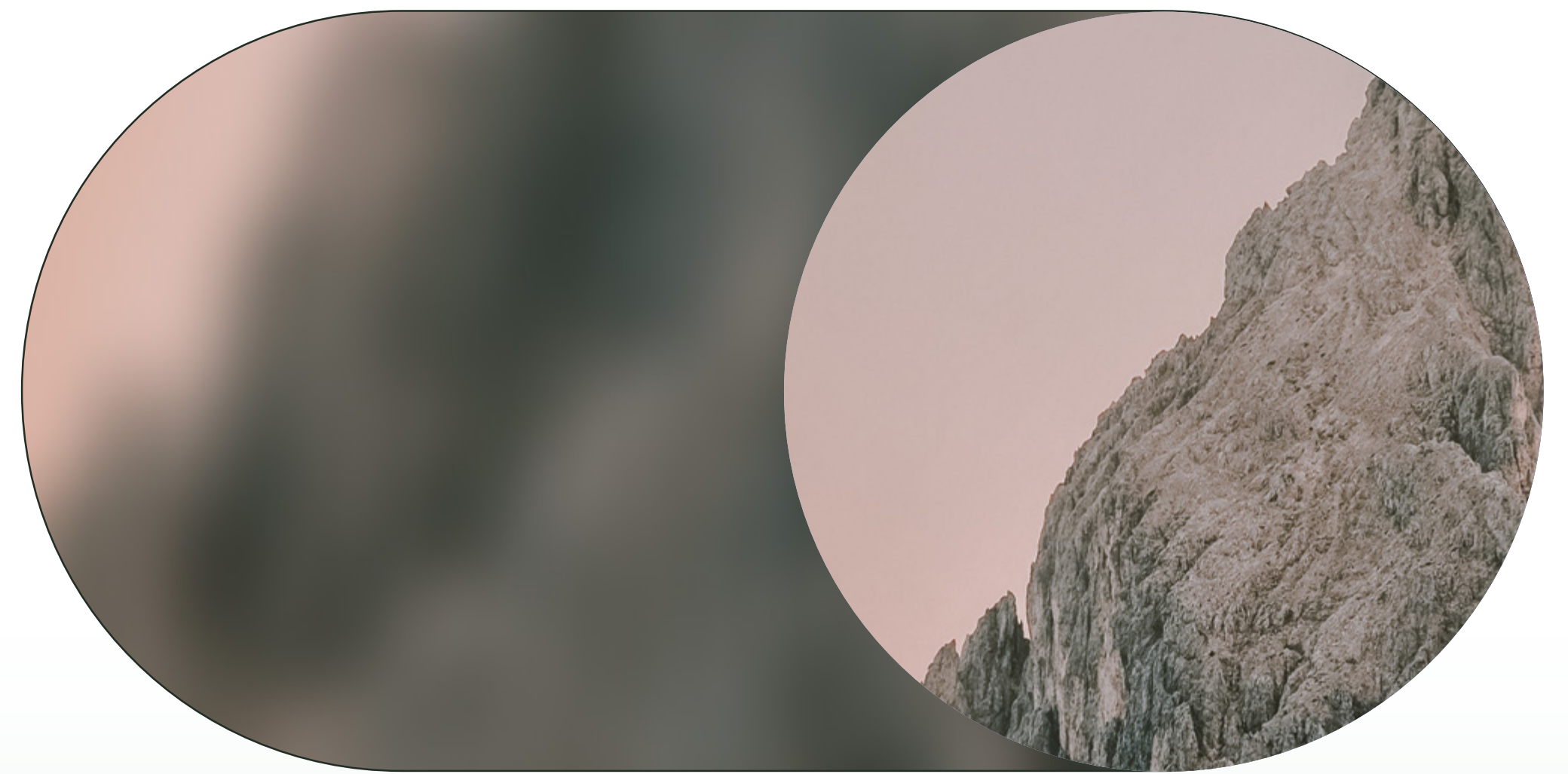


The State Of Sustainable Digital Design



Intro

DEFINITION

Sustainable Digital Design is a conscious approach to digital creative practices that considers the total impact these industries have on people, society, and the planet. This approach aims to reduce the industry’s negative impact while actively working on adding value.

Scope of the Digital & Creative Sectors

The scope of digital & creative sectors is broad, and encompasses a diverse range of industries, including advertising, web development, user experience, 3D, and graphic design. This report focuses on creative professions whose primary way of working, and the end result of said work, is digitally based.

This report will focus broadly on the digital & creative sectors but will use statistics, trends and research derived generally from subsections of this wider global industry. However, these industries are often overlapping in existing reports and statistics.

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Thirty-one years ago, the first website was published in 1991.

Since then, the internet, and the subsequent global digital creative industry - amongst others - has come to dominate the world we live in, and the lives we lead.

Increasingly powerful digital tools have created a thriving world of digital ecosystems. These digital ecosystems have made our reality - or should we say realities - ones of endless, never-ending possibilities. Existing in an age of real-time collaboration, we can work, imagine, produce and release creative work from anywhere in the world, thanks to the constant evolution of tools from Google Docs and Notion to Miro and Figma.

Designers, technologists, makers, and artists are responsible for creating new ways of negotiating these digital ecosystems. Mores Law applies not only to the rapid development of technology itself but to all run-off industries that technology touches. Thanks to this, digital design and the creative industries have exploded in awe-inspiring and economically powerful ways we would never have dreamed of before. The last century has seen digital practices redefine entire industries in ways that digital practitioners and

businesses continue to benefit and profit from today.

The pandemic brought urgency and the means for a mass migration to digital ecosystems. Fast-forward two years, we are all sitting on the precipice of change, with promises of endless growth and untapped opportunity. These promises have resulted in a digital gold rush and an epicentre of creative exploration, innovation, and experimentation. Entire industries and communities are racing towards being the first

to set the protocols, governance, and standards of so-called “Metaverses” at a rate technology cannot yet keep up with.

With endless possibilities come seemingly endless debates and challenges. Discussions around ethics, diminishing in-person interactions, and uncomfortable resignations to an existence where humans and AI coexist have become commonplace. Technology is not isolated from the rest of the planet. As concerns for irreversible climate degradation

to become increasingly rampant, new conversations are emerging that call us to reflect on the effects potentially endless digital growth has on people, society, and the planet as a whole.

As these changes continue their inexorable progress, it begs the question: How can digital practitioners challenge contexts of constant growth and avoid mimicking the unconscious modes of production that got us here in the first place?

“95% of business leaders are expecting a positive impact on their industry within five to 10 years as a direct result of the metaverse. With this statistic, it now feels impossible to reduce the metaverse to a short-lived stunt.”

VALUE CREATION IN THE
METAVERSE: THE REAL BUSINESS
OF THE VIRTUAL WORLD

REPORT FROM MCKINSEY
& COMPANY, 2022



Enter a new era of digital ethics: one focused on tech sustainability, and the realisation that digital activities have a real carbon cost. Increasingly, workers in the creative and digital sectors are becoming more selective of the clients they work with (especially the industries they operate in), the types of projects they take on, and the impact their work has on the planet.

The Sustainable Digital Design (SDD) *State of Digital Sustainability* report will outline the current impact of digital emissions and measurement techniques used. Secondly, this report will share the current trends in sustainable digital design. Finally, the report will explore the opportunities a more conscious digital world will bring with it.

“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, explains Mike Hazas, a researcher at Lancaster University. And these emissions are predicted to double by 2025.”

WHY YOUR INTERNET HABITS ARE
NOT AS CLEAN AS YOU THINK,
BBC, 2020

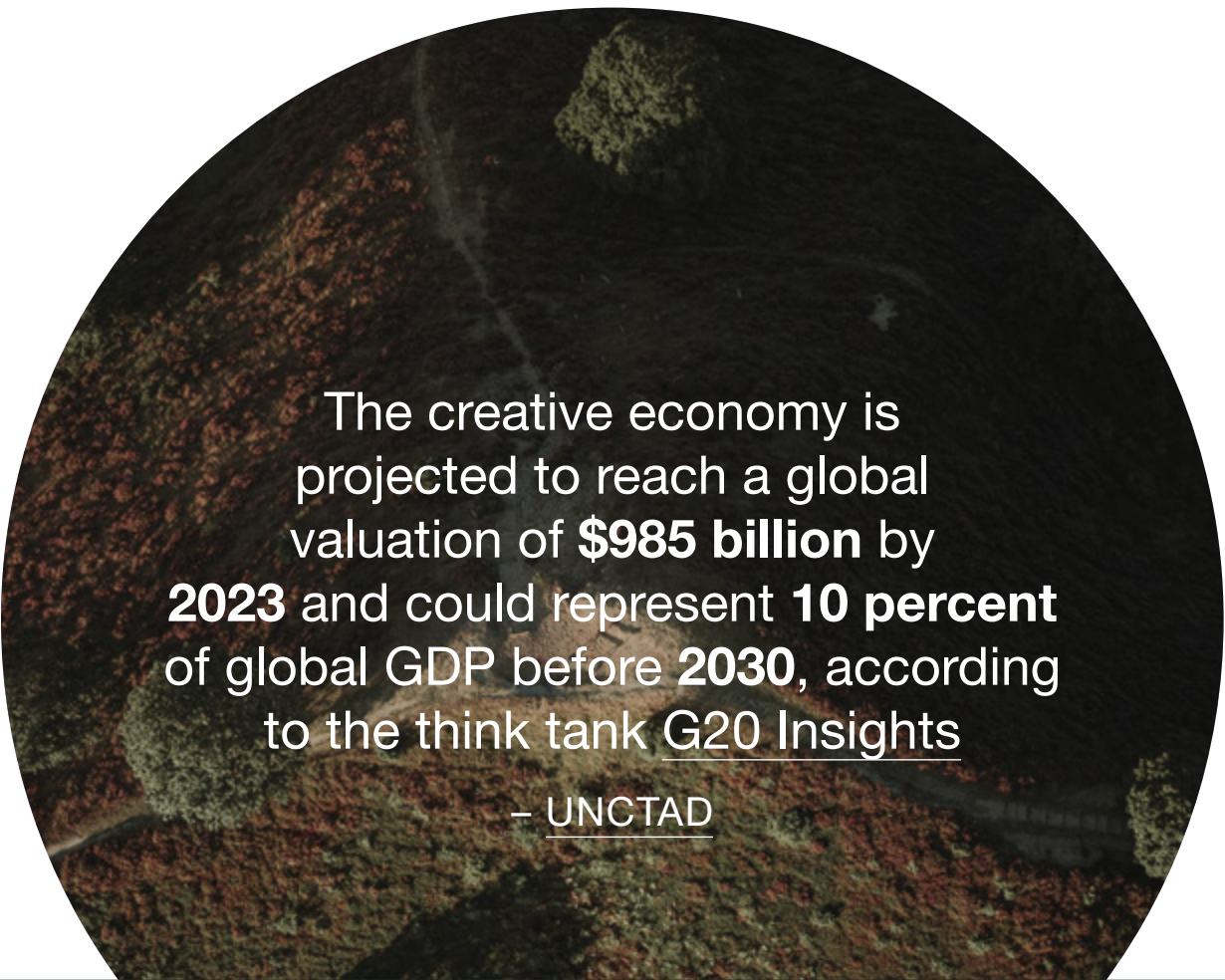
“According to a 2010 New York Times analysis, one e-reader required 50 times the minerals and 40 times the amount of water to manufacture than a print book. You’d need to read more than 100 books on an e-reader before it would have a lower pollution impact than reading the equivalent number of print books.”

NEW YORK TIMES, 2010

“Estimates by Carbon Brief have shown that for 2019, the data centre that stores the data was likely to use about 0.0139kWh (that’s kilowatt hours), transmission of the data would be about 0.0188kWh, and our big 4K TV would use about 0.1200kWh, equating to a total of 0.1527kWh, or 71.49g of CO₂ per hour.... Our full binge of Breaking Bad would come to 61.3 hours

at 71.49g CO₂ per hour, so a total of 4.382kg of CO₂. In comparison, a typical electric car in the UK emits about 100g CO₂ per kilometre (battery uncertainty and different models give some differences here), so that means you could have driven about 44km (27 miles) for the same carbon emissions as watching the show.”

WHAT’S THE CARBON FOOTPRINT OF A 4K
NETFLIX BINGE? (BBC SCIENCE FOCUS, 2022)



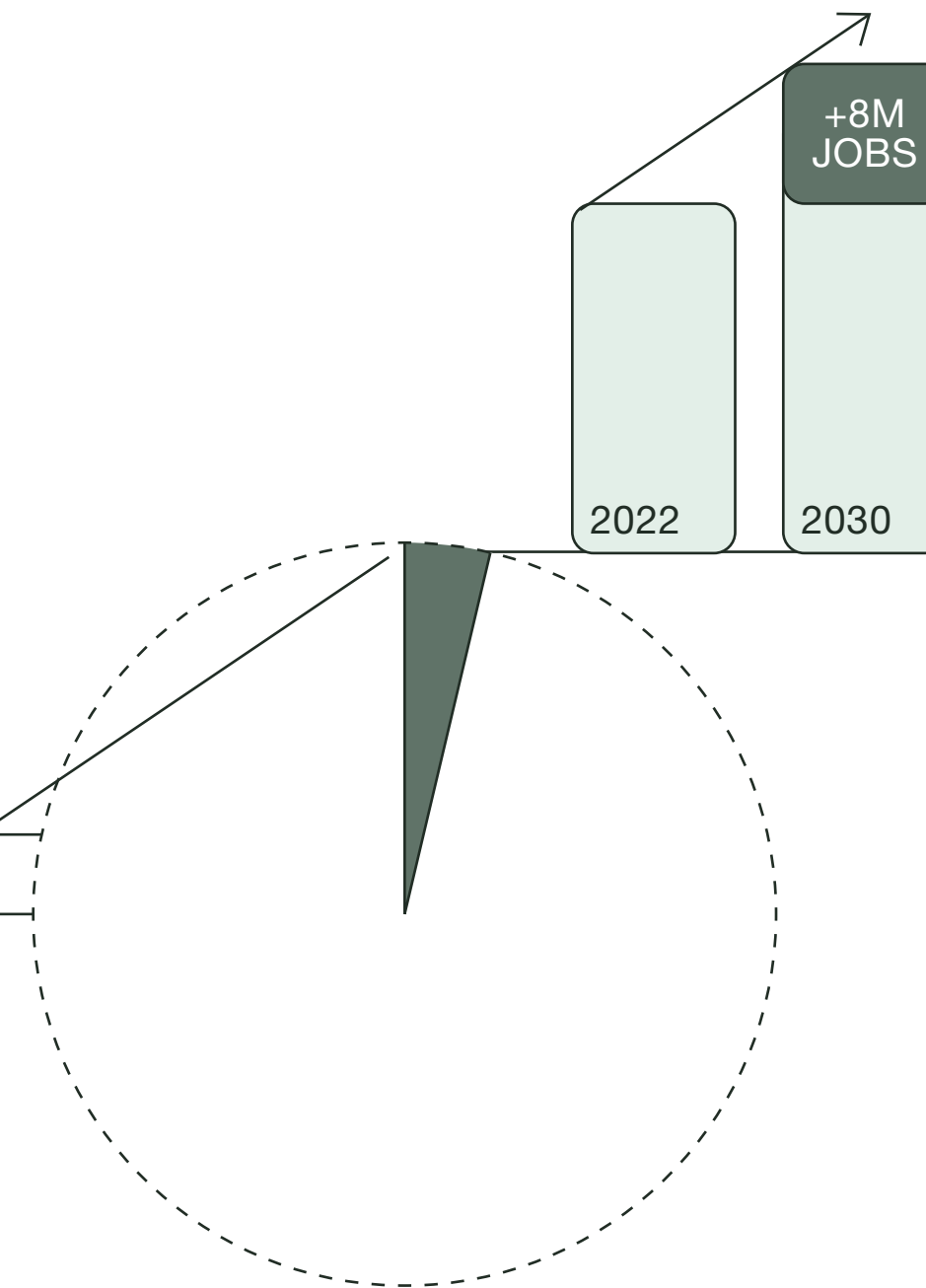
 HIGHLIGHT POINT

The digital design and creative industries will continue to grow, along with our increased use of online, collaborative, and cloud-based tools. Both of which contribute to increased CO₂ emissions into our atmosphere at a time when we should be looking to neutralise our emissions.

Overall Impact

Creative workers account for 3.8% of the European Union’s workforce, working across 1.2 million businesses in industries such as advertising, design, publishing, music, photography, and music. This figure is expected to increase by 40% come 2030, adding more than 8 million additional jobs. In financial terms, graphic and digital design alone was valued at \$43.4bn in 2022 and is estimated to employ 281,500 people in the US, 91,000 in the UK, and 220,000 in Europe.

3.8%
 CREATIVE INDUSTRY
 EU WORKFORCE



The reliance on digital tools within these industries is only set to increase. Through the pandemic years, we saw this with the increased use of online creative collaborative tools like Figma and Miro.

According to the EU Commissions Strategic Foresight Report (2022) information and communication technology (ICT) is responsible for 5-9% of global electricity usage and 3% of greenhouse gas emissions. This includes the manufacturing and usage of digital devices, covering everything from the production of an iPhone, to cloud computing and to daily data usage.

The Calculation

If we use our own studio at Wonderland as a starting point, our digital designers use (on average) 2.36GB of data per day on everything from Slack, to Figma, to Google Meets.

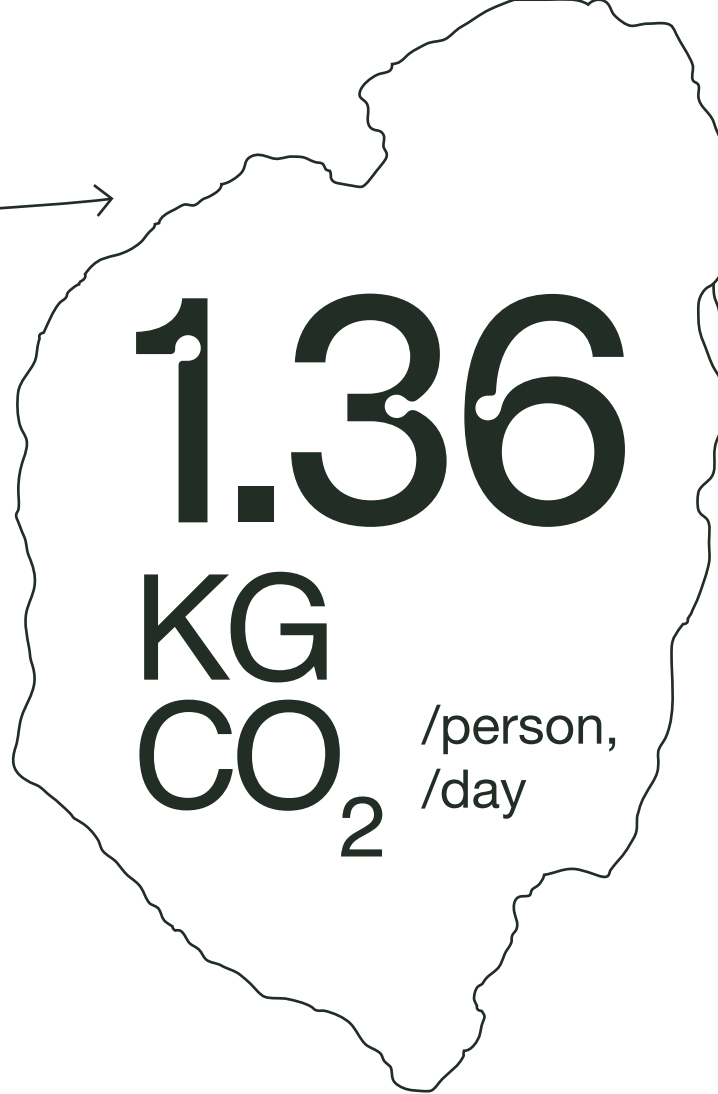
In the Netherlands the carbon intensity was 343kgCO₂/kWh for August 2022. Therefore...

APPROXIMATELY

1.264.800

KG CO₂

from data transfer for the **30,000 digital designers** in the Netherlands for August 2022



This only accounts for the output of the workers themselves. Excluded from this is are the carry-on effects of the end users, consumers, and audiences who interact with the end products.

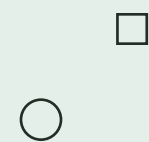
Carbon emissions from digital also depends on the energy source. Based on the [Electricity Map](#), we can see that a digital designer in Stockholm would emit 0.11kgCO₂ per day, while designer in Sydney would emit 2.40kgCO₂ per day.

Read more on on how to calculate the carbon emissions from data transfer [here](#).



THINK POINT

If the average digital designer produces 1.36kGCo₂ per day, that equates to 319kg per year. That's roughly the equivalent of that same designer taking a one-way flight from Amsterdam to Lisbon (338kg).



Taking into account the total number of digital designers in the Netherlands, this would be the same one person taking 83 round-trip first-class flights (which are more carbon heavy than economy) from [Auckland to New](#)

[York City](#) which, as of September 23rd, 2022, is the longest and most carbon-emitting flight you can take. You can calculate your individual carbon emissions for your next flight [here](#).

THINK POINT

COMPARISON 2

Creative and digital workers send large numbers of working files - or WIPs - to clients. The desire to show only the highest quality renders or exports in WIP phases has a real impact on digital emissions.

Compressing or rendering at lower resolutions during a WIP review or concepting phase has the potential to save 54.6kgCO₂ per person, per year.

| | 1M VGA VIDEO | 1M ULTRA HD VIDEO |
|---|-----------------------|-----------------------|
| AVERAGE TRANSFER SIZE | 24.1MB | 348MB |
| CARBON EACH TRANSFER | 0.01kgCO ₂ | 0.21kgCO ₂ |
| CARBON OVER 1 YEAR PERIOD AT 5 FILES SENT A WEEK: | 2.6kgCO ₂ | 54.6kgCO ₂ |

Why does digital emit CO₂?

☀ DATA CENTRE

As defined by Cisco, “a data centre is a physical facility that organisations use to house their critical applications and data. A data centre’s design is based on a network of computing and storage resources that enable the delivery of shared

applications and data. The key components of a data centre design include routers, switches, firewalls, storage systems, servers, and application-delivery controllers”. Data centres facilitate the transfer of data between devices.



ANSWER

The biggest emitter is data centres.

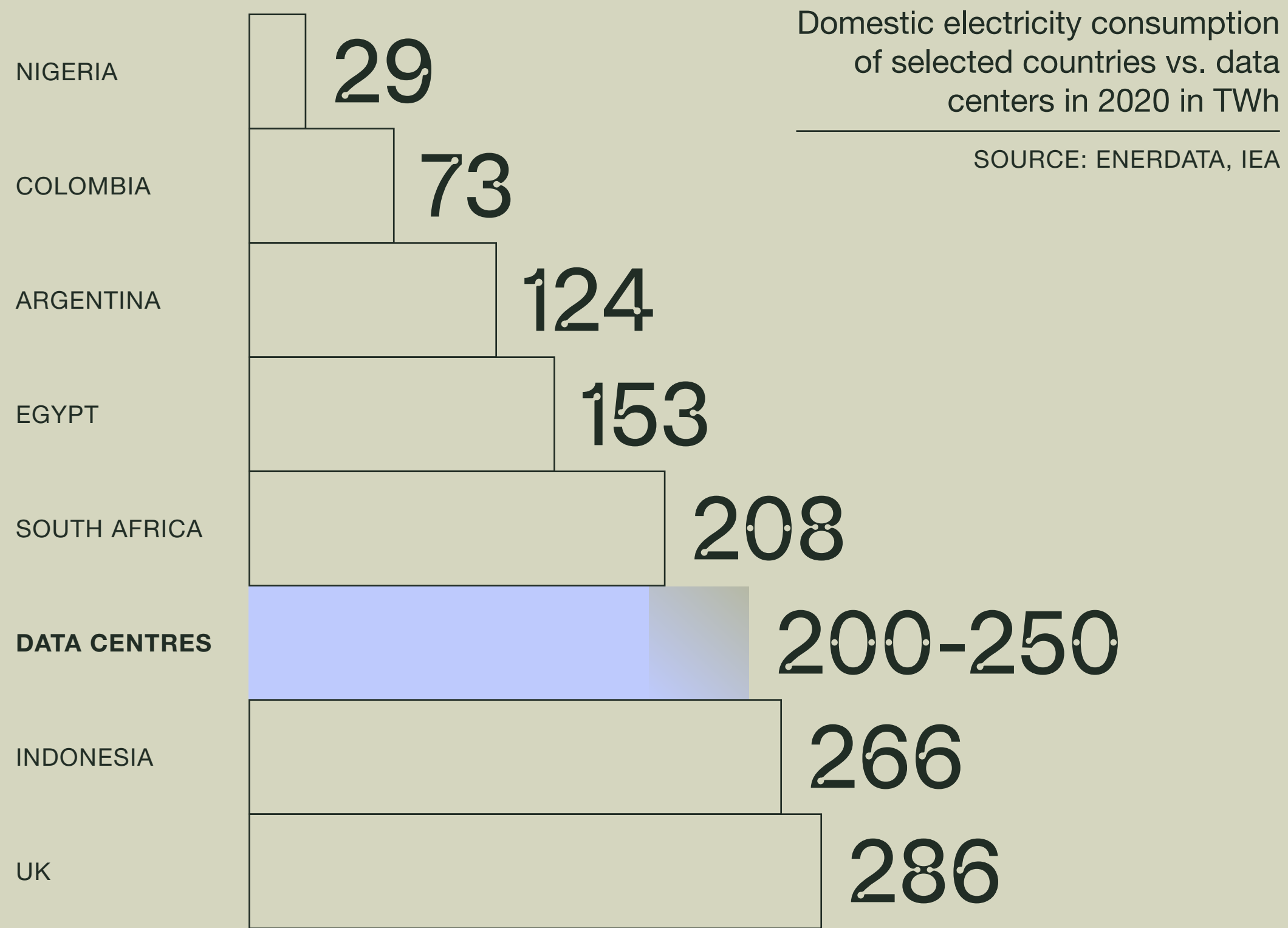
The source of digital emissions can be traced back to servers and data centres that we more commonly call “the cloud”. Unlike the common name suggests, there is nothing natural, organic, or replenishing coming out of these cloud centres.

Data centres are responsible for processing transfers, downloads, uploads, streaming, and general wifi usage, and account for 0.3% of global CO₂ emissions, accounting for about 99,000,000,000kg - that’s 99 billion kg - of CO₂ in 2021. For context, the entire world emitted 33 gigatons of CO₂ in 2021

— 99,000,000,000kg

 HIGHLIGHT POINT

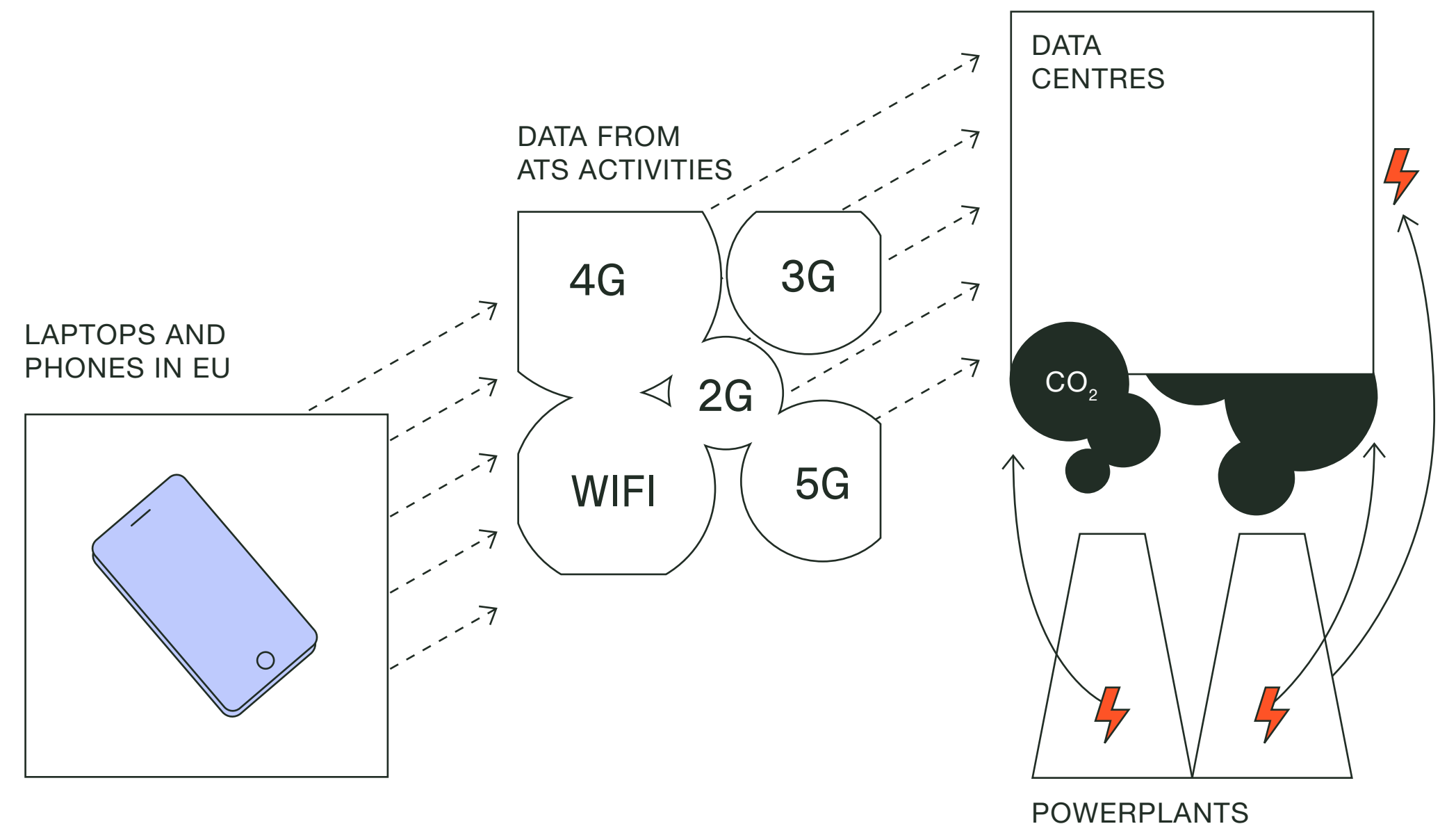
In 2020, data centres globally used roughly as much electricity as entire countries, such as South Africa and Indonesia.



 HIGHLIGHT POINT

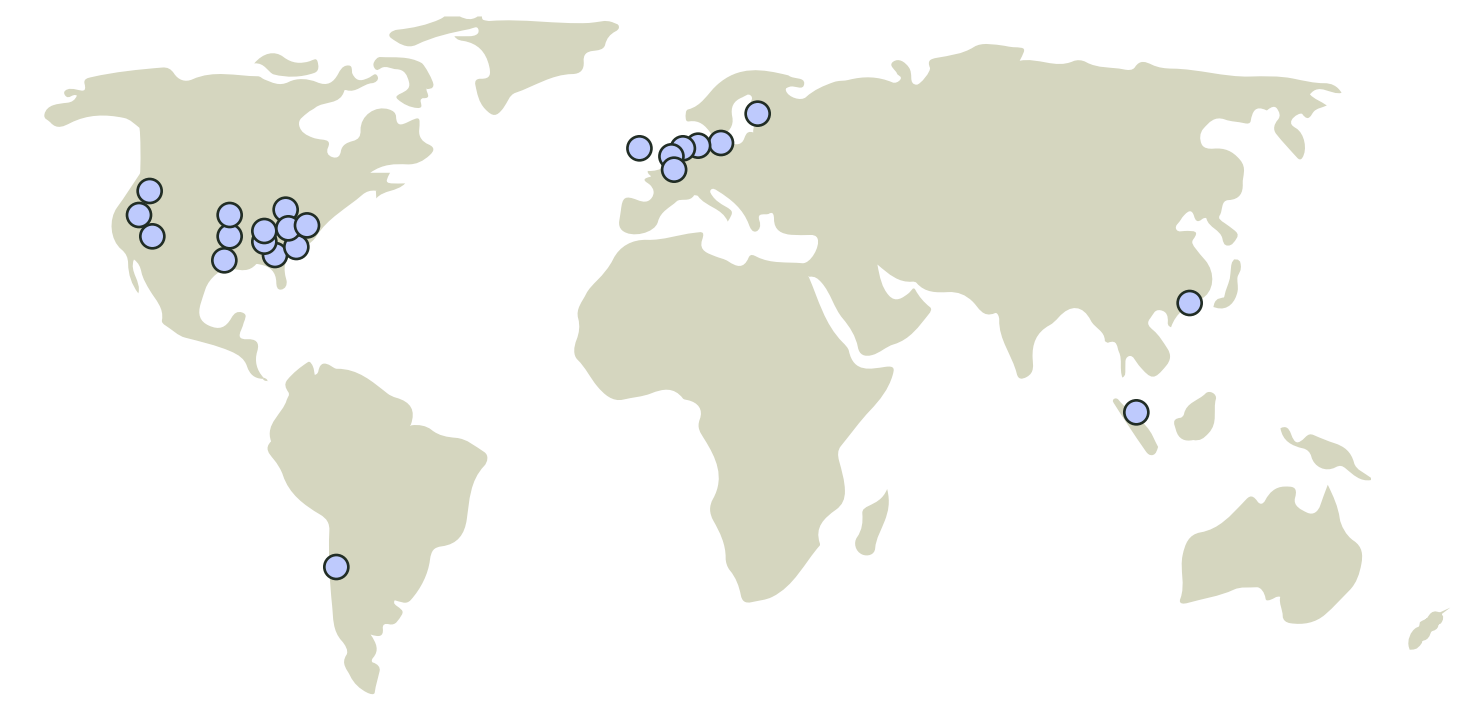
According to the International Energy Agency, data centres consume approximately 200 terawatt-hours (TWh) of electricity, or nearly 1% of global electricity demand, contributing to 0.3% of all global CO₂ emissions.

How the system works



Summary

Google's Data Centre Map



Every bit of data on the internet — from our iCloud files to our frequented websites — are stored in an interconnected network of data centres across the world. Each bit of data is likely stored in multiple data centres, a common practice by cloud providers to backup your data. These data centres can be independently owned or managed by mass providers of web storage, such as Equinix, Microsoft Azure, Google, IBM, or Amazon.

Unless you are building your own website from scratch, the data centre that stores your data isn't determined by you. In the past, there have been discussions surrounding B2C green cloud storage - but as of yet, there are no services we can recommend. Even if you transfer your files and images from iCloud to a green hosting service, you have no control over what data centre stores the content you access online. From Netflix to the news, we, unfortunately, have no control over how sustainable our access is, or where it's stored.

If you are developing your own website from scratch, there are a number of green hosting services, such as [Leafcloud](#), that we can recommend that will store your data on environmentally conscious servers. Unfortunately, at this stage, this excludes CMS services such as Squarespace and WordPress.

Progress in sustainable data centres

CORPORATE-LEVEL:

Microsoft's Project Natick is working the reduction of emissions created from cooling the data servers by submerging server racks in specially designed fluids and powered by offshore renewable energy. [Google is aiming to have its data centres run on 100% renewable, carbon-free energy by 2030.](#)

GLOBAL RECOGNITION:

The European Union is not ignoring the problem. To fit in with its digital strategy, they have set the goal of [climate-neutral data centres by 2030](#). Implementing best-practice ideas like efficient cooling systems, heat reuse, better infrastructure, and renewable energy supplies can go a long way towards achieving these goals.

INDUSTRY STANDARDS:

The [JRC Code of Conduct](#) is a collection of best practices for data centres to be energy efficient, and therefore have a smaller impact on the environment. As of 2022, 450 data centres have joined this code of conduct and actively adhere to the guidelines. (Think: B-Corp but for data centres)



Equinix owns the most data centres globally — with 202 of them spread across 27 countries worldwide.

2

SDD Trends

This section will highlight initiatives leading the way forward and core trends emerging within the Sustainable Digital Design space.



Challenging unsustainable clients

We are seeing a surge of companies cutting ties with unsustainable and unethical companies at all levels of the creative industries. At the top level, this includes initiatives like Clean Creatives or planet pledge which encourage advertising, PR, and marketing agencies to state their commitment to stop working for environmentally detrimental clients. It's not just agencies and studios challenging clients.

A major contributor to achieving B-Corp status can be determined by the types of clients and suppliers an organisation works with. The B-Corp point system rewards applicants who have a high proportion of their revenue coming from sustainable, ethical, or purpose-driven clients.

HIGHLIGHTED PROJECTS

Industry Pledges

Clean Creatives is a collective of industry leaders who are continuously rallying against working with fossil fuel companies. The collective has launched multiple media campaigns, and published reports around an active pledge that encourages PR and advertising agencies to refuse contracts with companies considered environmental polluters. Planet Pledge is a CMO-led initiative and educational centre for marketing professionals aimed to promote and pledge support for the UN Sustainable development goals.



Guidelines

Run by The Glimpse Collective, the Brief Sabotage Handbook aims to motivate young creatives to act against high-carbon clients. The Handbook has been distributed online and through live protests in front of companies' offices in London.



“Advertising is only evil when it advertises evil things. Like Shell, or pop tarts.”
— David Ogilvy

External Motivation

A major contributor to achieving B-Corp status can be determined by the types of clients and suppliers an organisation works with. The B-Corp point system rewards applicants who have a high proportion of their revenue coming from sustainable, ethical, or purpose-driven clients.



“The wider and more established your platform is as a designer, the bigger the responsibility becomes, and the greater your impact when it comes to raising awareness”

– JOSEPH TÖREKI

Creatives for good

There is a growing trend in digital and creatives using their skills, creativity, and platforms to support sustainable and ethical initiatives and companies. This trend is comprised of studios

and agencies that only serve ethical and sustainable clients for profit, and collectives and individuals volunteering their skills for good causes or public awareness.

HIGHLIGHTED PROJECTS

MEK

Studio Mek is an ethical and sustainable design studio building future-ready brands with social and environmental impact. MEK has successfully built a profitable and successful agency by focusing purely on sustainable and ethical clientele and projects.

Mek

Creatives for Climate

A network of creatives that create and run workshops and conferences, and produce educational resources that drive action and education about climate change.



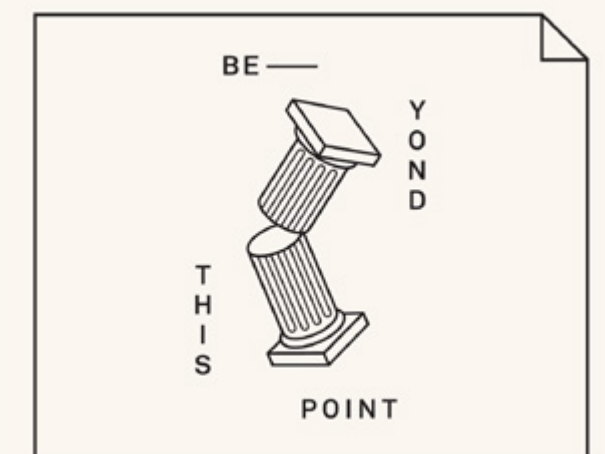
Pekka Niittyvirta & Timo Aho

Using digital and physical methods to demonstrate the impact of sea-level rise on the planet. In their project, Lines of Light, they installed LED lights around Scotland's Outer Hebrides to show where sea levels will rise too if we don't act now. The result of their project is a shocking visualisation of the true impact rising sea levels will have on people's homes and communities. You can explore the impact digitally and see what could happen to your own home or city through their platform [Coastline Paradox](#).



Beyond This Point

A sub-platform of the design studio, Civilisation, where creatives can be invited to discuss ethical design practices, from sustainability to social justice.



Greener Production

Platforms, studios, and agencies are starting to wake up to the fact that their day-to-day work has a carbon footprint. A trend in open source tools, energy efficient websites, green servers and conscious individual-level usage. The movement to design, develop and produce in ways that require

less data and therefore produce less CO₂ in their end use is only in its early days. The coming years are likely to bring with them an onset of exciting and practical new tools, techniques, and approaches to digital design, development, and production.

HIGHLIGHTED PROJECTS

Dodonut


Dodonut is a web development studio which focuses on low-carbon websites and features on their websites. They also offer full transparency into the carbon weights of their own website, and how they calculate their emissions.



Dodonut
Sustainable design
for mindful brands.

Manoverboard

Manoverboard is a B-Corp UX/UI development studio based in Manitoba which focuses on green web development. They also offer other resources to creators and developers.



In a Sea of
Digital Noise
**We Bring Humanity
to the Surface**

Heylow

Developing cool, aesthetic websites that are carbon neutral while also providing resources on their development process, such as where they go for green website hosting.



Hey a Low
Carbon Future
is Possible

Education



Sustainability is a complicated, multi-faceted, ever-evolving topic. The increasing popularity of the topic in publications and educational platforms shows the growing awareness and shifting public opinion. Understanding the problem is the

first, critical step these publications need to take, but in coming years their purpose will need to extend, seeing them become hubs where all digital users can keep up to date with latest developments and trends, and educate themselves.

HIGHLIGHTED PROJECTS

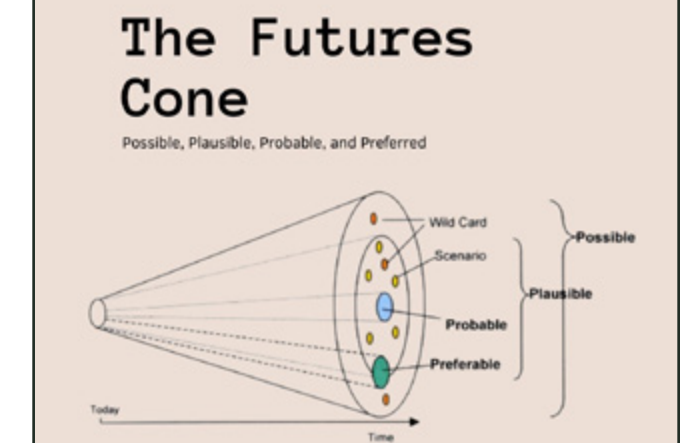
We are Europe

A news platform that covers a wide range of climate change topics, from sustainable digital design to eco-anxiety. They also include interesting sustainable features on their website, like text descriptions of images which you can load only if you are interested.



Probable Futures

Interactive maps of future climate scenarios based on scientific models of global temperature rise. They also provide stories and explanations to educate people about climate change.



Lowtech Magazine

A website about sustainable technology that is powered entirely by solar power. They provide resources on how they power their website and the energy and carbon attached to it.



Branch

A website that changes based on grid and carbon intensity and energy sources in your area, providing information and education on sustainability and the climate crisis.



Loww Directory

The Lowww Directory is a catalogue of low-data and low-carbon websites.



User Behaviour

Informing and providing simple choices for more sustainable product usage is becoming increasingly common. Small interventions are giving product designers a chance to directly encourage more sustainable behaviour among

users such as websites encouraging low-use modes or click to load modes. As this trend develops, we expect to see increasingly more digital products being designed with end user behaviour in mind.

HIGHLIGHTED PROJECTS

Organic Basics


Eco-friendly and ethically made underwear and activewear. They also have resources for sustainable digital design, such as their low impact website manifesto and sustainable website for their own products — which limits data usage if your energy source has high carbon intensity.



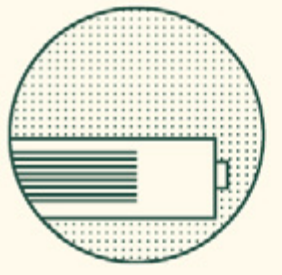
“Digital designers should think beyond the product to the end user and consider ways that they can build or design recommendations that will lower the usage cost. Suggestions such as lowering video resolution, toggling animations on or off, or pushing for regularly listened to songs to be downloaded rather than streamed, will have a small, but incremental, impact on the total environmental cost.”

– RACHEL HE


1. Does not load any images before they are actively requested by the user.



2. Minimizes the power consumption on the users device.



3. Adapts to reflect the amount of renewable energy it's currently running on.



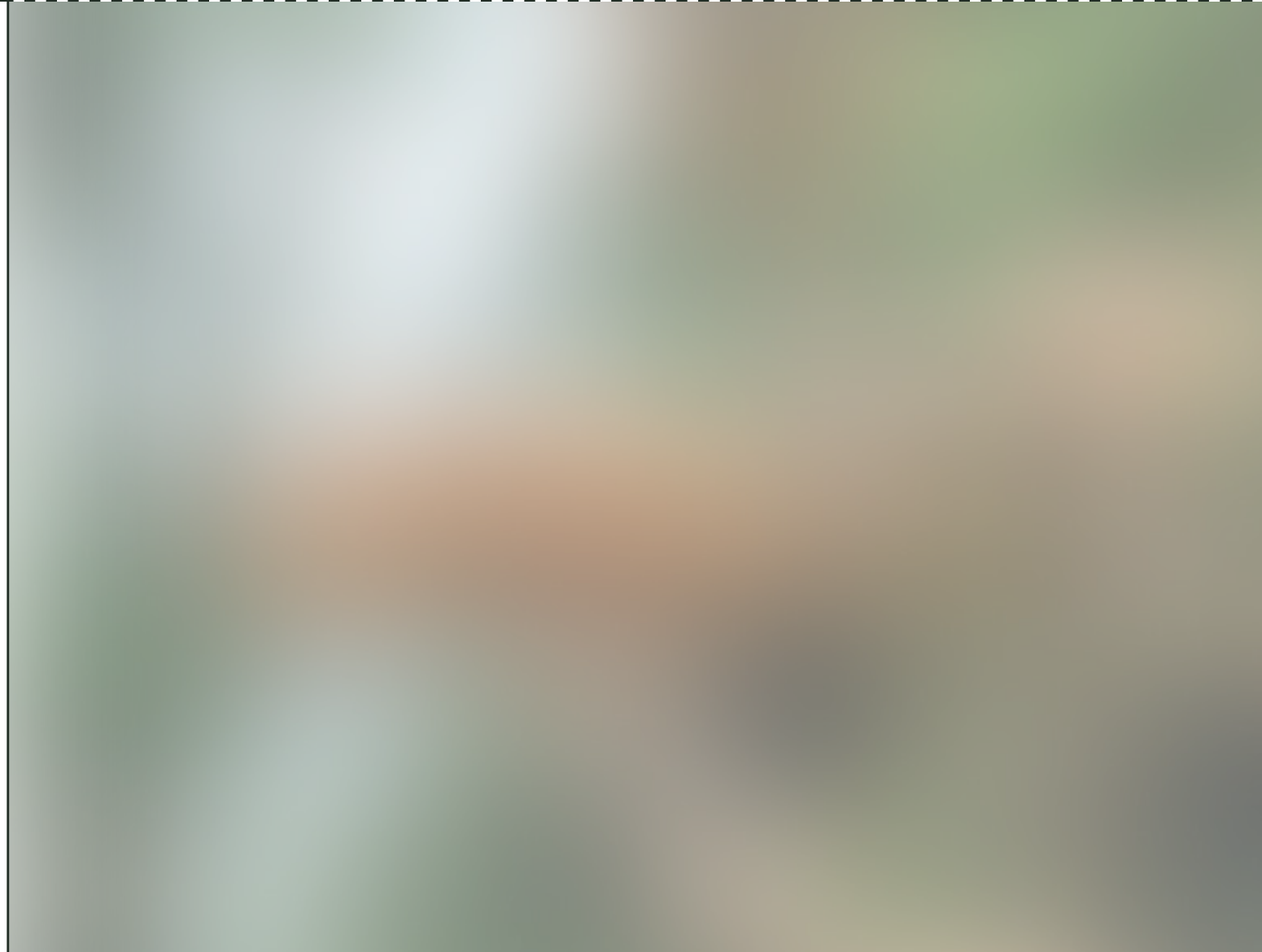
3

Opportunities

FORESIGHT

Digital & Creative Businesses

With the advent of new questions, challenges, and changes, it is essential to reflect on the implications of digital and creative businesses. New digital business strategies are emerging that reward reactivity and change. This comes at the expense of those who focus only on outdated growth models.



Better Brand Experiences

In our growing conscious-consumer era, creative and digital businesses that become the go-to's for building sustainably minded brands and products will be in demand. According to a [2020 First Insight report](#), 73% of Gen Z consumers are willing to pay more for sustainable products. A further study by [Simon-Kucher & Partners](#) found that 85% of people globally indicated their purchase behaviour shifted toward being more sustainable in the last five years. Over a third of those surveyed say they are willing to pay a 25% premium on average for more sustainable products and services.

As consumer uncertainty increases, new expectations and motivations must be addressed. The growing sustainable value economy is now diversifying as consumer behaviour disrupts not only traditional production but also branding, creative communications, and brand experience tactics. This shift enables us to quantify perceived sustainable value in brand experience terms. Brands opt for sustainably affirmative communications and touchpoints. For example, brand touchpoints focused on participation and community building to convert sustainable brand values into a tangible economic force.

Ethical Employees

Younger generations are questioning not only how they spend their money but, increasingly, how they make it. Environmental, social, and corporate governance (ESG) commitments are now expected as a bare minimum. A recent study shows that 31% of Generation Z workers in 2022 would turn down roles in companies with poor ESG credentials, and over half (54%) would take a pay cut to work for a business that reflects their ethics. A job market where top talent calls the shots has become the norm. Predictions that the creative and digital sectors in the UK alone will need an additional 1.2 million workers to keep up with growth show

the likelihood that today's employee-run market is not going anywhere soon.

According to the [2021 WeTransfer Ideas Report](#), 43% of creative and digital talent wanted to do something positive for the world. Additionally, the report found that 40% of freelance designers had already turned down work because they did not align with clients' values.

Smart companies know that perks alone won't win the fight for talent. It is becoming paramount for digital and creative businesses to leverage value-based tactics if they hope to attract and retain talent.

THINK POINT

How do we encourage clients to adopt authentically sustainable approaches?

“I truly hope our industry starts to question the practices and ethics of the clients and companies we work with and use our seats at the table to challenge greenwashing and humane washing.”

– MIRELLA ARAPIAN, MEK

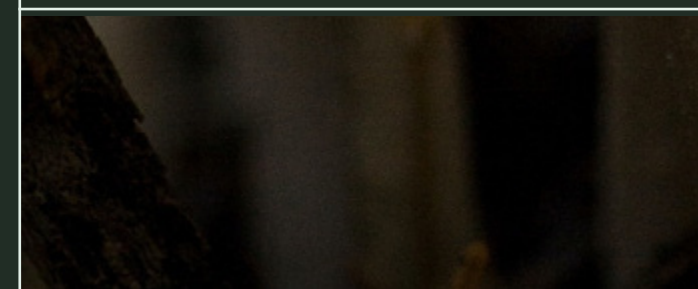
THINK POINT

What can workplaces do to show the talent they are serious about sustainability?

Aligning with sustainable accreditations can show employees your creative digital business is serious about sustainability.

“When Innocent drinks became a B Corp in 2018, CEO Douglas Lamont declared on Twitter it was the “proudest day of my career” and urged CEOs to sign up to the B Corp movement, describing it as a “pretty effective way to grow your business, attract great talent, drive up employee engagement, and deepen brand love”

– CEO DOUGLAS LAMON IN [SUSTAINABILITY MAG](#)





Actions to lever change

Looking at the state of Sustainable Digital Design, it is clear this movement has a long way to go to before it becomes a mainstream way of thinking or working. With a potentially overwhelming number of entry points, it is essential to take change one step at a time. The following actions can be implemented to facilitate shifts in production, behaviour, and awareness. See these actions as starting points in further need of urgent exploration, collaboration and experimentation.

Positive Production

GREENER PRODUCTION

Workplaces and individuals can take the first steps by implementing day-to-day activities to reduce production-associated emissions.

CHALLENGE CLIENTS, BRIEFS & PROCESS

Educate yourself and your studio. Become a leader to clients. Make challenging briefs and sustainable processes the norm.

Positive Behaviour

ENCOURAGE LOW-IMPACT CHOICES

Use your skills to harness marketing & communications that drive more sustainable consumer behaviour. Volunteer to create campaigns for climate-positive organisations or challenge clients to include sustainable usage guides in advertising and communications, or the product itself.

RESPONSIBLE PRODUCT USAGE MADE EASY

Challenge frictionless product design and consider in-product interventions to allow users to make a choice and become more aware of their behaviour. Awareness and education at the point of use can facilitate significant changes.

Positive Awareness

EMISSIONS GRADING AS THE NORM

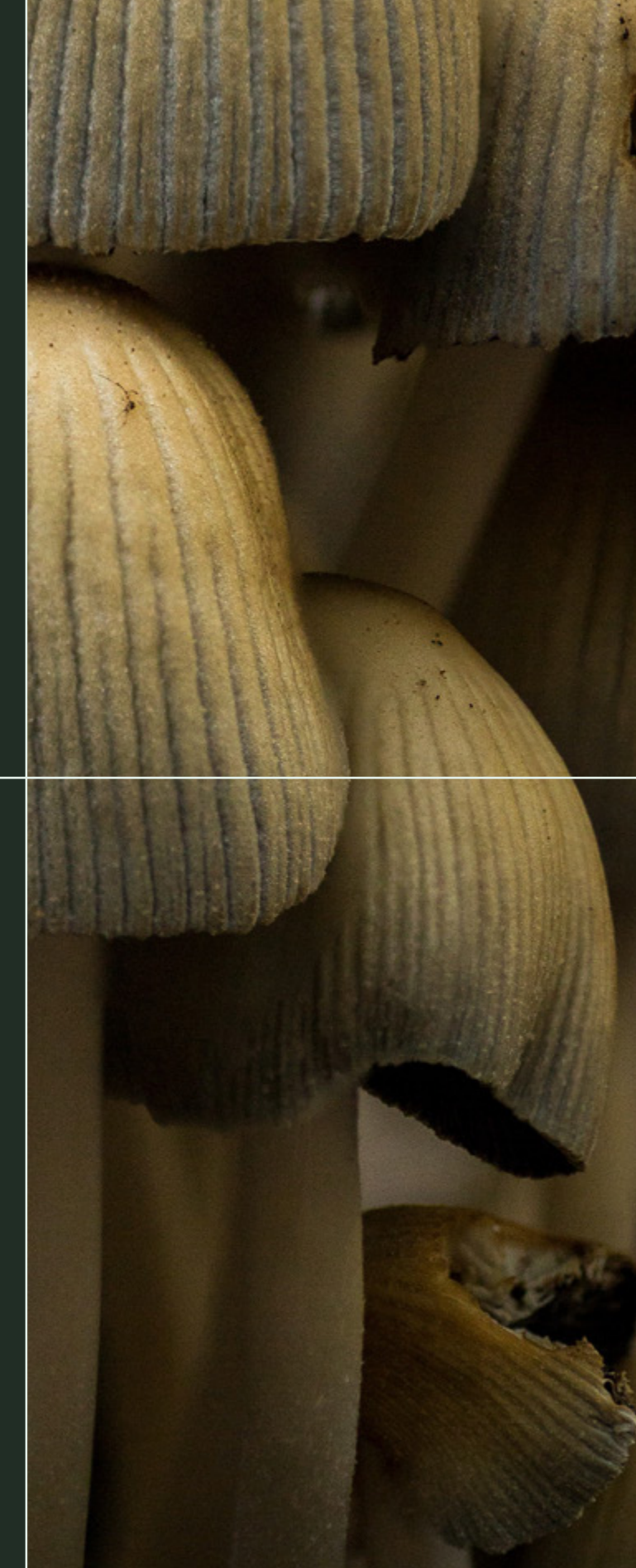
Implement emission tracking in projects and display emissions as the baseline, like an energy label on appliances. Become a leader in bringing emissions front of mind to all audiences, users, and clients.

INDUSTRY STANDARDS

Work to define your personal, project and organisational standards and emission KPIs. Participate in a pledge, or start your own. Creating standards for individual sectors lets the whole industry know where they need to get to.

COLLABORATE ON COMMON GOALS

It's in the industry's nature to collaborate. New standards must be developed, new ways of working created, and public and client awareness increased. Join a community like SDD or start your own. Share knowledge, encourage each other and change will come.



Summary

This report was developed by Wonderland
For the Sustainable Digital Design platform.
Wonderland is a digital design studio
Based in Amsterdam, Netherlands
And was established in 2016.

Sustainable Digital Design is an open platform and
community for documenting and sharing knowledge,
conducting creative experiments, and taking action
towards creating more sustainable digital spaces.

Get in Touch

IS YOUR STUDIO OR ORGANISATION INTERESTED
IN LEARNING MORE ABOUT SUSTAINABLE
DIGITAL DESIGN?

We offer workshops, talks and consultation
in sustainable digital design practices.

Get in touch at
hello@sustainabledigitaldesign.com

WONDERLAND
VINKENSTRAAT 119, 1013 JN, AMSTERDAM, NL
HELLO@WONDERLAND.STUDIO

Credits

SUSTAINABLE DIGITAL DESIGN
IS A WONDERLAND INITIATIVE

AUTHORS

Molly Rooyackers Researcher & Analyst
Grace Houghton Lead Strategist & Project Lead
Hala Al-Sadi Content and Project Management

EDITORS

Theo de Monchy
Grace Houghton

DESIGN

Zuzanna Loch



About this Report

This report was first published in October 2022, and is based on research gathered by the team at Sustainable Digital Design and Wonderland. The contents and conclusions of this report are based on research, resources, articles, and calculations that were written or created between 2019 and 2022.

If you have any questions about the content or methodology of this report, please contact hello@sustainabledigitaldesign.com.

