DigiEmissions and Environmental Sustainability

2025

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Learning Objectives

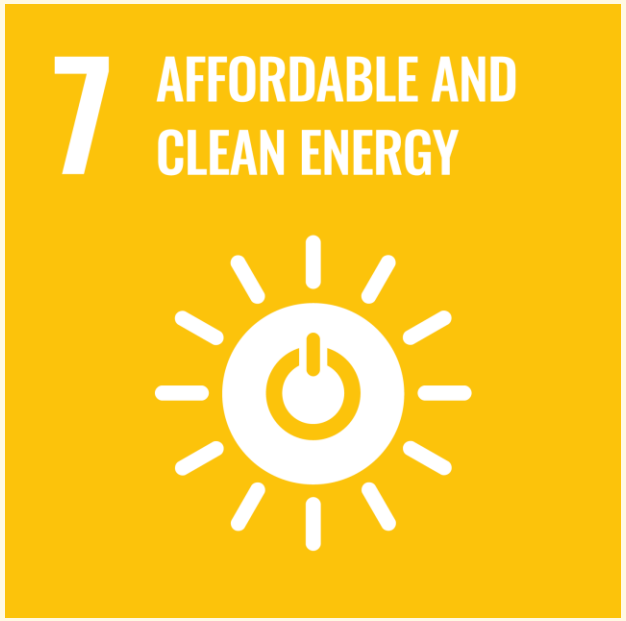
By the end of this session you will:

1. View part of your digital carbon footprint
2. Compare common digital editing emissions
3. Recommend at least two ways to reduce emissions

DigiEmissions influence

On average in 2022, people unlocked their phones 150 times a day, using them for an average of 171 minutes every day. This includes 147 minutes on social media (Kiran and Ivanov, 2023).

DigiEmissions influence



Politics | Parliaments | Brexit

Why Labour junked its £28bn green investment pledge

8 February

Google's AI alone may consume as much energy as Ireland

As we accelerate towards creating one of humanity's greatest technological achievements, we need to ask ourselves – what is the offset of this development?

Carbon Emissions and DigiEmissions:

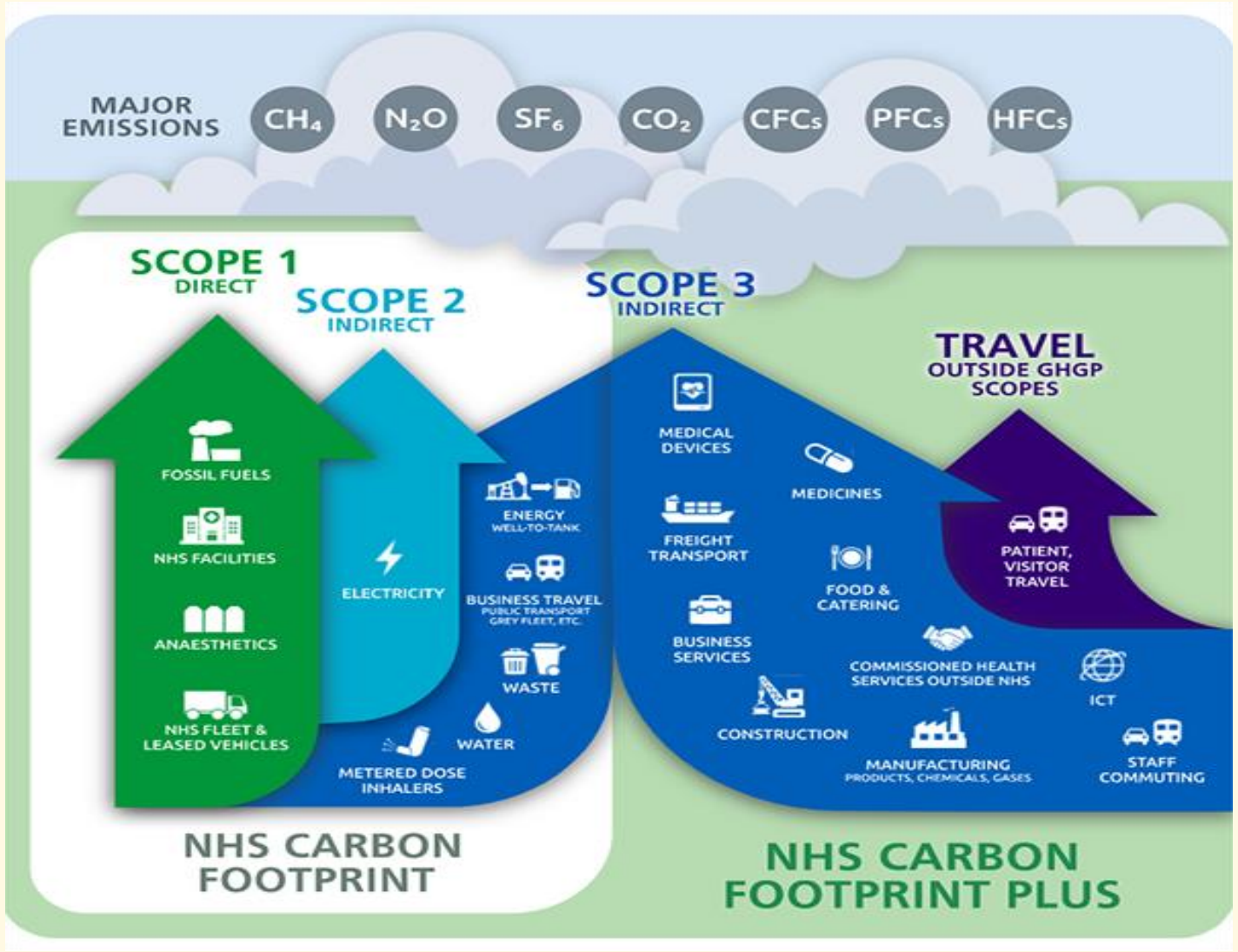
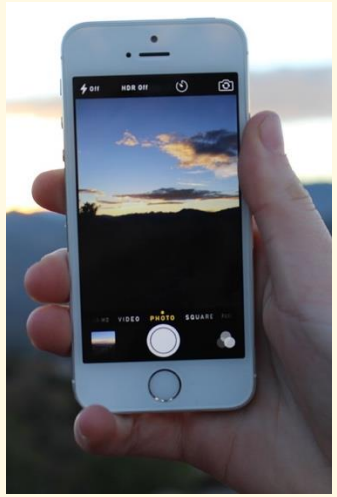
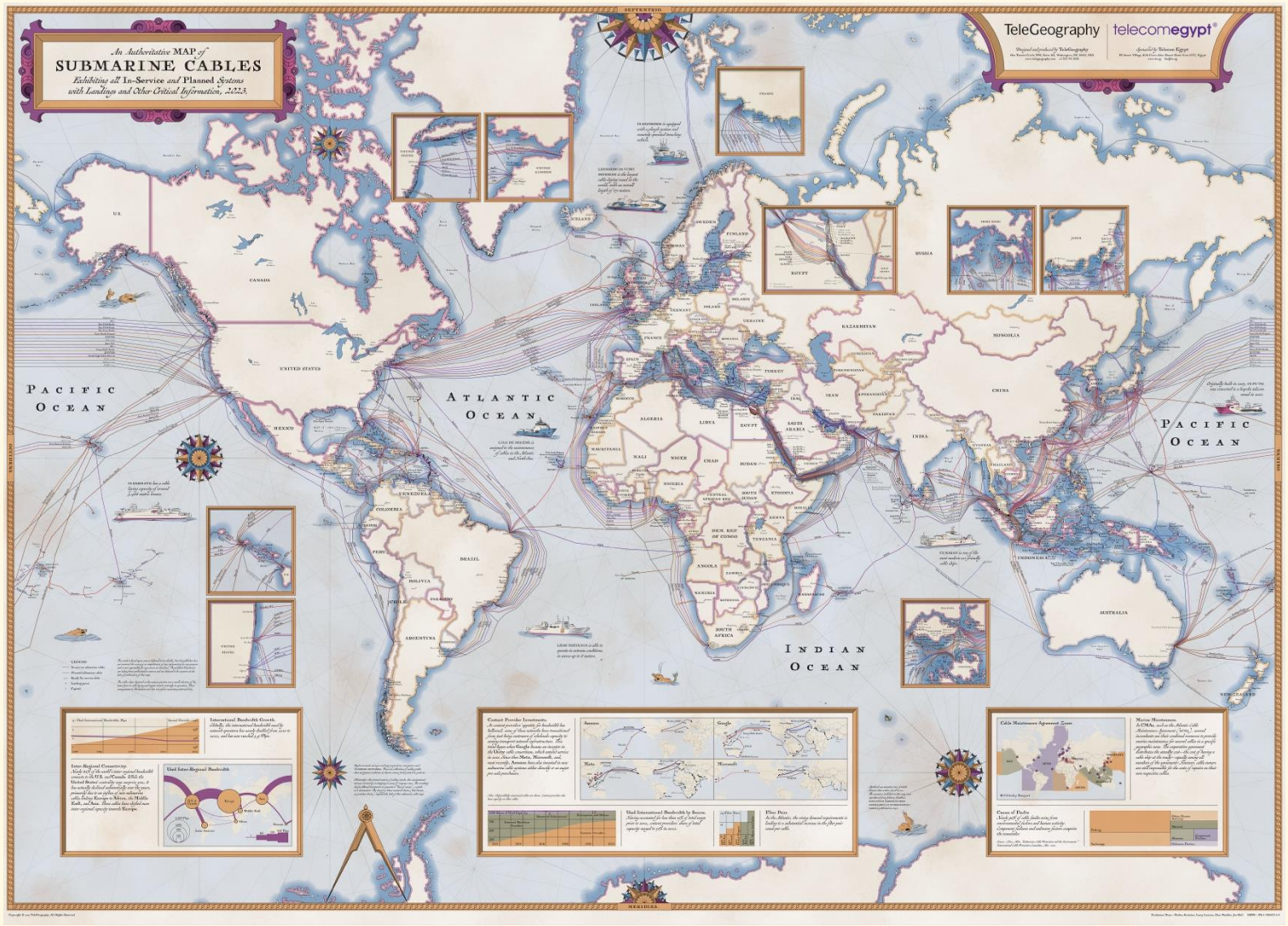


Figure 1: GHGP scopes in the context of the NHS, Delivering a NetZero NHS, 2022, available at: https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf

Visualising our DigiEmissions

Digital emissions and Internet Cables





Explore the map https://submarine-cable-map-2023.telegeography.com/

Find part of your digital carbon footprint!

If you have time, try 2:

1. https://www.websitecarbon.com/
2. https://ecograder.com/
3. https://digitalbeacon.co/

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Digi-Emissions in numbers

Technology usage	Approximate CO_2e emissions per year (kg)	Source
Inactive computer	11,700	Stonham, 2022
Smartphone charge, 15W adaptor	0.05	Johns, 2023
70 Email (10kb – 500 MB) daily	84	Stonham, 2022
5 hours web video conferencing daily	37,910	Griffiths, 2020
10 Text / SMS daily	0.00014	Berners-Lee, 2020
39 minutes LinkedIn daily	2,792,000	Stonham, 2022
Global online advertising	60,000,000,000	Pärssinen, 2016
Bitcoin	22,000,000,000	Griffiths, 2020
39 satellites, 7,000 channels broadcasting	42,500, 000	Eutelsat, 2023

500 km = 85kg CO_2e

Let’s talk about AI emissions

- **A single AI-generated image** = **half a smartphone charge**
- **Creating text 1,000 times** = **9% of a full smartphone charge**
- Training GPT3 = **300 round-trip flights for New York - San Francisco**
- If ChatGPT replaced Google searches = annual electricity of 1.5 million EU citizens.
- **25% of data center workloads** are related to **machine learning**.

Dhanani R (2024) Environmental impact of generative AI – 20 stats & facts, Sustainable Agency, available at: https://thesustainableagency.com/blog/environmental-impact-of-generative-ai/

Let’s talk about AI water consumption

A conversation of 20-50 questions

and answers with ChatGPT3

ChatGPT4 and others are higher

=

Dhanani R (2024) Environmental impact of generative AI – 20 stats & facts, Sustainable Agency, available at: https://thesustainableagency.com/blog/environmental-impact-of-generative-ai/

Water influence

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https://www.context.news/ai/video/forget-jobs-ai-is-coming-for-your-water

Our Digi-Emissions experiment 2024

Working from home with mixed energy (renewable, fossil fuels) and internet broadband

Digiemissions:

- 96 hrs, no AI =186kg CO_2e
- 50 hrs, some AI =167kg CO_2e

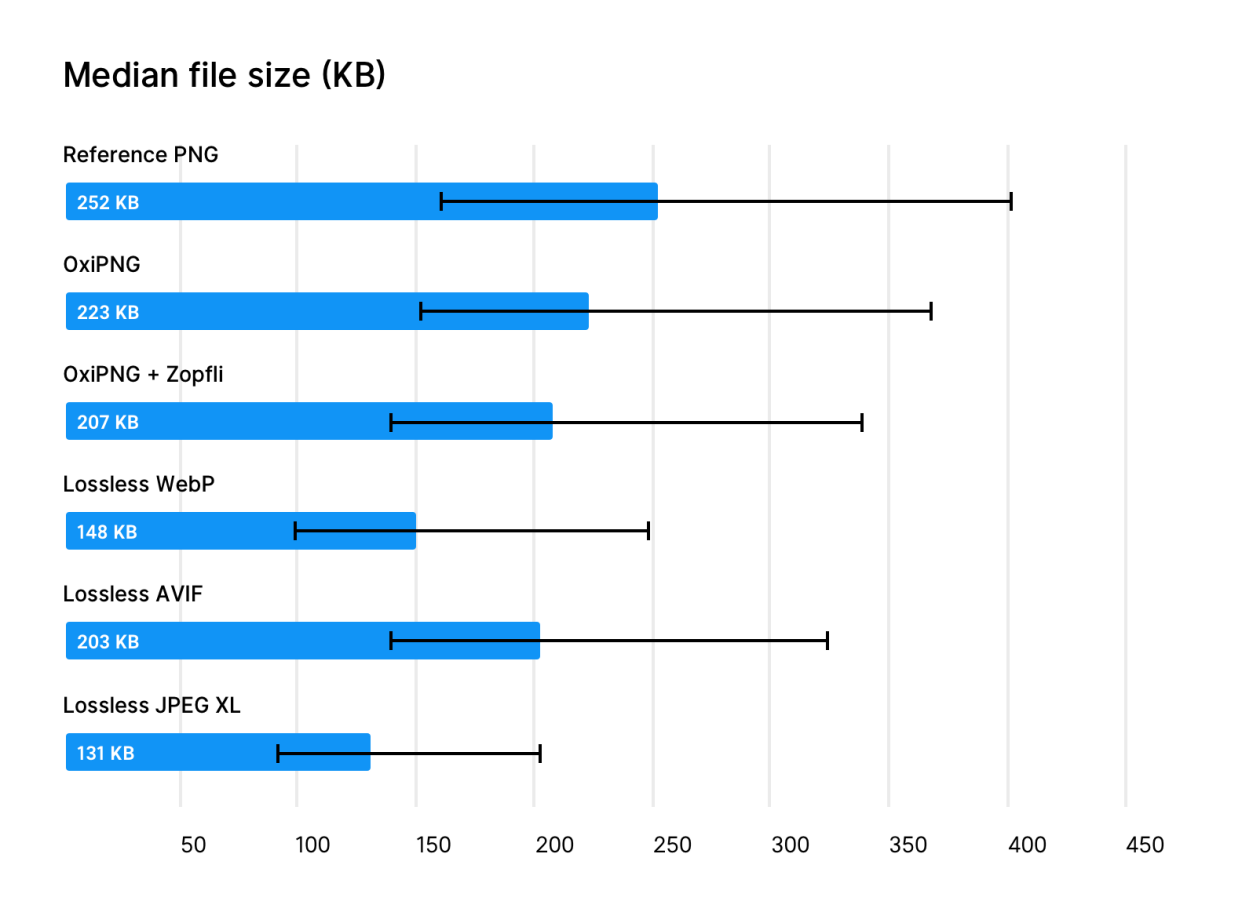
...About 4.5 one-way economy flights to Paris

But! *reflections on my blog*

How to reduce digi-emissions

- Reduce cloud storage
- Use audio only if video not required in meetings
- Reduce and maintain reasonable quality images, video
- Read W3C Sustainability 1.0 guidelines
- Compress images PNG vs AVIF vs JPEG vs webp format (Google developed)

Images sizes for the web



Siipola J (2021) what's the best lossless image format, available at: https://siipo.la/blog/whats-the-best-lossless-image-format-comparing-png-webp-avif-and-jpeg-x

How to reduce digi-emissions 2

- Compress video e.g Handbrake
- Ultimate Adobe guide to compressing videos in Adobe Minify
- Reduce online whitespace, html, CSS and Javascript (see W3C guidelines)

How to reduce digi-emissions – filming

Considerations:

Site location and travel to/from…

Combining shoots and human resources

Equipment, editing: green filming guidelines

More ideas:

How the BBC are becoming more sustainable

Challenge

Help create a video

You have been asked to help create a video introducing new ESG guidelines.

Include recommendations to reduce your digi-emissions in the video

Tip – include meetings/collaboration as well as filming/editing

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How to reduce – other useful links

1. https://greencompute.uk/
2. https://sustainablewebdesign.org/calculating-digital-emissions/
3. Loughborough Uni project: https://www.youtube.com/watch?v=8w48Lv95eik
4. https://patterns.greensoftware.foundation/ (Microsoft sponsor)

Feedback

Menti code:
tbc

https://www.menti.com/alt625dar8c5

Thank you

Nicola Avery
Nicola.Avery@ldnapprenticeships.com
Slack: @NicolaAvery

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