eGreen

REDUCING THE IMPACT OF DIGITAL PRACTICE ON THE ENVIRONMENT

Kit for VET professionals

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01 INTRODUCTION

CONTEXT

The eGreen project is an initiative created to address and reduce the environmental impact of the digital transformation of the VET (Vocational and Education Training) sector. Following the outbreak of the COVID-19 pandemic, VET professionals sought to adapt by digitalising their daily practices and developing new online opportunities for VET learners. Partner organisations from France, Italy, Ireland and Estonia will seek to reinforce the capacities of VET professionals & learners by developing resources to engage them in an inclusive & green digital transformation. The eGreen project foresees the development and dissemination of short-term, mid-term and long-term solutions so that VET professionals and learners can actively engage in a thriving green digital transformation.
The digital world is fast changing, so we all need to update ourselves regularly to the new changes.

The objectives of the project are

- Valorise the best practices for inclusive green digital transformation in the VET sector.
- Creation of a pedagogical tool for VET professionals to implement measures toward green digital transformation.
- Development of a method to raise awareness and engage VET learners in the green digital transformation.
- Enable VET learners to reduce their digital impact on the environment.

Following the main activities of the project, four main results are expected to be achieved

1. Cross-country study on the best practices regarding green digital transformation in Europe
2. Kit for VET professionals to reduce their digital footprint on the environment
3. Creation of inclusive training for VET learners on green digital transformation
4. Interactive tools to support VET learners in reducing their digital impact

The **specific objective** of this Tool Kit is to support VET professionals in implementing measures around green digital transformation (GDT). Through this kit, the consortium wants to reinforce the capacities and knowledge of VET professionals to support them in implementing new working methods and practices that are "digitally" less impactful for the environment.

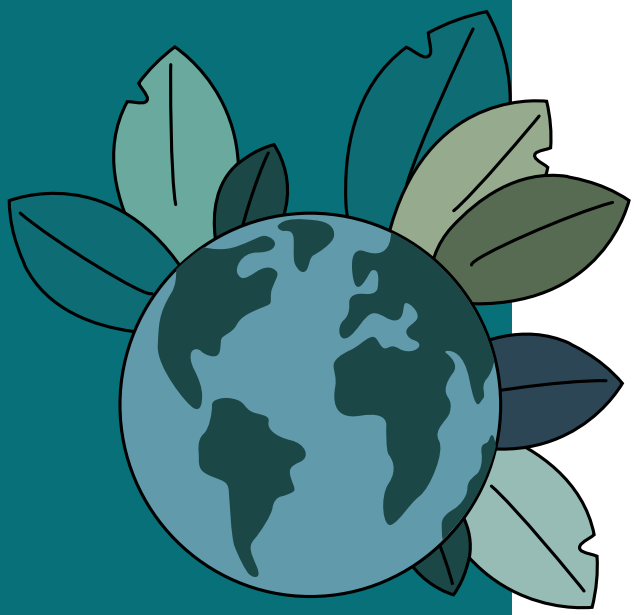
Structure

In this Toolkit you will find: a glossary and a Co2 Emission comparative Table. The document is divided in eight topics, with each section divided into a research section including four important facts with links to tutorials, and a self-assessment tool through a checklist of easy-to-implement measures.
All sources used are shared at the end of the document.

02 GLOSSARY OF TERMS

Carbon emissions	The release of carbon dioxide and other greenhouse gases into the atmosphere, causing global warming and climate change.
Carbon footprint	A measure of the amount of greenhouse gases (such as carbon dioxide) emitted into the atmosphere due to human activities, such as driving a car or sending an email. CO2e stands for carbon dioxide equivalent, which expresses the impact of different greenhouse gases on the environment in a common unit.
Cloud storage	A type of digital storage where data is stored on remote servers that can be accessed via the internet, instead of on a local device.
Cookies	A cookie is a small text file that a website stores on a user's device (computer, smartphone, etc.) when they visit the site. Cookies are used to track user activity on the website, remember user preferences, and personalise the user's experience.
Data centre	A facility that houses computer systems and associated components, such as telecommunications and storage systems. Data centres consume large amounts of energy to power and cool the servers and other equipment.
Device	In the context of technology, a device refers to any electronic or digital tool used to perform a specific function. Examples of devices include smartphones, laptops, tablets, and smartwatches. Devices can be both hardware (physical components such as a screen or keyboard) and software (programs or apps that run on the device).
Digital transition	The process of integrating digital technologies into various aspects of society, including business, government, education, and healthcare. This can involve the adoption of new digital tools and platforms, as well as the transformation of existing systems and processes.
Digitalisation	The process of converting analogue information or processes into digital formats or systems. This can involve the use of digital technologies to capture, store, and analyse data, as well as the automation of various tasks and processes.

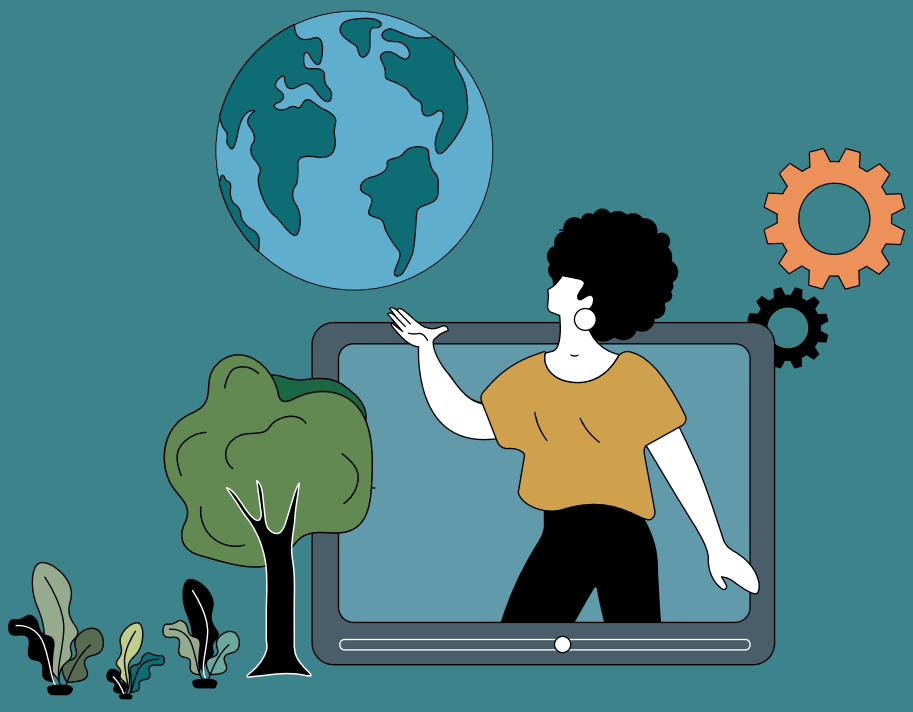
E-waste	This term refers to electronic waste, which includes any electronic device that is discarded, donated, or no longer used. Examples of eWaste include smartphones, computers, and televisions. eWaste can be harmful to the environment if not disposed of properly, as electronic devices contain toxic materials such as lead and mercury.
Green transition	The shift towards a more sustainable and environmentally friendly economy and society. It involves reducing carbon emissions, increasing the use of renewable energy sources, and promoting sustainable practices in all areas of life.
Greenhouse gas emissions	The release of gases into the atmosphere that contributes to the greenhouse effect, causing global warming and climate change. The main greenhouse gases are carbon dioxide, methane, and nitrous oxide.
Greenhouse gas	A gas that contributes to the greenhouse effect, causing global warming and climate change. The main greenhouse gases are carbon dioxide, methane, and nitrous oxide.
Information and Communication Technologies (ICT)	Refers to a broad range of technologies used to manage and communicate information, including computers, software, telecommunications equipment, and the Internet.
Terawatt-hours (TWh)	A unit of energy that is equal to one trillion watt-hours. It is used to measure the total amount of energy used by data centres.
Transmission	The process of sending an email from one device or location to another, using the internet or other electronic communication networks.



03 CO2 EMISSION TABLE

Activity	Estimated CO2 Emissions (g/usage or hour)	Estimated metres are driven by car*
Sending/receiving (1 email)	4	33
Cloud storage (video of 1 hour)	5	41
Printing one double-sided A4 page	6.5	53
Web browsing research (1 hour)	55	449
Video streaming (1 hour)	55	449
Social media (1 hour)	70	572
Cybersecurity measures (firewalls, encryption, etc.) per year	5,500	44 935 m = 45 km
1 device production (ex: smartphone, laptop, etc.)	72,000	587 399 m = 587 km

**According to the European Environment Agency (EEA), the average CO2 emissions from new passenger cars registered in the European Union (EU), Iceland, Norway and the United Kingdom (UK), in 2019 was 122.4 grams per kilometre (g/km). However, it's important to note that this figure may vary depending on the specific make and model of the car, as well as driving conditions and habits.*



04 MANAGEMENT OF EMAILS

Emails form now an integral part of daily practice of professionals across Europe, assessing their carbon footprint is therefore crucial to reduce the impact of VET digital practice on the environment. It is estimated that every time a solely text-based email is sent, it emits 4g of CO2e and goes up to 50g if it contains multiple attachments. Given that a person's average annual email usage produces between 3 to 40 kg of CO2e, it equates to driving a small petrol car for 16 to 206 kilometres.

Nonetheless, as pointed out by Rodrigues Viana, Boucher & Cheriet (2023), the carbon benefit of taking the time to delete 1000 emails would be of five grams CO2e. In the meantime, using a laptop for 30 minutes to delete them would emit 28 grams of CO2e. This means that manually deleting your emails can actually become counter-productive as using the computer would consume more energy. It remains difficult to quantify precisely the carbon footprint of emails given that ICTs are developing constantly, and that energy efficiency of data transmission and storage is constantly improving.

The eGreen initiative therefore suggests that professionals implement simple and convenient processes that would greatly reduce the number of emails sent and received automatically rather than allocating too much time to the task of deleting them.

TUTORIALS

- How to clean your inbox and keep it clean
- How to unsubscribe from unwanted emails
- How to set up rules to filter your emails (gmail)
- How to set up rules to filer your emails (outlook)

IMPORTANT FACTS

1. A single email has a carbon footprint of about **4 grams of CO2e** (carbon dioxide equivalent), which is equivalent to driving a car for about 10 metres. The carbon footprint grows up to **50g CO2 for an email** with a long and tiresome attachment.

2. The carbon footprint of emails is significant and continues to grow each year. In 2010, it was estimated that emails were responsible for **986 million tonnes of CO2 emissions annually**, which was equivalent to the emissions from 4 million cars driving around the world 1.6 times.

3. In 2022, it was estimated that approximately **333.2 billion emails** were sent and received each day, and this number is expected to increase to over **376.4 billion by 2025**.

4. The location of the recipient also plays a role in the carbon footprint of an email, as emails sent over longer distances require more energy to transmit and deliver. For example, the carbon footprint of sending an email from Europe to Asia is around **10 times higher** than the footprint of sending an email within Europe.

Checklist

FOR INDIVIDUALS

- [ ] Clear my inbox as soon as I have processed an email.
- [ ] Set up rules to filter my emails.
- [ ] Send emails with links to files instead of sending emails with large attachments.
- [ ] Do not reply or send any unnecessary emails.
- [ ] Do not use cc in emails, if not necessary.
- [ ] Avoid sharing my email if not necessary.

FOR ORGANISATIONS

- [ ] Our organisation provides digital tools to help professionals clean their inboxes automatically.
- [ ] Our organisation provides pedagogical tools or trainings to help professionals adopt healthy habits (how to unsubscribe from newsletters, how to set up filters, etc).
- [ ] Our organisation encourages the systematic use of an internal professional cloud rather than email and attachments.
- [ ] Our organisation deletes advertising emails when received and encourages students to do the same.
- [ ] Our organisation regularly unsubscribes from promotional emails.
- [ ] Our organisation clears out inboxes regularly.

05 CLOUD STORAGE

The pollution caused by data centres comes mainly from their continuous need for electricity as they operate 24/7. As they process the constant flow of data, data centres also generate colossal streams of heat that need to be abated to prevent the equipment from malfunctioning. Data centres therefore require massive cooling systems (either from air conditioning or water cooling) which are additional sources of negative environmental impact that need to be considered when tackling the issue of data storage.

Big data companies such Amazon, Google, or Facebook have already advertised about their modern data centres which are meant to help them reach their carbon-neutral objectives. While these infrastructures indeed greatly reduce their impact on the environment, Monserrate (2022) points out that the larger issue relies on smaller-scale data centres which are numerous and often located in old infrastructures, not optimised for cooling, and data storage capacity needs.

The current impact and estimated exponential growth of cloud storage is a challenge that has to be tackled through a multi-level response. There is a wide range of simple measures that can be implemented to efficiently reduce data storage pollution and it is up to both professionals and organisations to implement it effectively in daily practice. It is also worth mentioning that reducing overall individual and organisational data storage within a whole organisation will also greatly reduce economic costs while making a significant contribution to the green digital transition.

TUTORIALS

Tutorials to elaborate an efficient and environmental friendly cloud storage:

- How to find a sustainable cloud storage provider
- How to share files using iCloud
- How to back up your computer data
- How to clean unnecessary data
- How to set up a Network Attached Storage

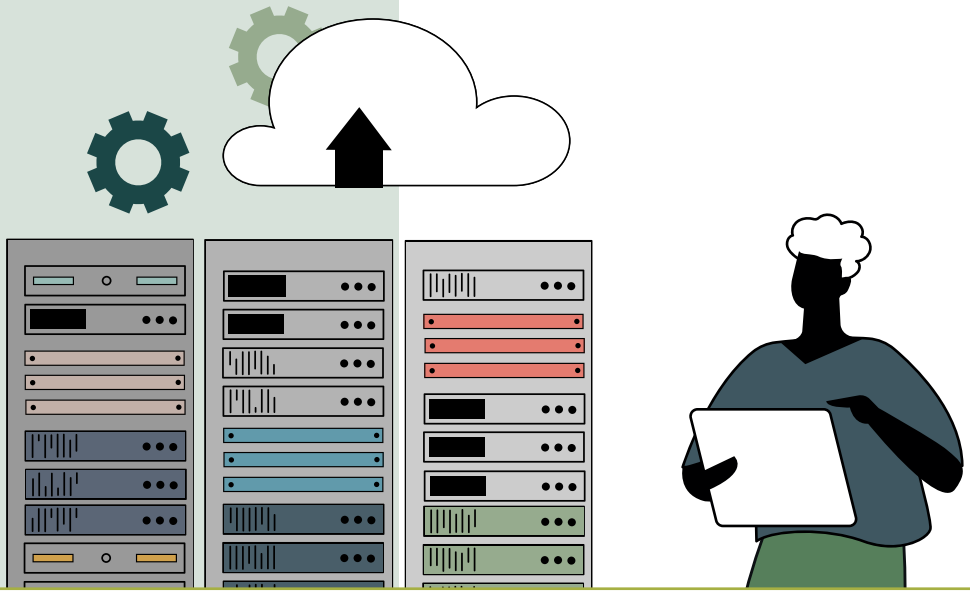
IMPORTANT FACTS

1. The carbon footprint of digital storage is not well understood or regulated. There is currently no standardised method for calculating the carbon footprint of data storage, and data storage companies are not required to disclose their emissions or energy usage.

2. The Cloud now has a greater carbon footprint than the airline industry. A single data centre can consume the equivalent electricity of **50,000 homes**.

3. Data centres consume approximately **200 TWh** of electricity or nearly 1% of global electricity demand, contributing to **0.3% of all global CO2 emissions**.

4. The energy consumption of digital data storage is a significant contributor to greenhouse gas emissions. In 2021, data centres were **responsible for around 1% of global carbon emissions**, and this is projected to increase to **3% by 2025**.



Checklist

FOR INDIVIDUALS

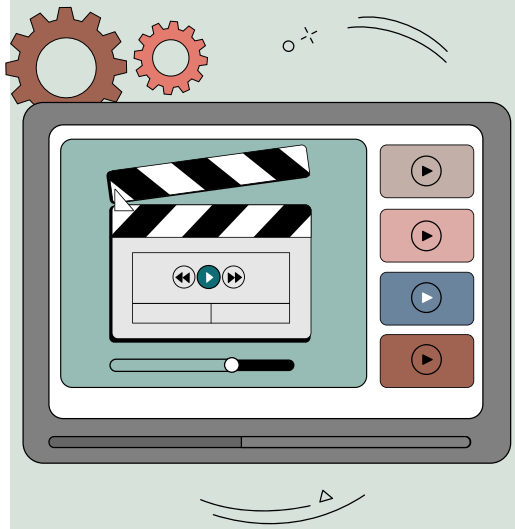
- [ ] Use a sustainable cloud storage software.
- [ ] Save digital files locally if they are only for my own use. I share them only via the Cloud if necessary.
- [ ] Back up my files at least once per month on local storage (hard drive).
- [ ] Clean local and digital storage at least once every month by using automated tools.
- [ ] Regularly check for duplicate files on both my computer and on Cloud.
- [ ] Use adapted tools for my tasks[1].

FOR ORGANISATIONS

- [ ] Our organisation provides a shared unique storage area that employees have to use (cf: tutorial 4 on Network Attached Storage).
- [ ] Our organisation implement an archiving policy that promotes the storage of unused data after a certain period of time.
- [ ] Our organisation developed a Data charter that provides clear processes for the management and storage of data that all employees have to adhere to.
- [ ] Our organisation provides a pack of files saved locally that is available to all employees to avoid storing routine documents.
- [ ] Our organisation cleans digital storage at least once per year.

[1] *(i.e. using the notepad app on windows for note taking as it is way less heavy than creating and saving a word document)*

06 THE IMPACT OF STREAMING MEDIA



Measuring the environmental impact of video streaming is a complex task as there are many identifiable parameters to consider. According to a study published by Ademe (2022), a French public agency promoting environmental sustainability and sobriety, the environmental impact of a cultural item depends mostly on how intensively it is used, whether digital or physical. Digitalisation increases the number of equipment required. This equipment, which needs a wide variety of raw materials and metals, has a significant impact on the environment.

Based on available data, the IEA estimates that one hour of video streaming consumes around 0.08 kWh of energy and emits approximately 36g of CO2. To put this into perspective watching an average-length movie or two back-to-back hour-long episodes would require planting at least one tree in your garden to offset the emissions.

Addressing the environmental impact of video streaming is therefore crucial on both global and individual levels. There are numerous solutions to drastically reduce the environmental impact of streaming services. Implementing energy-efficient practices in data centres and transmission networks can significantly lower emissions. Individuals can also make simple conscious choices like opting for lower-resolution streaming or reducing streaming hours. Supporting and utilising renewable energy sources for streaming platforms can also contribute to a more sustainable digital landscape.

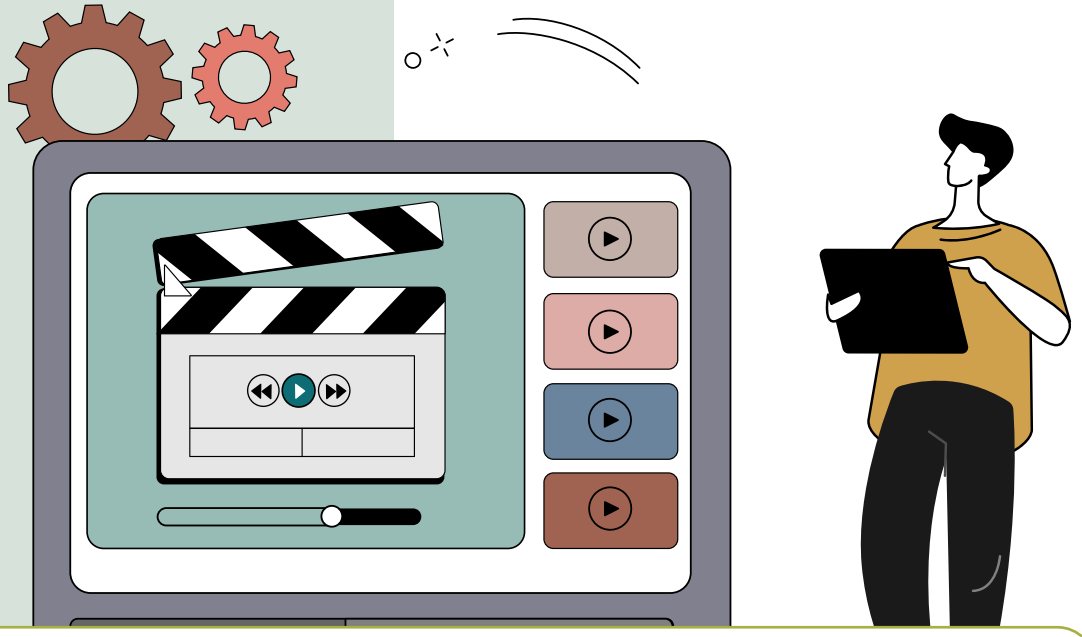
To be effective, the impact of streaming media will have to be weakened by streaming platforms themselves, as well as organisations and individuals. Professionals can contribute to the collective effort adopting eco-friendly streaming habits and promoting environmentally conscious practices within their institutions and among learners. Awareness campaigns and educational initiatives can further foster a culture of environmental responsibility within the VET sector, creating a positive impact on the environment.

TUTORIALS

- How to adjust streaming quality on Amazon Prime Video
- How to change streaming quality on Netflix
- How to set up a limit on screen time for Apple devices
- How to set up a limit on screen time for Android devices

IMPORTANT FACTS

1. Video streaming accounted for **80% of global data flux on the Internet in 2018**. It was even higher during COVID and keeps increasing.
2. Online video (including both streaming and downloading) accounted for approximately **1% of global greenhouse gas emissions in 2018**, or around **300 million tonnes of CO2** equivalent. With the constant increase in usage, it could potentially reach **7% by 2025**.
3. Video is a dense medium of information: 10 hours of high-definition film is more data than the entire English Wikipedia article database in text format.
4. Online video viewing generated more than **300 MtCO2 in 2018**, as much greenhouse gas as Spain, or almost 1% of global emissions.



Checklist

FOR INDIVIDUALS

- [ ] I prioritise streaming in the lower-quality resolution.
- [ ] I use energy-efficient devices to watch my videos.
- [ ] I prioritise Wi-Fi, if available, instead of Mobile Data.
- [ ] I use offline mode for my music and videos, if possible, and stream music on audio instead of video platforms.
- [ ] I deactivate autoplay.
- [ ] I don't stream on more than one device at the same time.

FOR ORGANISATIONS

- [ ] Our organisation has an efficient Wi-Fi connection for all employees.
- [ ] Our organisation stores local communication outputs and video media used frequently.
- [ ] Our organisation provides energy-efficient devices.

07 THE USE OF SOCIAL MEDIA

Social media has undoubtedly become a fundamental aspect of our modern society, connecting billions of people across the globe whether it is for personal or professional use. Nonetheless, we cannot ignore the environmental consequences that come with interconnectedness.
According to Greenspector, the top 10 social media platforms together emit a shocking 262 million tonnes of CO2e, which accounts for about 0.61% of global emissions. To put it in perspective, it is equivalent to the carbon footprint of an entire country like Malaysia.

The environmental impact of social media is influenced by various factors, with data processing, storage, and hosting multimedia content being the most significant contributors. As the demand for data continues to rise, the energy required to handle and store it also accelerates, leading to higher greenhouse gas emissions.

To tackle this issue, there needs to be a two-pronged approach. First and foremost, solutions at the macro-level must be undertaken at the international or national level through regulations and incentives aimed at companies as well as individuals to reduce the impact of social media. Social media companies themselves can greatly reduce their impact by transitioning toward renewable energy sources for their data centres and improve infrastructure efficiency. By transitioning to clean energy, they can significantly reduce their carbon emissions and contribute to a more sustainable digital landscape.

Individual action also plays a crucial role in mitigating the environmental impact of social media. Limiting the creation and consumption of multimedia content, prioritising meaningful interactions over constant scrolling, and taking periodic social media detoxes are all small yet meaningful actions that, when taken collectively, can make a significant difference in reducing the overall carbon footprint of social media usage.

TUTORIALS

- How to turn off notifications on Android
- How to turn off notifications on iPhone
- How to set up a limit on screen time for Apple devices
- How to set up a limit on screen time for Android devices

IMPORTANT FACTS

1. According to a report by Global Web Index in July 2021, the average time spent on social networks per day is **2 hours and 24 minutes**, which is an increase of **2 minutes compared to 2019**.

2. Considering the average carbon impact (1.15 gEqCO2) of the ten measured applications (TikTok, Reddit, Pinterest, Instagram, Snapchat, Facebook, LinkedIn, Twitter, Twitch, Youtube) per **60 seconds**, the estimated carbon footprint per user per day is **165.6 gEqCO2**.
This is equivalent to travelling **1.4 km in a light vehicle or 60 kgEqCO2** per user per year, equivalent to travelling **535 km** in an average light vehicle.

3. The carbon impact of social media usage alone accounts for **1% of the carbon footprint** of a French individual (7 tons).

4. Taking into account the average time spent on social networks according to the Visionary Marketing blog: if you only use TikTok (up to 52 minutes per projected day), you will consume nearly **149 GB per month**, Instagram (up to 53 minutes per day) **51 GB** and Facebook nearly **19 GB** (up to 58 minutes per day) per month. This shows how much-stored data users create by using social media.

Checklist

FOR INDIVIDUALS

- [ ] I disable social media notifications on my devices.
- [ ] I reduce time using social media by setting up a screen time limit on my phone or tablet.
- [ ] I hide social media apps from the first screen on my devices or I delete unused social media apps from my phone.

FOR ORGANISATIONS

- [ ] Our organisation raises awareness about the pitfalls of social media and their impact on the environment.
- [ ] Our organisation encourages professionals to set up time limits to block the use of social media on professional devices.
- [ ] Our organisation creates chat corners or coffee break minutes where professionals and learners are forbidden to use phones or other devices.
- [ ] Our organisation reduces the number of social media campaigns and uses social media only when needed for digital representation and reaching certain target groups, and/or wider populations.

08 PRODUCING ELECTRONIC DEVICES AND TOOLS

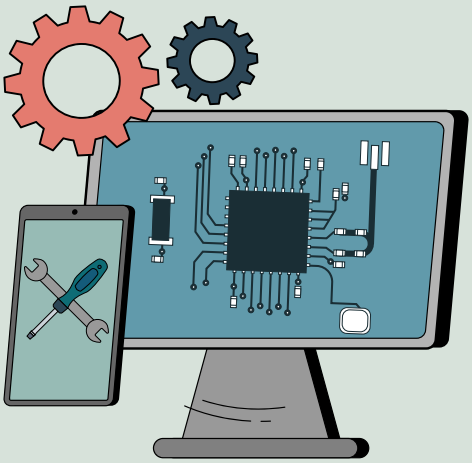
In 2020, the ICT sector was responsible for around 1.5 billion metric tons of CO2 equivalent emissions which is the equivalent of the entire aviation industry. Such high impact on the environment can mostly be attributed to the manufacturing of electronic devices (TV, phone, tablets) as their production (from mining materials to delivery) represents between 60 to 80% of the environmental impact of the service. Additionally, digitalisation as an ever growing phenomenon also leads to increased demand for equipment, which requires various raw materials and metals, significantly contributing to environmental issues.

This means that devices & tools represent a considerable share of the impact of the digital sector on the environment. To address this on a global scale, there needs to be a multi-level approach to the issue. First, it remains crucial to prioritise equipment longevity and drastically reduce the number of devices used, which can significantly improve our environmental indicators. That can be done through the promotion of systematic recycling, the promotion of second-hand use, facilitating the possibility for individuals to repair their own devices and finally, through the overall promotion of digital sobriety.

On an individual level, VET professionals should adopt eco-conscious practices such as optimising device usage and efficiency. Simple actions, like turning off devices when not in use, minimising idle time, and buying second-hand and sustainable materials for tools, can collectively contribute to a greener outcome.

TUTORIALS

- How to extend the lifespan of an electronic device
- How to extend the lifespan of an Android devices' battery
- How to extend the lifespan of an Apple devices' battery
- How to use dark mode on an Apple device
- How to use dark mode onan Android device



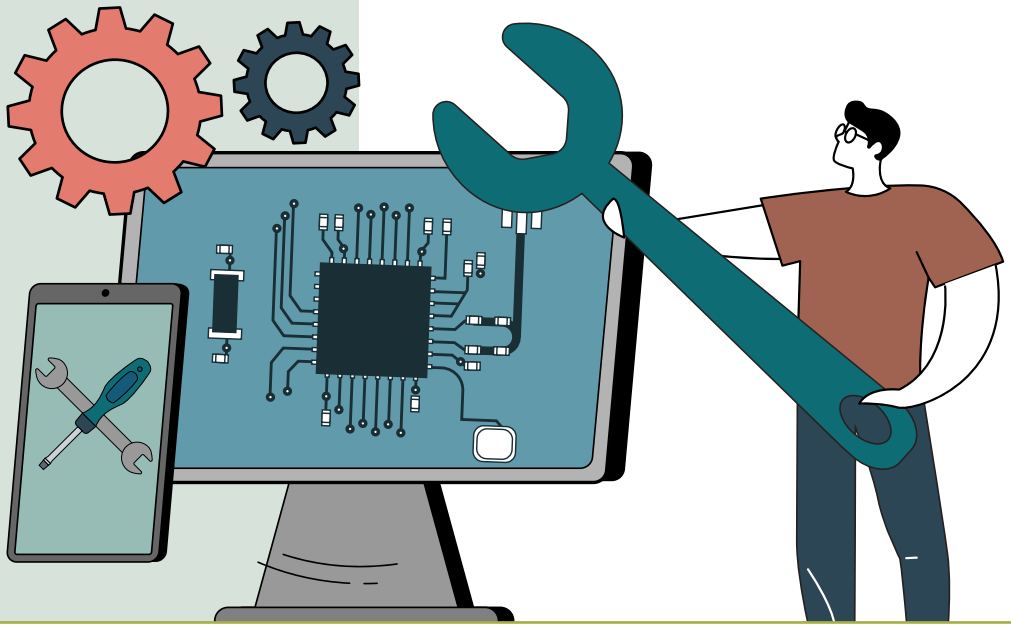
IMPORTANT FACTS

1. According to a report by The Shift Project, a French think tank, the global carbon footprint of digital technologies was estimated to be around **3.7% of global greenhouse gas emissions in 2018.** This is comparable to the emissions produced by the aviation industry.

2. A study conducted by researchers from McMaster University in Canada found that manufacturing a typical laptop computer emits approximately **270 kg of CO2, equivalent to driving a car for about 1,000 miles.**

3. The production of electronic devices accounts for approximately **60 to 80% of the environmental influence** of the whole digital sector.

4. When improperly disposed of, electronic waste releases hazardous substances and emits greenhouse gases during decomposition. A report by the United Nations University estimated that in 2019, approximately **53.6 million metric tons of e-waste** were generated globally, with only **17.4%** being collected and recycled.



Checklist

FOR INDIVIDUALS

- [ ] I maximise the lifespan of my device by taking precautions and adopting simple gestures.
- [ ] I use my devices as long as possible before disposing of them and I avoid buying devices when unnecessary.
- [ ] I systematically purchase second-hand electronics.
- [ ] I use dark/night mode to reduce energy consumption, as dark screens require less power to display.

FOR ORGANISATIONS

- [ ] Our organisation raises awareness among our workers and students concerning the digital carbon footprint of electronic devices.
- [ ] Our organisation recycles IT electronics that are not working and are unrepairable.
- [ ] Our organisation prolongs IT electronics' lifespan by protecting, repairing, and reusing them.
- [ ] Our organisation encourages our workers and students to turn off their devices if they are not using them for over an hour, unplug devices if they are not in use), reduce the brightness of the screen, use dark mode on their devices, and/or turn off keyboard backlighting.
- [ ] Our organisation tracks the power management of our infrastrures.

09 THE IMPACT OF CYBER SECURITY

Practices like encryption and data protection are essential for safeguarding sensitive information, but they also contribute to increased energy consumption, which affects the environment.

A study conducted by Lancaster University in the United Kingdom shed light on the energy consumption associated with cybersecurity activities, including encryption, decryption, and secure communication protocols. The findings revealed that such activities contribute to carbon emissions, and the researchers estimated that global CO2 emissions related to cybersecurity could reach 8.4 megatons by 2020.

The environmental impact is further compounded by the energy-intensive nature of cryptographic algorithms. These algorithms demand significant processing power, leading to higher energy consumption and, in turn, more carbon emissions. Moreover, data centres, which host and power these cybersecurity measures, also play a substantial role in the overall environmental impact.

To address these challenges responsibly, VET practitioners should adopt eco-conscious practices in their daily work. Minimising the use of energy-intensive security measures whenever possible is a practical step. Simple actions, such as turning off unused devices and optimising power settings on computers and other equipment, can collectively make a positive difference.

TUTORIALS

- How to block cookies in your browser
- How to clear cookies on a computer

IMPORTANT FACTS

1. Research conducted by the Carbolytics Project revealed that the energy consumption required to maintain browsing cookies from the top **1 million most-viewed websites** on the Internet amounted to **11,442 metric tons of CO2 per month**.

2. On average, each website generated over **21 million cookies per visit**, belonging to **1,200 companies**, leading to a staggering **197 trillion cookies** created per user per month.

3. The level of energy consumption is equivalent to the carbon footprint of a small European city of roughly **30,000 people** in the same month-long timespan.

4. A study conducted by Lancaster University in the United Kingdom revealed that the energy consumption associated with cybersecurity activities, including encryption, decryption, and secure communication protocols, contributes to carbon emissions. The researchers estimated that global cybersecurity-related CO2 emissions could reach **8.4 megatons by 2020**.

Checklist

FOR INDIVIDUALS

- [ ] I regularly clear cookies from all my devices.
- [ ] I refuse unnecessary cookies.
- [ ] I delete old or unused accounts.
- [ ] I regularly update security settings.

FOR ORGANISATIONS

- [ ] Our organisation sets procedures on how to safely use data and files online.
- [ ] Our organisation deletes old or unused accounts of former employees.
- [ ] Our organisation regularly updates security settings and versions.
- [ ] Our organisation rejects/blocks/limit/regularly clears cookies.
- [ ] Our organisation regularly updates our cybersecurity policy.
- [ ] Our organisation provides an updated and reliable cybersecurity tool for all professionals.

10 USING APPS, PLATFORMS AND INTERNET BROWSERS

According to Mike Hazas, a researcher at Lancaster University, the carbon footprint of our gadgets, the internet, and their supporting systems currently contributes to 3.7% of global greenhouse emissions, comparable to the impact of the airline industry. What's even more concerning is that these emissions are projected to double by 2025.

When conducting quick searches online, you'll come across various carbon footprint calculators. The Website Carbon Calculator indicates that an average web page produces about 0.5 grams of CO2 per pageview. For a website with 10,000 monthly pageviews, this amounts to approximately 60 kg of CO2 per year.

To address our environmental impact both at a global and individual level, we need to consider some crucial aspects. Collaboration across industries becomes imperative to adopt sustainable practices. Developers and service providers must prioritise energy-efficient coding methods and optimise server infrastructures to minimise the ecological footprint of digital platforms and apps.

As individuals, professionals also have a role to play and hold a responsibility to make environmentally conscious choices. By opting for eco-friendly internet browsers and energy-saving apps, professionals can also actively contribute to reducing the carbon footprint of platforms and apps.

TUTORIALS

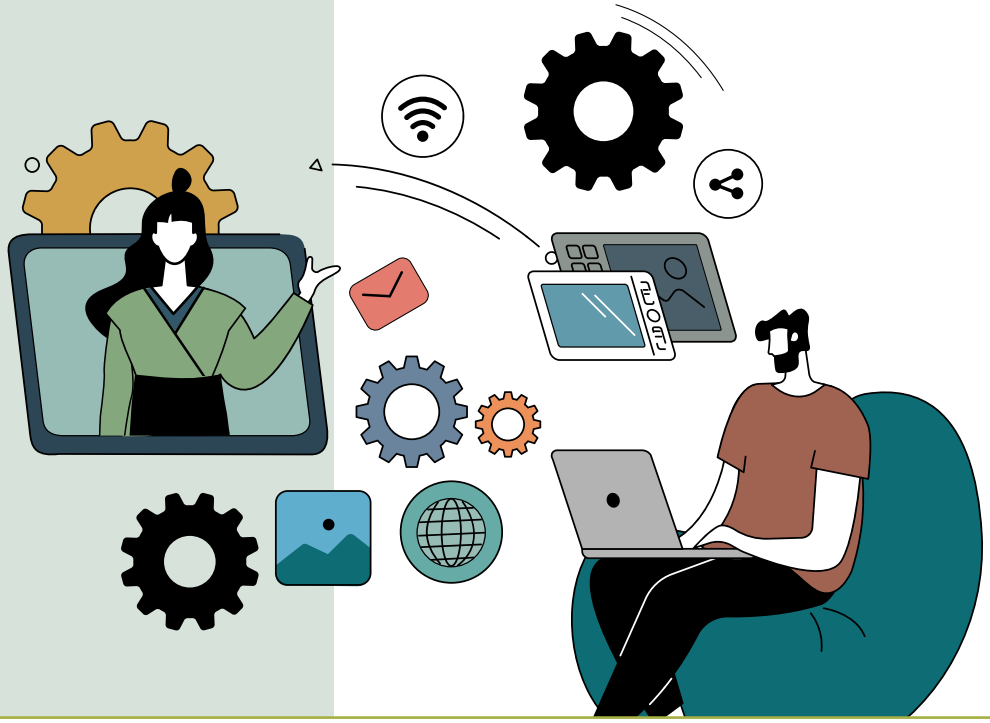
- How to clear App data on iPhone
- How to clear App data on Android
- How to use the Ecosia search engine

IMPORTANT FACTS

1. A one-hour Zoom meeting with two people in HD quality generates **0.0037kg of CO2**, equivalent to driving **0.01 miles**.

2. It was found that Android-based platforms consume an average of **9.2 Wh per 1,000 page views**, i.e. around 5 times less than the PC platform. For browsers, Google Chrome is the most energy-hungry: **27 MWh**.

3. When browsing the web, an average internet user yearly needs about **365 kWh of electricity and 2,900 litres of water**, which corresponds to the CO2 that is emitted when you travel **400 km by car**.



Checklist

FOR INDIVIDUALS

- [ ] I regularly clear data from apps and platforms.
- [ ] I use sustainable search engines, such as Ecosia.
- [ ] I limit the use of video during online calls.
- [ ] If I am doing a search, I prioritise the address bar over the engine bar and I directly put a specific website.
- [ ] I remove the notifications from apps.

FOR ORGANISATIONS

- [ ] Our organisation encourages us to add pages we visit regularly into favourites and then open them directly.
- [ ] Our organisation encourages us to limit the number of open tabs or windows.
- [ ] Our organisation prioritises face-to-face meetings at the local level, when easily accessible.
- [ ] Our organisation uses the most energy-efficient apps.
- [ ] Our organisation regularly clears data from apps and platforms.

11 PRINTING AND DIGITALISATION OF DOCUMENTS

The pulp and paper sector has a significant environmental impact, responsible for about 2% of all industry emissions, emitting approximately 190 Mt of CO2 in 2021. Unfortunately, this carbon footprint is projected to increase further by 2030, necessitating action to address its environmental consequences. Choosing digital sources for information access may be more environmentally friendly than relying on physical books. A paperback book contributes around 1 kg CO2e to the environment, while a weekend newspaper's carbon footprint ranges from 0.3kg to 4.1kg CO2e. Embracing digital platforms can thus lead to potential environmental benefits.

In «Assessing the Carbon Footprint of Paper vs. Electronic Invoicing,» Tenhunen and Al highlight the substantial carbon reduction achieved by transitioning to electronic invoicing. The electronic invoice life cycle proves approximately 63% more environmentally friendly due to the elimination of paper products and transportation.

While many efforts focus on promoting paperless practices to address deforestation concerns, it is vital to also consider the environmental implications of digital media usage as well. Although consulting documents online consume less energy than printing papers, factors like materials used for production, purchased energy, and e-waste produced contribute to the overall carbon footprint of an item. As shown in previous topics, the production of electronic devices through the extraction of materials remains one of the largest pollution sources of the digital sector (60% to 80% of the overall sector). The digitalisation of paper-work is therefore a phenomenon that needs to be assessed depending on the specific context and benefits that it could create. In certain cases, the production and use of electronic devices for digitalisation may be more harmful to the environment than printing (see Tenhunen and Al, 2018).

Therefore, it seems that the conflict between printing and digitalisation may prove to be an erroneous approach.
Instead, it may be more relevant to focus on finding and implementing sustainable measures for both media to reduce their environmental impact. Professionals and organisations hold a significant responsibility in adopting and disseminating such practice.

TUTORIALS

- How to select a sustainable paper supplier
- How to print on both sides

IMPORTANT FACTS

1. The carbon footprint of one A4 sheet of office paper ranges from **4.29 to 4.74 g CO2eq**
2. In 2021, the pulp and paper sector was responsible for about **190 Mt of CO2 emissions 2021, about 2% of all emissions from industry**. Paper production is projected to increase by 2030.
3. The electricity consumption of computers, cell phones, flat-screen TVs, iPods and other gadgets will **double by 2022 and triple by 2030**.
4. One of the most significant causes of deforestation in the United States can be linked to the growing use of digital media to reduce paper use and save forests.

Checklist

FOR INDIVIDUALS

- [ ] I buy recycled paper.
- [ ] I eliminate unnecessary printings.
- [ ] I reuse printed paper.
- [ ] I recycle used paper.
- [ ] I prioritise double-sided printing.

FOR ORGANISATIONS

- [ ] Our organisation buys recycled paper from a sustainable producer of paper.
- [ ] Our organisation encourages sustainable communication.
- [ ] Our organisation implements policies to ensure the sustainable use of digital devices.
- [ ] Our organisation forbids unnecessary printings.
- [ ] Our organisation prioritises double-sided printing.

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