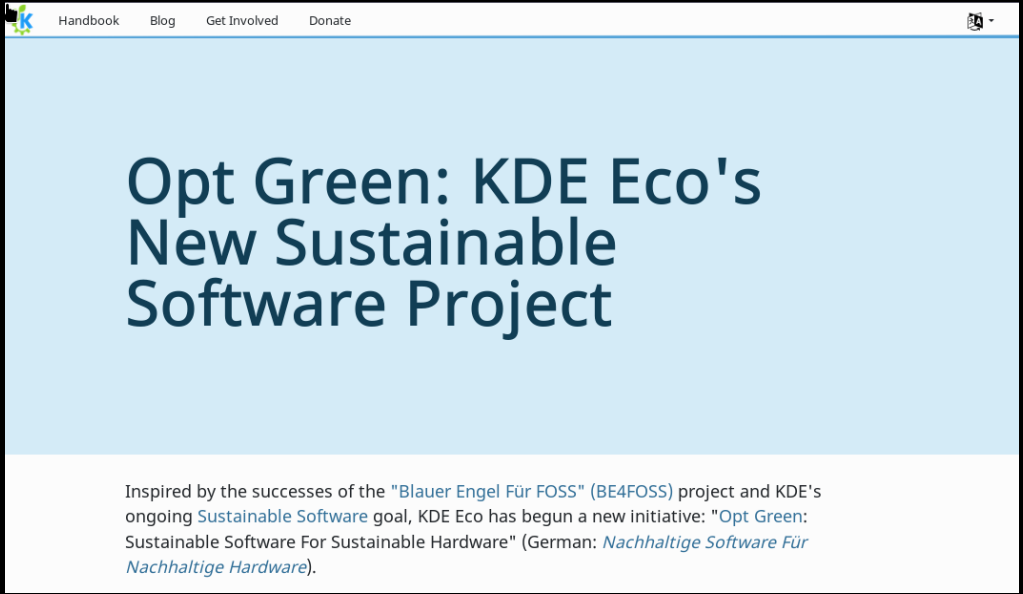
Opt In? Opt Out? Opt Green!
KDE Eco's New Sustainability Initiative

@be4foss@floss.social

Akademy – 8 September 2024

Slides available under "talks":

https://invent.kde.org/teams/eco/opt-green/



Screenshot from :https://eco.kde.org/blog/2024-05-29_introducing-ns4nh/

Today's Presentation

- Part I — This Is NOT Fine!
- Part II — What About BE4FOSS?
- Part III — Opt In? Opt Out? Opt Green!
- Part IV — How To Contribute?

Part I — This Is NOT Fine

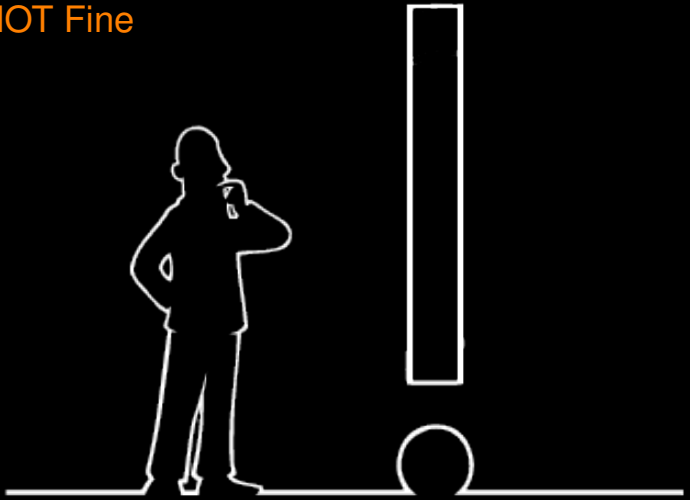


Image (modified) from Karanjot Singh published under a CC BY-SA 4.0 license:

https://eco.kde.org/blog/2022-03-03-sok22-kde-eco/

This Is NOT Fine

The Guardian

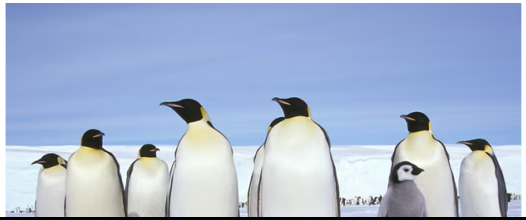
The Observer
Climate crisis

‘Simply mind-boggling’: world record temperature jump in Antarctic raises fears of catastrophe

An unprecedented leap of 38.5C in the coldest place on Earth is a harbinger of a disaster for humans and the local ecosystem

Robin McKie
Science editor

Sat 6 Apr 2024 16.00 CEST



Screenshot (modified) from:

theguardian.com/environment/2024/apr/06/simply-mind-boggling-world-record-temperature-jump-in-antarctic-raises-fears-of-catastrophe

NATIONAL GEOGRAPHIC

A southern rockhopper penguin stands on a cliff on Marion Island, South Africa.

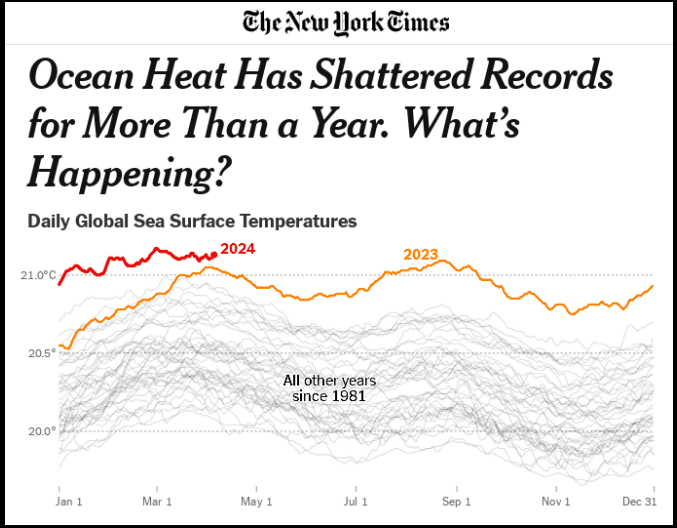
Penguins are slow to evolve, making them vulnerable to climate change

A sweeping study of extinct and living penguins shows the birds may not be able to keep up with the breakneck pace of modern warming.

By Rebecca Dzombak

July 19, 2022 • 6 min read

Screenshot (modified) from :https://www.nationalgeographic.com/animals/article/penguins-are-slow-to-evolve-and-vulnerable-to-climate-change



Screenshot (modified) from :https://www.nytimes.com/2024/04/10/climate/ocean-heat-records.html

The New York Times

It's Been the Hottest Summer on Record, European Officials Say

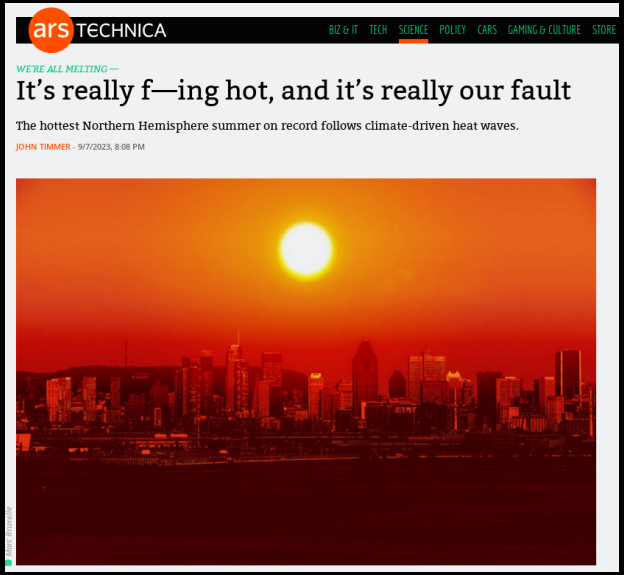
Sept. 5, 2024

The excessive heat worldwide suggests the full year will also be a record-breaker, according to Copernicus, the E.U. agency that tracks global warming.

Las Vegas has seen a particularly hot summer season. Wade Vandervort/Las Vegas Sun, via Associated Press

By Austyn Gaffney

Screenshot (modified) from :https://www.nytimes.com/2024/09/05/climate/2024-hottest-summer-on-record.html



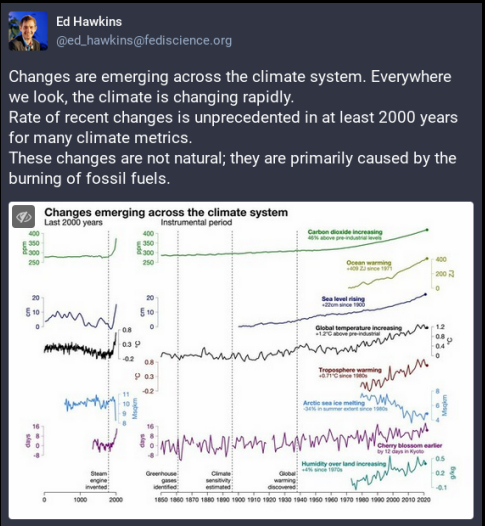
Screenshot from :https://arstechnica.com/science/2023/09/yes-this-year-is-as-hot-as-you-think-it-is/

“These Changes Are Not Natural”

“***Changes are emerging across the climate system. Everywhere we look, the climate is changing rapidly.***”

Ed Hawkins, University of Reading, 18 Jan. 2023

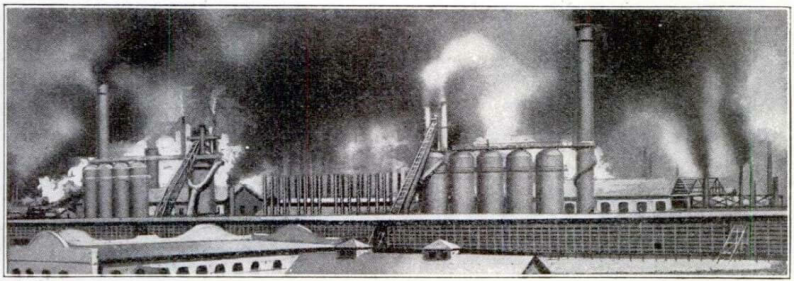
`fediscience.org/@ed_hawkins/109710462146263953`



. . . To Let It Last This Long And Get This Bad

1912 – C02: A “Blanket For The Earth”

March, 1912 POPULAR MECHANICS 341



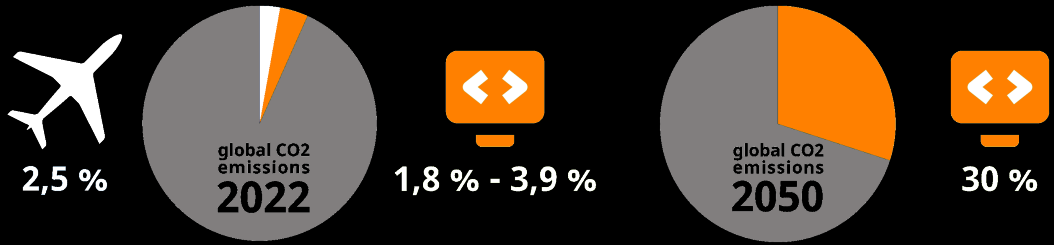
The furnaces of the world are now burning about 2,000,000,000 tons of coal a year. When this is burned, uniting with oxygen, it adds about 7,000,000,000 tons of carbon dioxide to the atmosphere yearly. This tends to make the air a more effective blanket for the earth and to raise its temperature. The effect may be considerable in a few centuries.

“***[Adding CO2] tends to make the air a more effective blanket for the earth and to raise its temperature. This effect may be considerable in a few centuries.***” – Popular Mechanics, 1912

https://commons.wikimedia.org/wiki/File:191203_Furnaces_of_the_world_-_Popular_Mechanics_-_Global_warming.jpg

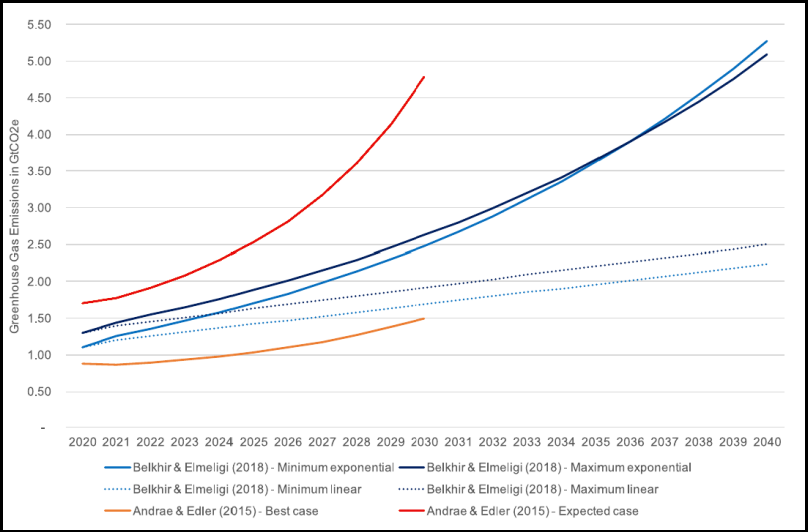
ICT

"Computing can help mitigate climate change but must first cease contributing to it."



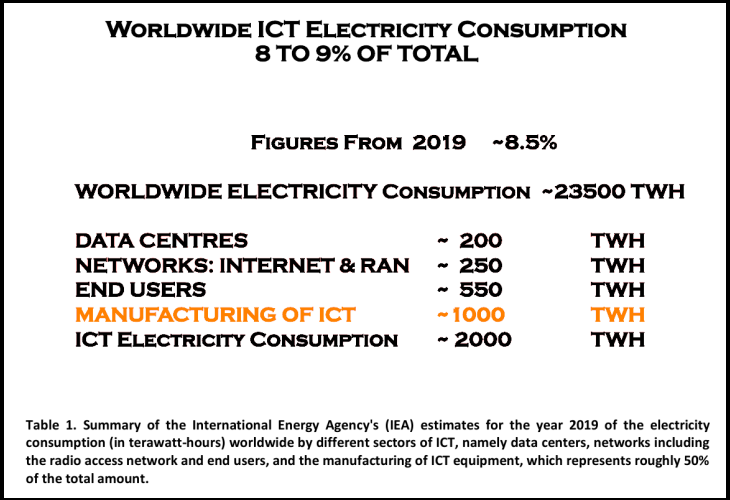
ACM Tech Brief (2021): https://dl.acm.org/doi/pdf/10.1145/3483410

All Estimates Go Up



Freitag et al. 2021: https://www.sciencedirect.com/science/article/pii/S2666389921001884

Energy Consumption By ICT Sector



Worldwide ICT Electricity Consumption
8 to 9% of total

Figures From 2019 ~8.5%

Worldwide Electricity Consumption ~23500 TWh

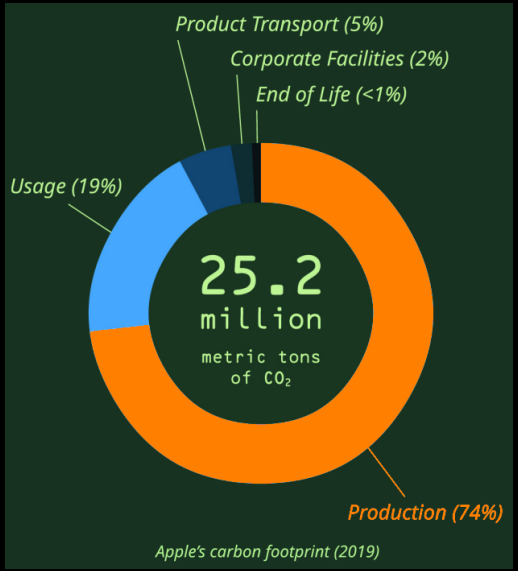
Data centres	~ 200	TWh
Networks: internet & RAN	~ 250	TWh
End users	~ 550	TWh
Manufacturing of ICT	~1000	TWh
ICT Electricity Consumption	~ 2000	TWh

Table 1. Summary of the International Energy Agency's (IEA) estimates for the year 2019 of the electricity consumption (in terawatt-hours) worldwide by different sectors of ICT, namely data centers, networks including the radio access network and end users, and the manufacturing of ICT equipment, which represents roughly 50% of the total amount.

From: "Electricity Consumption by ICT: Facts, trends, and measurements" (2023, ACM):

https://dl.acm.org/doi/pdf/10.1145/3613207

Apple's Carbon Footprint



Carbon Footprint By Device

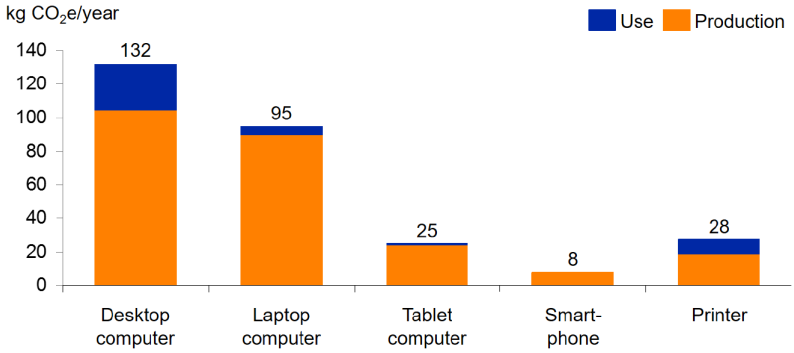


Figure 2: Average annual greenhouse gas emissions per end-user device during production and use by device type. The annual values of production emissions (grey) are based on current average useful lives of the devices.

From (modified): “Opportunities and Risks of Digitalization for Climate Protection in Switzerland” (2017):

https://www.zora.uzh.ch/id/eprint/141128/10/Study_Digitalization_Climate_Protection_Summary_Oct2017.pdf

High Environmental Impact

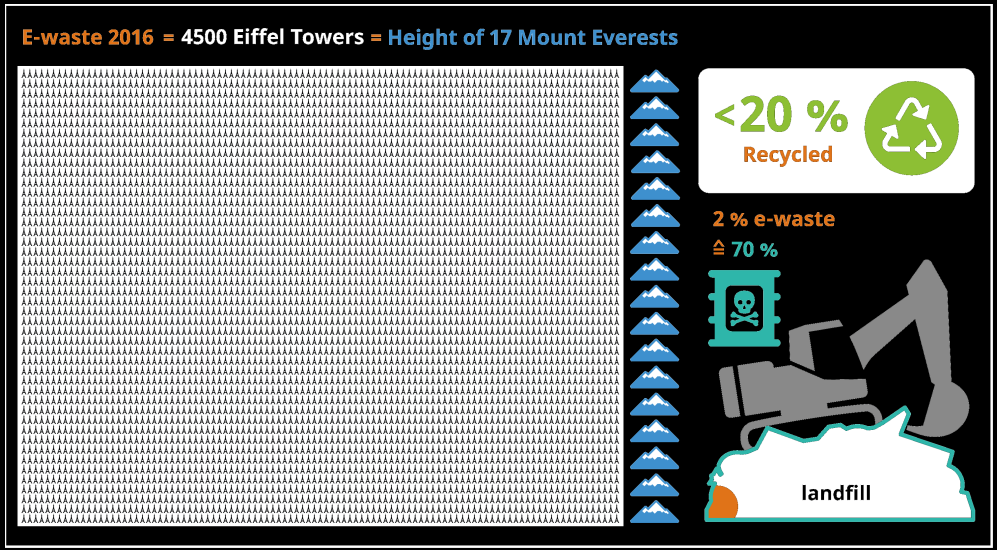
Image by Muntaka Chasant: https://en.wikipedia.org/wiki/File:Agbogbloshie,_Ghana_-_September_2019.jpg

And At Huge Social Costs, Including Human Rights Violations

Photo of child labor in a cobalt mine in Congo from Thomas Coombes (CC BY-SA 3.0 DE)

Holding Companies Responsible (Supply Chain Due Diligence Act): `https://www.goethe.de/ins/id/en/kul/mag/22370005.html`

“Tsunami Of E-Waste’, Achim Steiner, UNEP



Based on report: https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20.pdf

Part II — What About BE4FOSS

Image (modified) from Karanjot Singh published under a CC BY-SA 4.0 license:

https://eco.kde.org/blog/2022-03-03-sok22-kde-eco/

Blauer Engel For Desktop Software (v. 4 2024)

FOSS For Sustainability

Autonomy and **Transparency** recognized
as being crucial to sustainable software design!

(A) Resource & Energy Efficiency

- Energy consumption (idle & standard usage)
- Minimum system requirements (CPU, working memory)
- Support for energy saving modes

(B) Potential Hardware Operating Life

- Runs on hardware at least 5 years old

(C) User Autonomy

- Uninstallability / Modularity (installing essential functions only)
- Continuity of support (security updates)
- Freedom from advertising / tracking
- Documentation (open standards, uninstallation how-to, privacy policy)
- Data formats / Transparency (open source/APIs open standards)

The Environmental Problem Of Vendor Dependency

Users Have Limited / No Choice

- Proprietary Software: Users have little influence over software they depend on
- Bloatware / Feature Creep: "Device doesn't meet minimum system requirements . . . "
- Abandonware / Planned Obsolescence: "Device is no longer supported . . . "

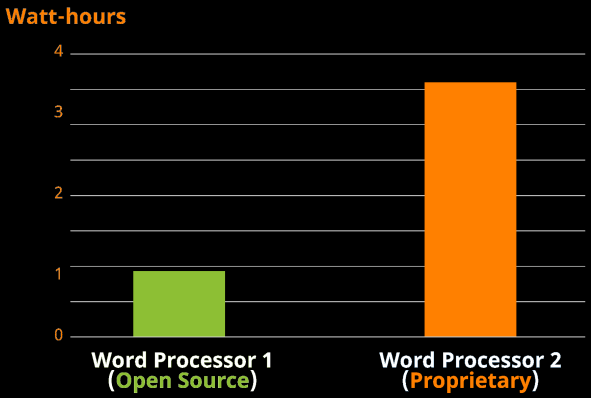
Result

- Use – Increasing demands require new, more powerful devices
- Dispose – Functioning devices discarded as e-waste
- Produce – New devices produced and shipped unecessarily

Their Ads, Our Computing . . . Even When You Pay

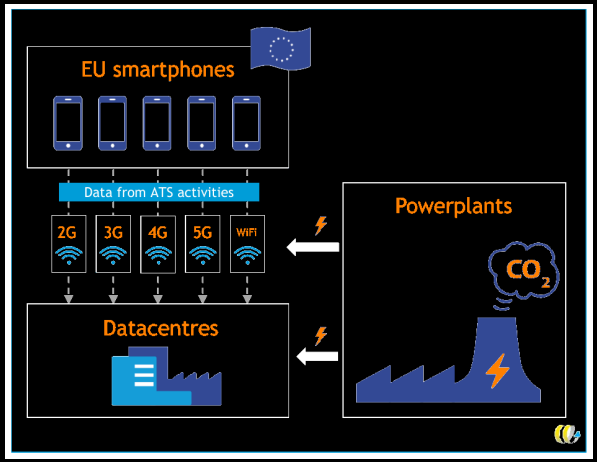
Screenshot (modified) colors from: https://www.pcworld.com/article/1668041/ads-in-the-windows-11-start-menu-are-definitely-coming.html

Increasing Demands & Energy Use



Adapted from: https://www.umweltbundesamt.de/publikationen/entwicklung-anwendung-von-bewertungsgrundlagen-fuer

No Opt Out For Ads/Tracking



Data from ATS = Ad / Tracking Services

Screenshot with modified colors from “Carbon footprint of unwanted data-use by smartphones: An analysis for the EU”:
https://groenlinks.nl/sites/groenlinks/files/2021-09/CE_Delft_210166_Carbon_footprint_unwanted_data-use_smartphones.pdf

End Of Support Of Newer Hardware Is Driving E-Waste

Windows 10 support ending means more e-waste

240 million PCs ineligible for Windows 11 could become e-waste from October 2025

- Incompatibility with Windows 11 prevents partners and ITAD firms from refurbishing and reselling still-viable PCs
- Donating unsupported devices to disadvantaged communities globally presents challenges for digital equity
- Microsoft will offer Extended Security Updates for Windows 10 from 2025 until 2028, but at an undisclosed annual cost

If all the PCs ineligible for Windows 11 were folded laptops stacked one on top of another, they would be 4,080km tall – 600km taller than the moon!

Source: Canalys estimates, PC Service and Sustainable Ecosystems Analysis, December 2023

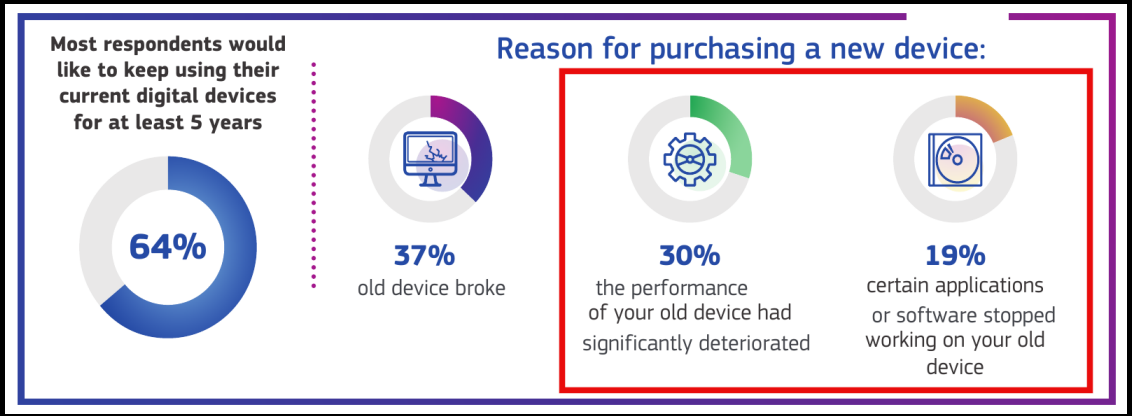
canalys

From: https://www.canalys.com/insights/end-of-windows-10-support-could-turn-240-million-pcs-into-e-waste

And More E-Waste . . . And More CO2 And Toxic Pollution

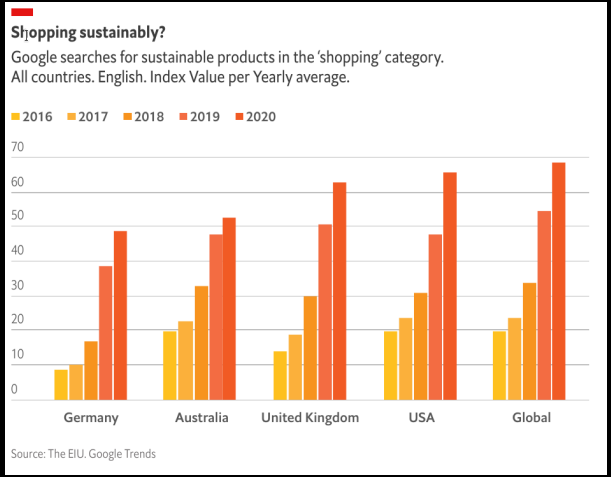
From: https://arstechnica.com/gadgets/2023/07/with-macos-sonoma-intel-macs-are-still-getting-fewer-updates-than-they-used-to/

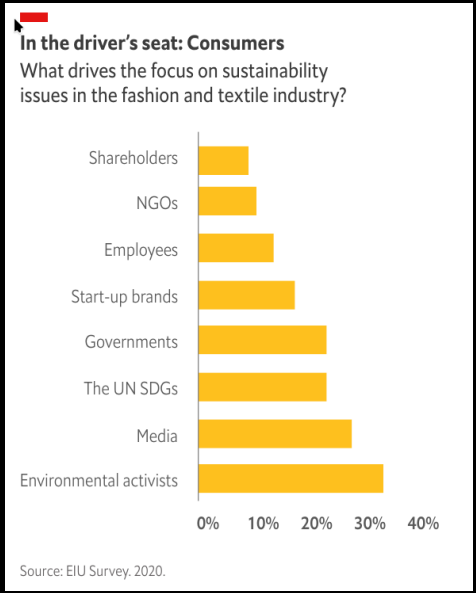
Consumers May Be Aware Of The Problem, But Not A Solution!



Screenshot (modified) from: https://europa.eu/eurobarometer/surveys/detail/2228

Consumer Interest & Influence Is Up



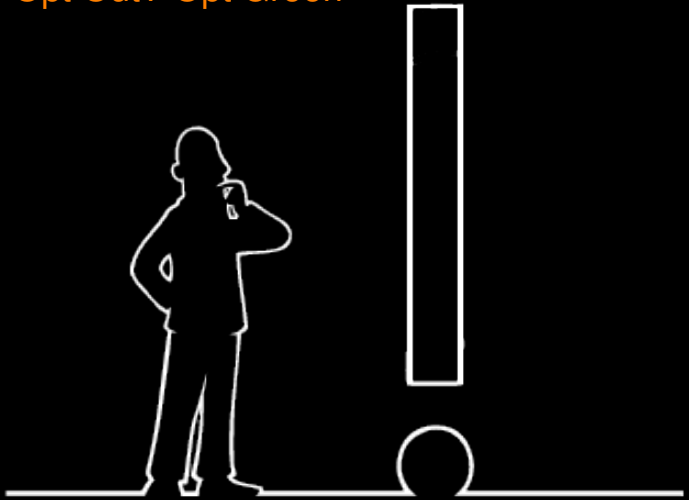


Screenshots from: https://www.worldwildlife.org/publications/an-eco-wakening-measuring-awareness-engagement-and-action-for-nature

How Many Consumers Know About The Blue Angel For Software?

And the role software plays in hardware lengevity!

Part III — Opt In? Opt Out? Opt Green



Focus On Eco-Consumers

Images from Karanjot Singh
Images from Karanjot Singh

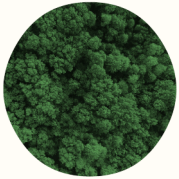
Design Driven

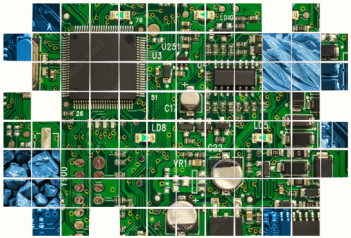
Visuals: Imagery

Image selection emphasizes the physical world and human connection within the context of technology. Sample image types include hardware, nature, natural resources, people, and communities.

Images are framed in simple hand-drawn shapes to emphasize tactility and the human touch. They are sometimes colorized in dark versions brand's primary colors to unify disparate images and styles.

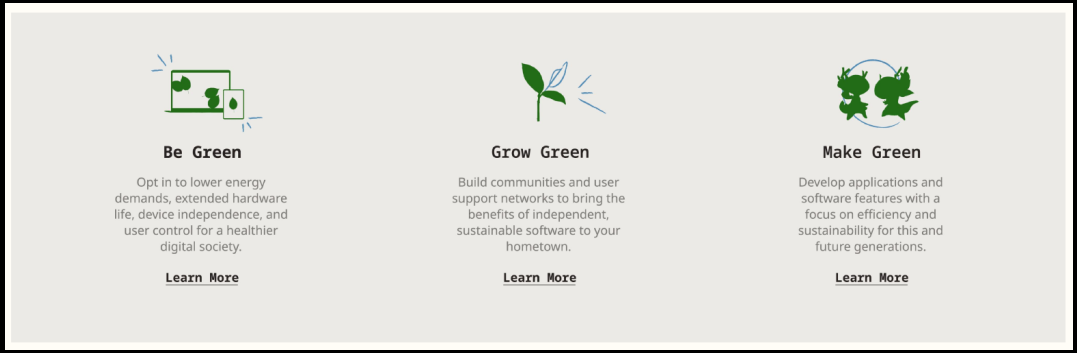
Images can be used in isolation or be composed into collages with other images and elements. A pixel-based structure, inspired by computer screens, can be used as a foundation for larger collages.



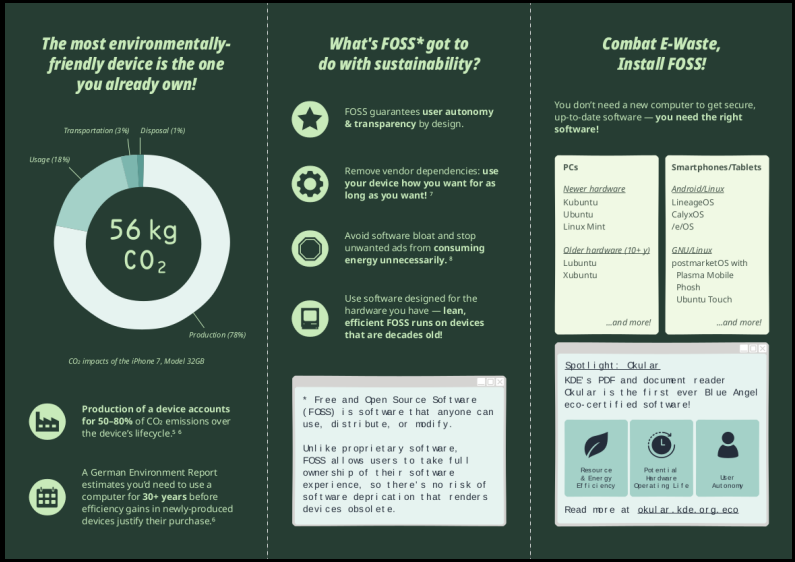


See : https://invent.kde.org/teams/eco/opt-green/-/blob/master/organizational/brand/opt-green-branding-proposal.pdf

Revamped Website – eco.kde.org



Campaigns & Advertisements – To Combat E-Waste With FOSS

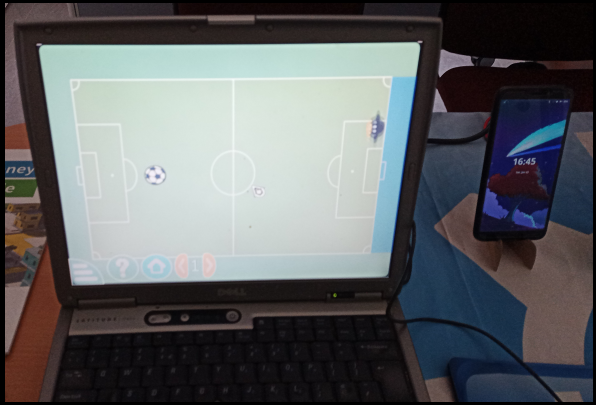


Leaflet (KDE CC BY-SA 4.0; design Anita Sengupta): https://invent.kde.org/teams/eco/ns4nh/-/issues/1

Eco-Festivals, Open-Air Markets, Organic Shops

From: https://www.umweltfestival.de/social-media-kits/

Eco-Festivals, Open-Air Markets, Organic Shops

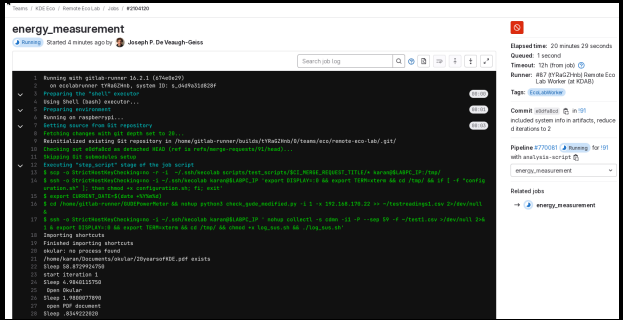


Demo (Unsupported) Hardware Running Free Software

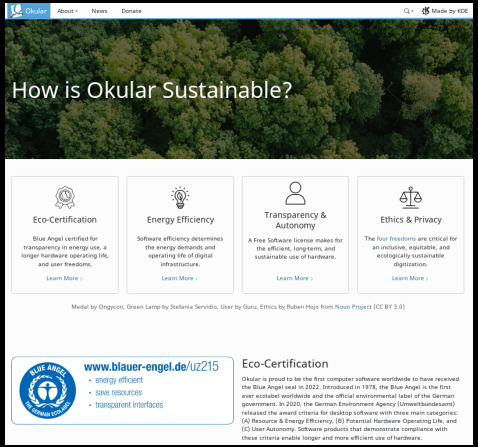
FOSS already excels in this space, by design . . . and it is a blue ocean!

Image (CC BY-SA 4.0) from Raimond Spekking: https://upload.wikimedia.org/wikipedia/commons/6/65/Apple_MacBook_Pro%2C_model_A1278-8109.jpg

Visibility – Energy Measurements & Sustainability Documentation

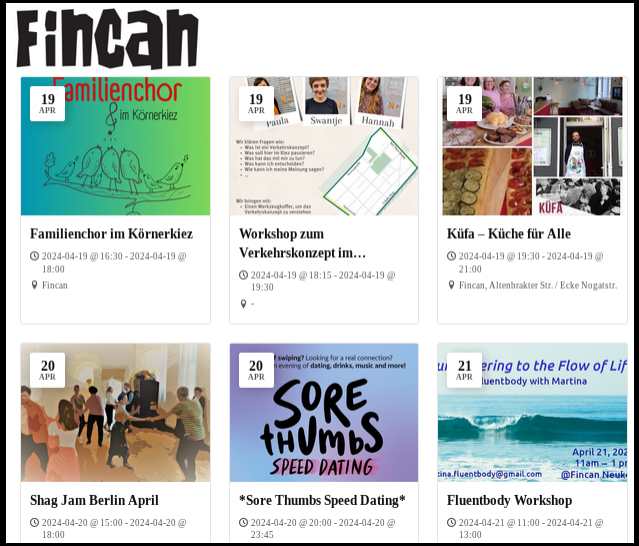


Screenshot KEcoLab



Screenshot (design Anita Sengupta): `https://okular.kde.org/eco/`

Upcycling Workshops – In Culture Centers



Screenshot (modified) from: `https://fincan.eu/veranstaltungen/#events`

. . . And Schools

See: https://engineering.upvest.co/posts/sponsoring-future-engineers/

Good For The Environment – Good For Penguins

And Gnus and Geckos . . . and Dragons

Screenshot (modified) from https://arstechnica.com/gadgets/2024/03/linux-continues-growing-market-share-reaches-4-of-desktops/

Part IV — How To Contribute

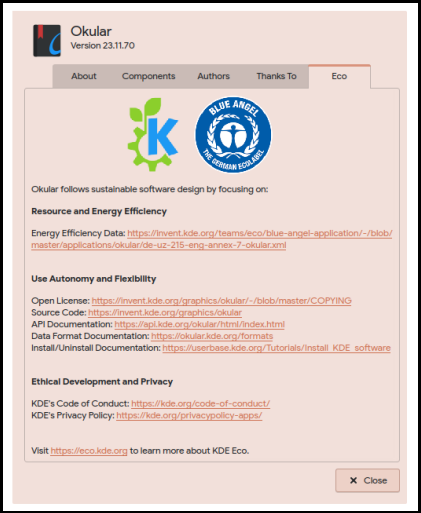
Opt Green BoF!

Monday, 10h, Room 2

Topics

- Design – promotional materials, advertisements, website
- Documentation – Eco tab in About dialogue, minimal system requirements
- Workshops/Campaigns – organize in your home town, oldest hardware competition
- Marketing – measuring and comparing software products
- Translation – Opt Green infoflyers, pamphlets, etc.

Contributor Invite – Visibility With Eco Tab



Opt Green BoF

Monday, 10h, Room 2

`https://invent.kde.org/teams/eco/sustainable-software-goal/-/issues/2`

Contributor Invite – Design

Opt Green BoF

Monday, 10h, Room 2

Images from Karanjot Singh

Measurement BoF!
Monday, 15h, Room 2

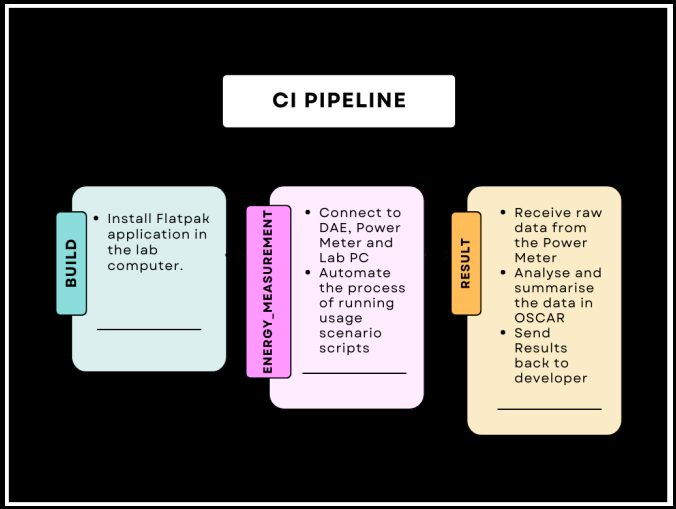
Topics

- KDE Tooling – KEcoLab / KdeEcoTest
- External Tooling– Eco-CI from Green Coding Solutions
- Automation – usage scenario scripting with KdeEcoTest, Selenium

Contributor Invite – KEcoLaB Development

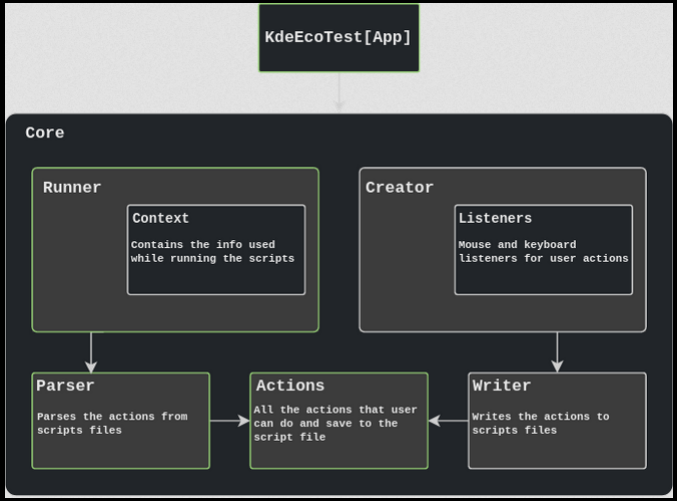
Measurement BoF

Monday, 15h, Room 2



Karanjot Singh https://eco.kde.org/blog/2023-06-13-gsoc23-energy-measurement-lab/

Contributor Invite – KdeEcoTest Development



Mohamed Ibrahim https://eco.kde.org/blog/2023-04-14-sok23-eco-tester/

Measurement BoF

Monday, 15h, Room 2

Open Thoughts

- How low is too low for minimum hardware requirements?
- Can we improve performance on low spec hardware?
  - Document what improves responsiveness, or resource usage;
  - Have an automated system identify your system's hardware bottlenecks;
  - Connect these so when the biggest hardware bottlebneck are identified, there's an "optimize" button that eases the load on the worst-performing system component.
- How do LLMs, etc. fit into this?
- Which distro with KDE Plasma is best for new users?
- Energy measurement dashboard for KDE developers?

Funding Notice

This project was funded by the Federal Environment Agency and the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV). The funds are made available by resolution of the German Bundestag.

The publisher is responsible for the content of this publication.

Slides available under "talks":

https://invent.kde.org/teams/eco/opt-green/