Combatting Software-Driven Environmental Harm With Free Software

FOSDEM 2023 – Energy Devroom
04 February 2023

be4foss@floss.social

CC BY SA

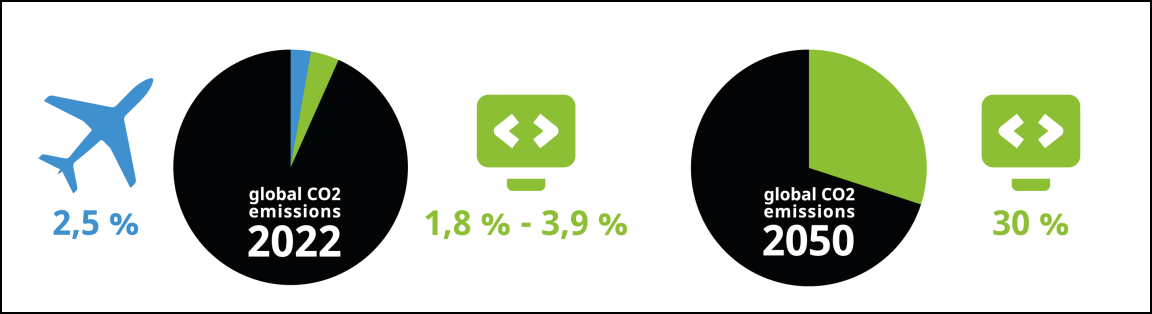
Slides available under "conferences-workshops":

https://invent.kde.org/teams/eco/be4foss/

Carbon Footprint – ICT Sector

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

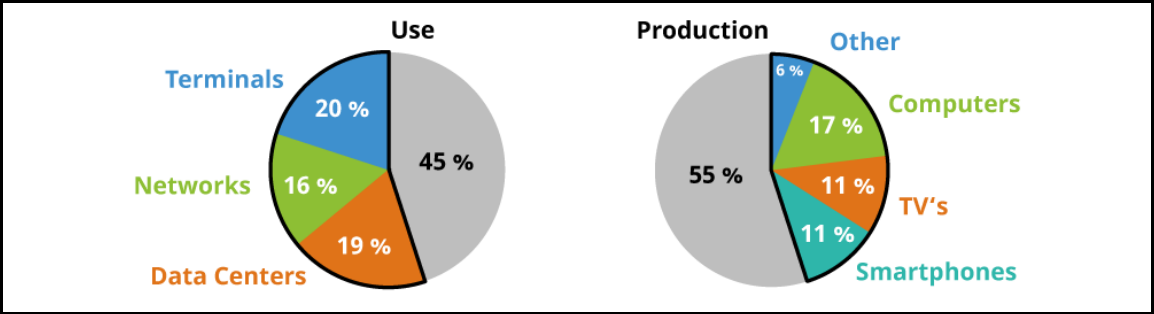
ACM Tech Brief: https://dl.acm.org/doi/pdf/10.1145/3483410



Airplane (CC-BY) by Simon Child from https://thenounproject.com/icon/airplane-74604/

IT image (CC-BY) by Sari Braga from https://thenounproject.com/icon/it-3341003/

Energy Consumption – Use & Production



https://theshiftproject.org/wp-content/uploads/2019/03/Lean-ICT-Report_The-Shift-Project_2019.pdf

- **Efficiency** — *same task, fewer hardware demands*
- **Conservation** — *reducing waste driven by software*

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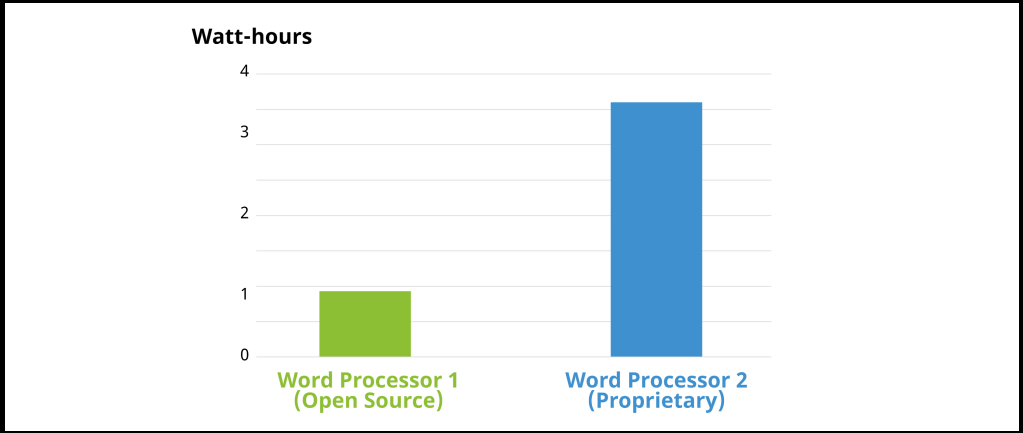
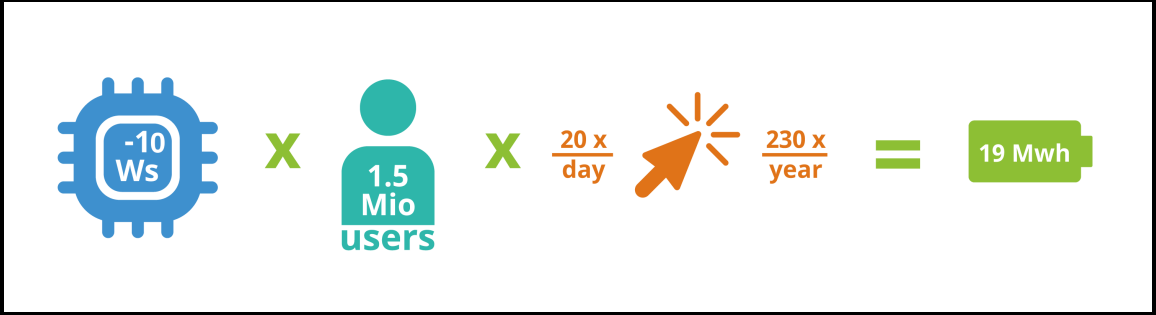
Efficiency – Usage Scenario Measurements



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

Efficiency – Scale Up

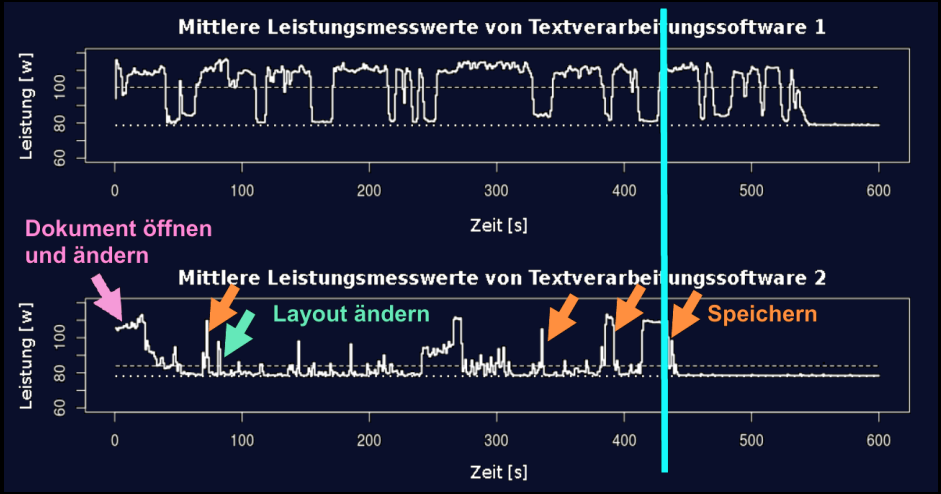


Adapted from Detlef Thoms HPI course: https://open.hpi.de/courses/cleanit2021/items/5DHsS3tlsXAqfUE4q4F82Z

Efficiency – Act Local, Act Global

Adapted from Detlef Thoms HPI course: https://open.hpi.de/courses/cleanit2021/items/5DHsS3tlsXAqfUE4q4F82Z

Efficiency – Eliminating Unnecessary Processes



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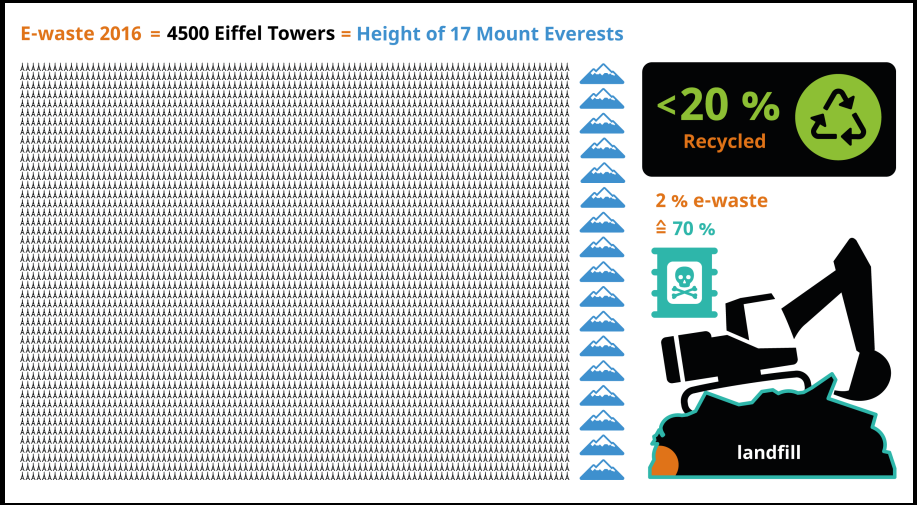
- Conservation — *reducing waste driven by software*

Conservation – “Tsunami Of E-Waste”



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

Conservation – Software-Driven Hardware Obsolescence

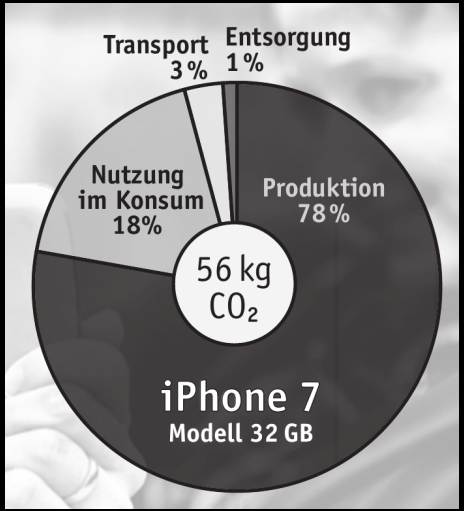
Software

- Abandonware / Planned Obsolescence: "Device is no longer supported . . . "
- Bloat / Feature Creep: "Device doesn't meet minimum system requirements . . . "

Result

- New devices produced and shipped unecessarily
- Functioning devices discarded as e-waste

Conservation – Production Has A Big Environmental Impact



Based on data from "Smarte Grüne Welt": https://www.oekom.de/buch/smarte-gruene-welt-9783962380205

KDE's Vision – A People-Oriented Digital Society

"A world in which everyone has control over their digital life and enjoys freedom and privacy."

https://community.kde.org/KDE/Vision

"A **world** in which **everyone** has **control** over their digital life ..."

"We don't want to hand over control to anybody else. [...] KDE wants to put you in the driver's seat."

→ **How? By developing Free & Open Source Software!**

"... and enjoys **freedom** and **privacy**."

"**. . . without the freedom to make changes and share them, [users] are entirely reliant on the vendor's benevolence for apparent 'control'"**

→ **Transparency and user autonomy aren't features – they are inherent to FOSS!**

Blauer Engel For Desktop Software (2020)

FOSS Advantage

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

3 Steps of Eco Certification

MEASURE

Run usage scenarios to measure energy and hardware consumption in three modes

ANALYZE

Data analysis using OSCAR (Open Source Software Consuption Analysis in R)

CERTIFY

Submit a reportnon the fullfillment of the Blauer Engel criteria

(A) Resource & Energy Efficiency

- Hardware performance/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)
- Offline capability / Freedom from advertising
- Documentation (open standards, uninstallation how-to, privacy policy)
- Transparency (open source/APIs open standards)

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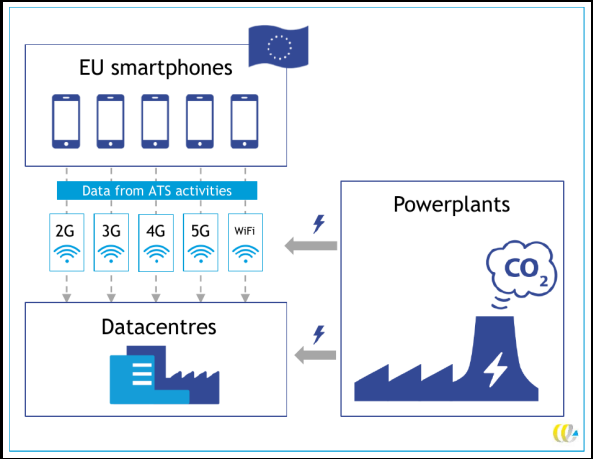
Uninstallability / Modularity

```
prox14amd:~$ sudo apt purge ...
```

Continuity Of Support

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

Offline Capability / Freedom From Advertising



Screenshot 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

KDE Eco Handbook – https://eco.kde.org

Table of contents

- Introduction
- PART I: Environmental Impact Of Software
  - "Material Footprint Of Digital Technology"
  - When Less Is Not More
  - A "Tsunami Of E-Waste"
  - Look To The Software
  - Part I Sources
- PART II: Eco-Certifying Desktop Software
  - The Blue Angel
  - The ABCs Of The Award Criteria For Desktop Software
  - First Eco-Certified Computer Program: KDE's Popular Document Reader Okular
  - Part II Sources
- PART III: Fulfilling The Blue Angel Award Criteria
  - (A) How To Measure Your Software
  - (B) Hardware Operating Life
  - (C) User Autonomy
  - Submitting Your Application For The Blue Angel
  - Benefits Of Blue Angel
- About The Authors
- Acknowledgments
- License

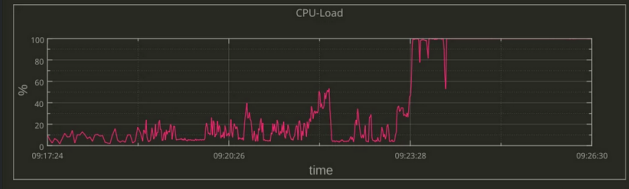


Figure : Monitoring energy and hardware consumption in real time with KDE's LabPlot (image published under a CC-BY-NC-ND-4.0 license).

The three main categories of the Blue Angel award criteria for desktop software are:

- (A) Resource & Energy Efficiency
- (B) Potential Hardware Operating Life
- (C) User Autonomy

Blauer Engel Eco-Certification

First Ever Eco-Certified Computer Program:
KDE's Popular PDF Reader Okular

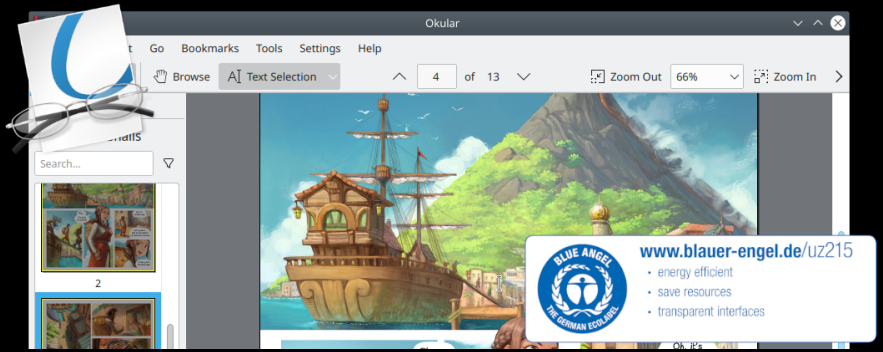


Image from: https://eco.kde.org/blog/2022-03-16-press-release-okular-blue-angel/

We Can Demand More – Right To Repair Must Include Software

Open Letter To Legislators In EU, 27 April (Upcycling Android, FSFE)

That is why we ask legislators in the European Union to make use of the historic chance and enable a more sustainable use of electronic products and devices with a universal right to install and run any software on any device. To this end, we demand that:

Users have the right to freely choose operating systems and software running on their devices

Our tablets, phones and other connected devices are general purpose computers. Replacing software and operating systems on these devices enables us to extend the initial lifespan of a device and to make full use of our hardware. For the ability to reuse and repurpose our resources in a creative and sustainable way we need **the universal right to install and develop any operating system and software we want on any of our devices.** Any legal, technical or other obstacles to reuse these devices for any purpose must not be allowed.

https://fsfe.org/activities/upcyclingandroid/openletter.html

And Do More – By Keeping Hardware In Use With Free Software

https://fsfe.org/activities/upcyclingandroid/howtoupcycle.en.html

And Measure – To Make The Most Efficient Software Now

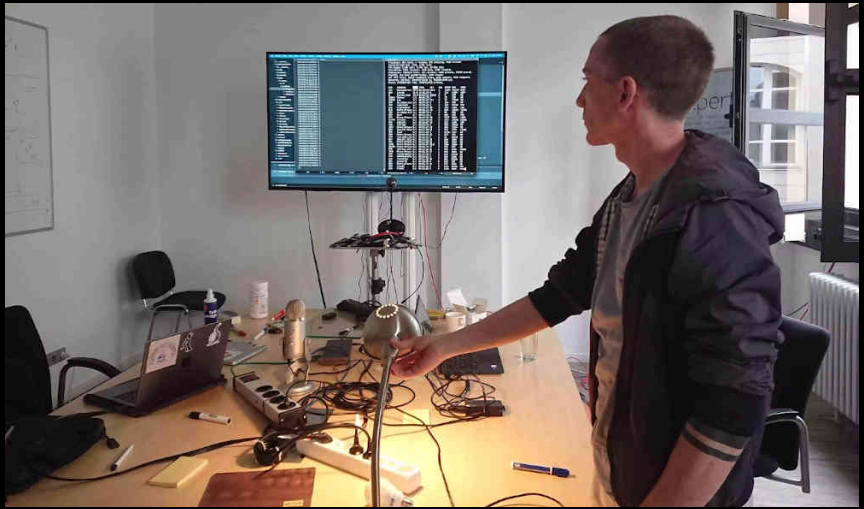


Image from: https://eco.kde.org/blog/2022-07-25-sprint-lab-follow-up/

KDE Goals – Sustainable Software

KDE's New Goals - Join the Kick Off Meeting

Submitted by Anonymous (not verified) on Wed, 2022/11/16 - 8:53am
By Adam Szopa

KDE is ready with three new Community Goals, and you're invited to the kick-off meeting!

Image from: https://dot.kde.org/2022/11/16/kde%E2%80%99s-new-goals-join-kick-meeting

Get Involved – https://eco.kde.org

Contact

- **Email**: joseph@kde.org
- **Mastodon**: https://floss.social/@be4foss

Discuss

- **BigBlueButton**: Monthly meet-ups, 2nd Wed. 19:00 CET/CEST
- **Energy Efficiency Mailing List**: https://mail.kde.org/cgi-bin/mailman/listinfo/energy-efficiency
- **Matrix Room**: https://webchat.kde.org/#/room/#energy-efficiency:kde.org

Resources

Slides available under "conferences-workshops":

https://invent.kde.org/teams/eco/be4foss/

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