

# Achieving A Circular Economy With Free Software



Ubuntu Summit  
5 Nov. 2023

 @be4foss@floss.social



Slides available under "conferences-workshops":

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







# Free Software, — Society

# Autonomy & Transparency – Inherent To FOSS By Design



Free Software, Free Society

# Autonomy & Transparency – Software Design Enabling 3R



## Free Software, Three (R) Society

# Circular Economy – Environmental Impact



**Circular Economy:** products **designed** to enable the **3R** across their life cycle.

Shifting to a circular economy is estimated to reduce **global greenhouse gas emissions** by up to 70%.

Sarah King, circular economy researcher, Swinburne University of Technology, Melbourne, Australia,

<https://www.scientificamerican.com/article/>

[reduce-reuse-recycle-why-all-3-rs-are-critical-to-a-circular-economy/](#)

# Blauer Engel For Desktop Software (2020)

Free & Open Source Software

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



## ABC of Certification Criteria





# KDE Eco Initiative – FOSS For A Circular Economy

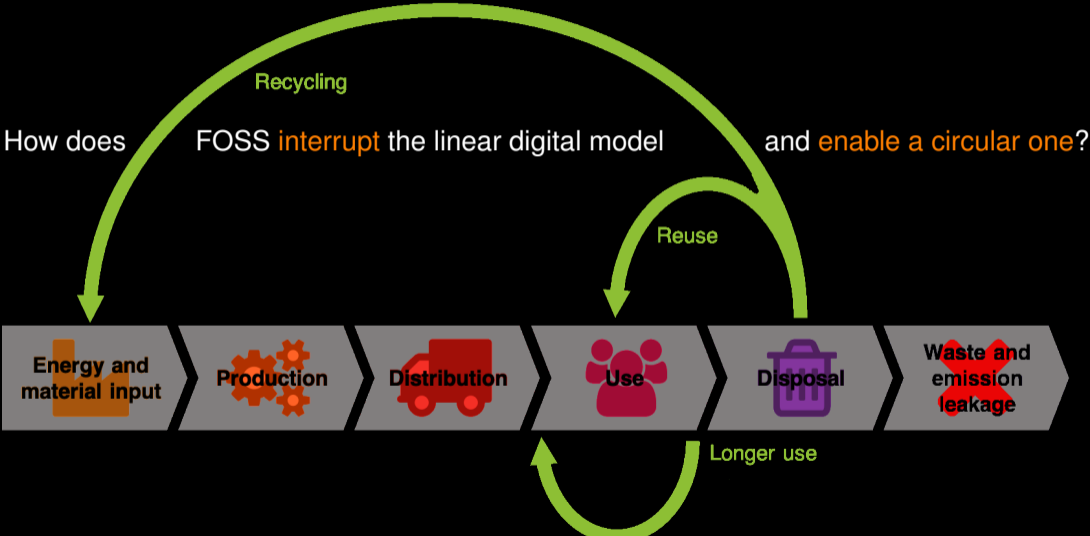


Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# What's The Problem . . . And How Does It Relate To Software?



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/>

# 1856 – “The Receiver [. . . ] Became Itself Much Heated”

“The highest effect of the sun’s rays I have found to be in [CO<sub>2</sub>]. The receiver containing the gas became itself **much heated** [...] and on being removed [from the sun] it was **many times as long in cooling**”.

Eunice Newton Foote, 1856

[floss.social/deck/@be4foss/109987603351052830](https://floss.social/deck/@be4foss/109987603351052830)

ART. XXXI.—Circumstances affecting the Heat of the Sun's Rays; by EUNICE FOOTE.

(Read before the American Association, August 23d, 1856.)

My investigations have had for their object to determine the different circumstances that affect the thermal action of the rays of light that proceed from the sun.

Several results have been obtained.

First. The action increases with the density of the air, and is diminished as it becomes more rarified.

The experiments were made with an air-pump and two cylindrical receivers of the same size, about four inches in diameter and thirty in length. In each were placed two thermometers, and the air was exhausted from one and condensed in the other. After both had acquired the same temperature they were placed in the sun, side by side, and while the action of the sun's rays rose to 110° in the condensed tube, it attained only 88° in the other. I had no means at hand of measuring the degree of condensation or rarefaction.

The observations taken once in two or three minutes, were as follows:

Exhausted Tube.			Condensed Tube.		
In shade.	In sun.		In shade.	In sun.	
55	90		75	80	
74	82		78	55	
80	82		80	100	
82	84		82	105	
84	82		82	110	

This circumstance must affect the power of the sun's rays in different places, and contribute to produce their feeble action on the summits of lofty mountains.

Secondly. The action of the sun's rays was found to be greater in moist than in dry air.

In one of the receivers the air was saturated with moisture—in the other it was dried by the use of chlorid of calcium.

Both were placed in the sun as before and the result was as follows:

Dry Air.			Damp Air.		
In shade.	In sun.		In shade.	In sun.	
75	74		75	75	
78	88		79	90	
82	92		82	100	
82	104		82	110	
82	105		82	114	
82	108		82	120	

The high temperature of moist air has frequently been observed. Who has not experienced the burning heat of the sun that precedes a summer's shower? The isothermal lines will, I think, be found to be much affected by the different degrees of moisture in different places.

Thirdly. The highest effect of the sun's rays I have found to be in carbonic acid gas.

One of the receivers was filled with it, the other with common air, and the result was as follows:

In Common Air.			In Carbonic Acid Gas.		
In shade.	In sun.		In shade.	In sun.	
80	90		80	90	
81	94		84	100	
90	99		84	110	
81	100		82	120	

The receiver containing the gas became itself much heated—very sensibly more so than the other—and on being removed, it was many times as long in cooling.

An atmosphere of that gas would give to our earth a high temperature; and if as some suppose, at one period of its history the air had mixed with it a larger proportion than at present, an increased temperature from its own action as well as from increased weight must have necessarily resulted.

On comparing the sun's heat in different gases, I found it to be in hydrogen gas, 104°; in common air, 106°; in oxygen gas, 108°; and in carbonic acid gas, 125°.

ART. XXXII.—Review of a portion of the Geological Map of the United States and British Provinces by Jules Maroon,\* by WILLIAM P. BLAKE.

GEOLOGICAL maps of the United States published in Europe and widely circulated among European geologists, are necessarily regarded by us with no small degree of attention and curiosity. This is more especially true, when such maps embrace regions of which the geography has only recently been made known and the geology has never before been laid down on a map with any approach to accuracy.

The recent geological map and profile by M. J. Maroon, which has appeared in the Annales des Mines and in the Bulletin of

\* Carte Géologique des Etats-Unis et des Provinces Anglaises de l'Amérique du Nord par Jules Maroon. Annales des Mines, 3e Série, T. vi, p. 325. Published also with the following:

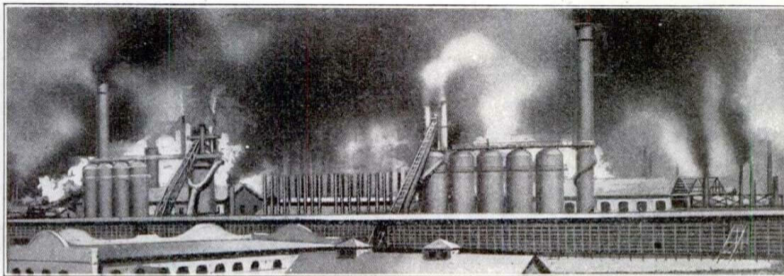
Revue explicative d'une carte géologique des Etats-Unis et des provinces anglaises de l'Amérique du Nord, avec un profil géologique allant de la vallée du Mississippi aux côtes du Pacifique, et une planche de faunes, par M. Jules Maroon. Bulletin de la Société Géologique de France, Mai, 1855, p. 413.

# 1912 – “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 CO<sub>2</sub>] 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](https://commons.wikimedia.org/wiki/File:191203_Furnaces_of_the_world_-_Popular_Mechanics_-_Global_warming.jpg)

# 2023 (Jan.) – “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](mailto:fediscience.org/@ed_hawkins/109710462146263953)



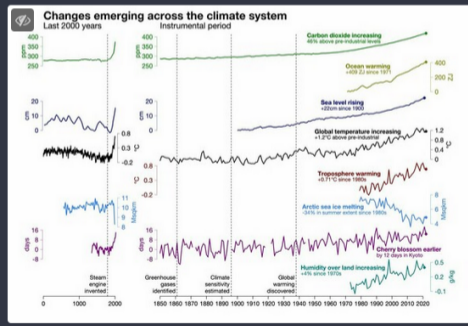
Ed Hawkins

@ed\_hawkins@fediscience.org

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

Rate of recent changes is unprecedented in at least 2000 years for many climate metrics.

These changes are not natural; they are primarily caused by the burning of fossil fuels.



APOSTOLIC EXHORTATION

## **LAUDATE DEUM**

OF THE HOLY FATHER  
FRANCIS

TO ALL PEOPLE OF GOOD WILL  
ON THE CLIMATE CRISIS

***“I have realized that our responses have not been adequate, while the world in which we live is **collapsing and may be nearing the breaking point.**”***

Pope Francis, Apostolic Exhortation, 4 Oct. 2023

[https://www.vatican.va/content/francesco/en/apost\\_exhortations/documents/20231004-laudate-deum.html](https://www.vatican.va/content/francesco/en/apost_exhortations/documents/20231004-laudate-deum.html)

# ICT Sector – On A Par With Global Aviation Industry . . . And Increasing

*“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>

See also Freitag et al. 2021: <https://www.sciencedirect.com/science/article/pii/S2666389921001884>

# Linear Model – Produce, Use, Dispose

All stages apply to both **software** & **hardware**



Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)



## Today: where the two intersect

- ▶ (1) **Lean Software** ... for longer & more efficient hardware use
- ▶ (2) **Vendor Independence** ... for hardware reuse/repair
- ▶ (3) **Software Recycling** ... for new hardware support



Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

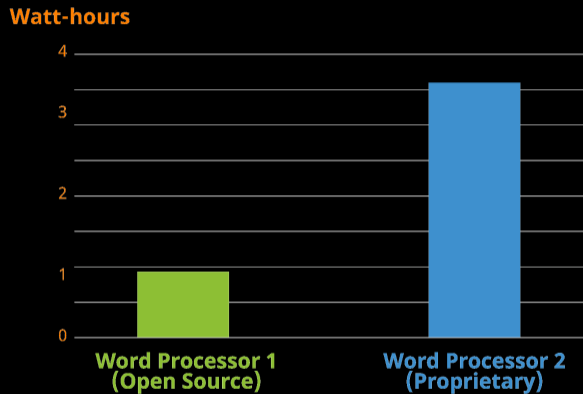
# Lean Software – Efficient Use Of Hardware

Doing the **same** task with **fewer** hardware demands



Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# Usage Scenario Measurements



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

# Scale Up



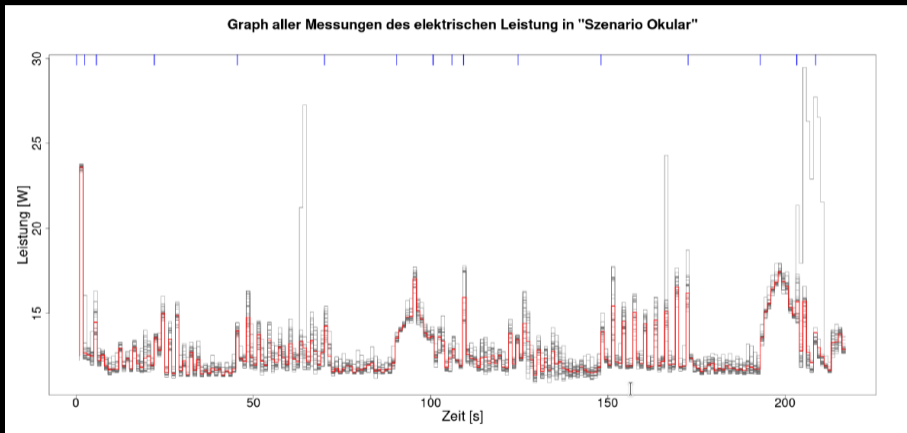
Adapted from Detlef Thoms HPI course: <https://open.hpi.de/courses/cleanit2021/items/5DHsS3tJsXAqfUE4q4F82Z>

# Act Local, Act Global



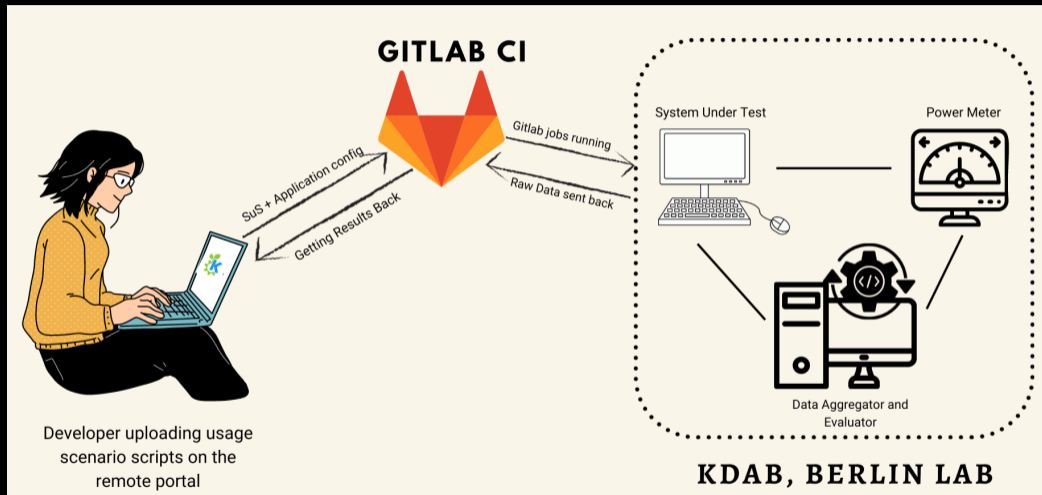
Adapted from Detlef Thoms HPI course: <https://open.hpi.de/courses/cleanit2021/items/5DHsS3tJsXAqfUE4q4F82Z>

# KDE Eco – Measuring Free Software’s Energy Consumption



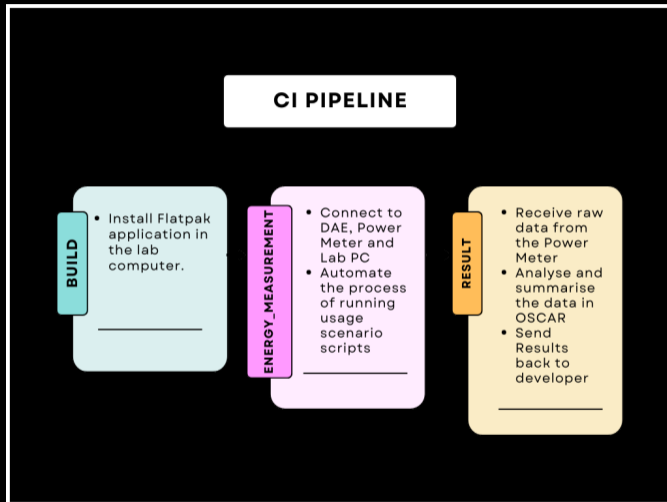
<https://invent.kde.org/teams/eco/feep/-/blob/master/measurements/okular/2022-09-22/Bericht%20SCAR%20Standardnutzungsszenario.pdf>

# KDE Eco – KEcoLaB (WIP) For Free Software Developers



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

# KDE Eco – KEcoLaB (WIP) For Free Software Developers



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



# Linear Model – Produce, Use, Dispose

But “Use” is just one step in the **linear** model.



Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

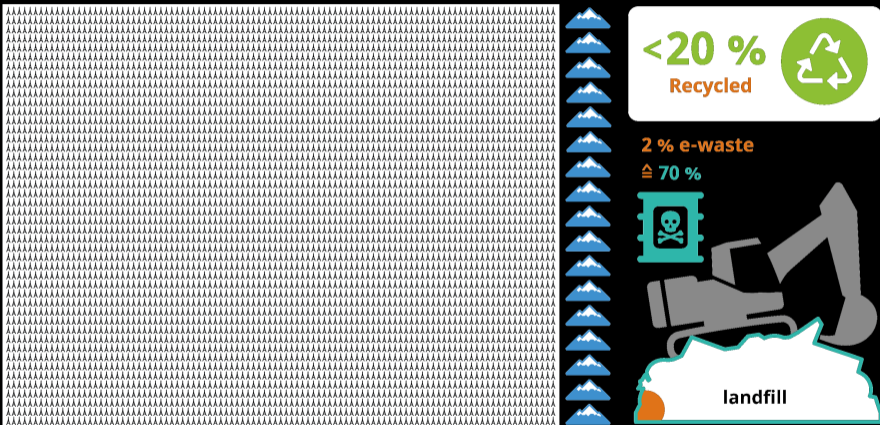
# Linear Model – Produce, Use, DISPOSE



Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# “Tsunami Of E-Waste”

E-waste 2016 = 4500 Eiffel Towers = Height of 17 Mount Everests



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

# E-Waste & Emission Leakage



Image by Muntaka Chasant: [https://en.wikipedia.org/wiki/File:Agbogbloshie,\\_Ghana\\_-\\_September\\_2019.jpg](https://en.wikipedia.org/wiki/File:Agbogbloshie,_Ghana_-_September_2019.jpg)

# E-Waste & Emission Leakage



Image of smoke from the burning of e-waste, plastic, and garbage, Tamir Kalifa: <https://nytimes.com/2019/09/12/opinion/sunday/west-bank-e-waste.html>

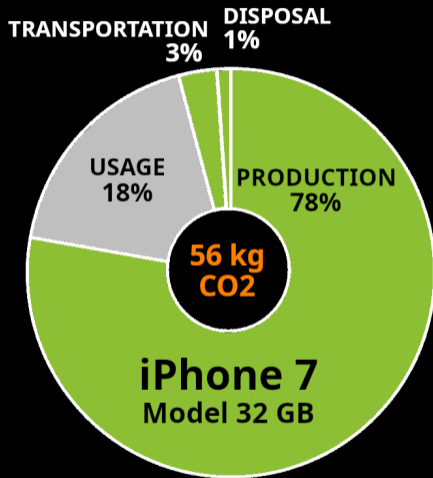
# Linear Model – PRODUCE, Use, Dispose

To replace discarded devices, process starts again from **beginning** ...



Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# Disproportionate Impact Of Production, Transportation, And Disposal



Based on Apple's "iPhone 7 Environmental Report (2017)" as reported in "Smarte Grüne Welt": <https://www.oekom.de/buch/smarte-gruene-welt-9783962380205>

## ... 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>



# Software Design Plays A Critical Role

## Software

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

## Result

- Functioning devices discarded as **e-waste**
- New devices **produced and shipped** unnecessarily

# Linear vs. Circular Model – Role Of Free Software

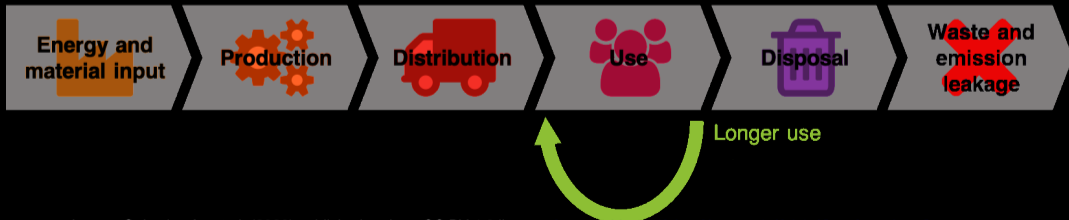
How does FOSS **interrupt** the linear model?



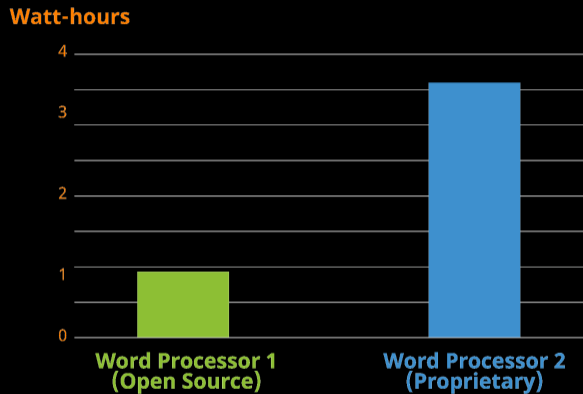
Image (modified): Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# Circular Model – REDUCE, Reuse, Recycle

Software freedom enables coding **lean software** to combat premature hardware obsolescence

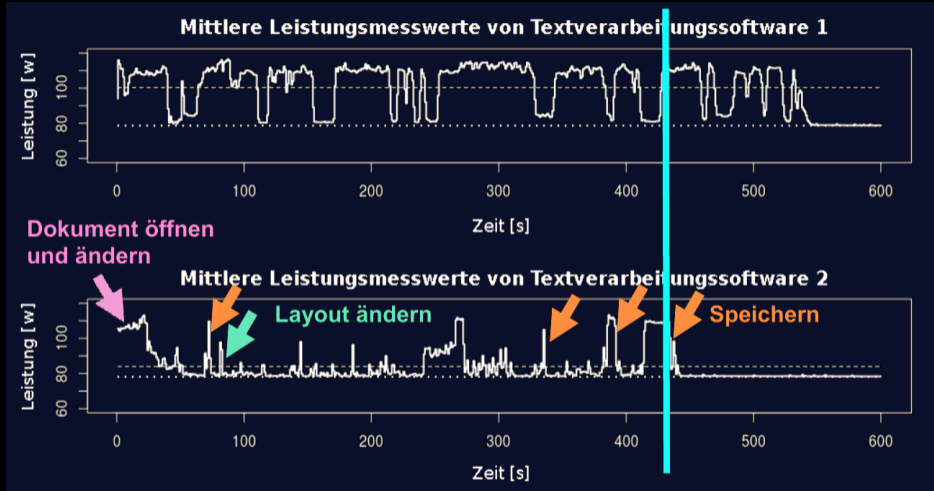


# Recall – Usage Scenario Measurements



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

# Freedom To Eliminate Processes



Modified from: <https://www.umweltbundesamt.de/publikationen/entwicklung-anwendung-von-bewertungsgrundlagen-fuer>



<https://fsfe.org/activities/ada-zangemann/>

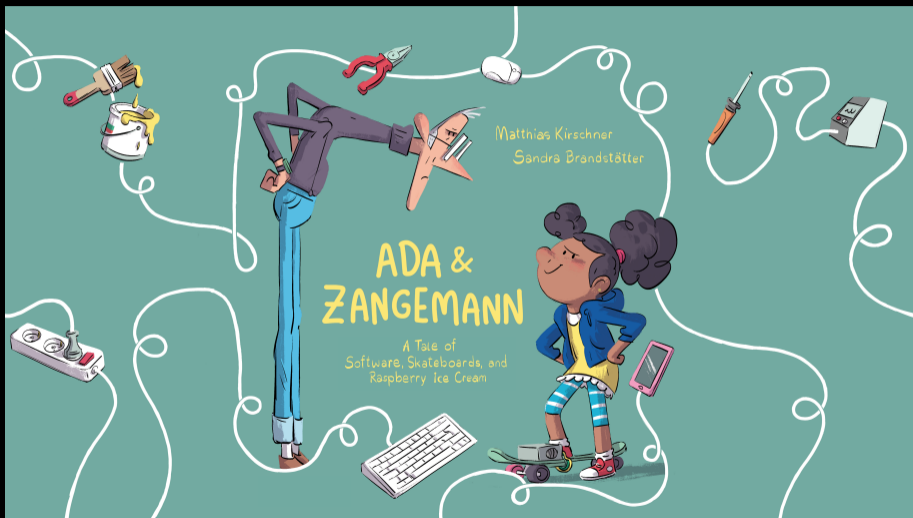
## Proprietary Software = Vendor Dependency

“[With a key] all the ice-cream machines in town would **dispense only vanilla ice cream.**”

“Sometimes people were disappointed when their favorite flavor wasn’t available, but **what could they do?**”

*Ada & Zangemann - A tale of software, skateboards, and raspberry ice cream (p. 17)*

# Ada & Zangemann – A Tale Of Software, Skateboards, and Raspberry Ice Cream



<https://fsfe.org/activities/ada-zangemann/>

# Transparency & Autonomy – For A Lean Digital Society



<https://fsfe.org/>



# KDE Eco – Efficiency MRs

## Merge requests

Select project to create merge request

Open 30 Merged 346 Closed 32 All 408

Recent searches Label **Efficiency** Updated date

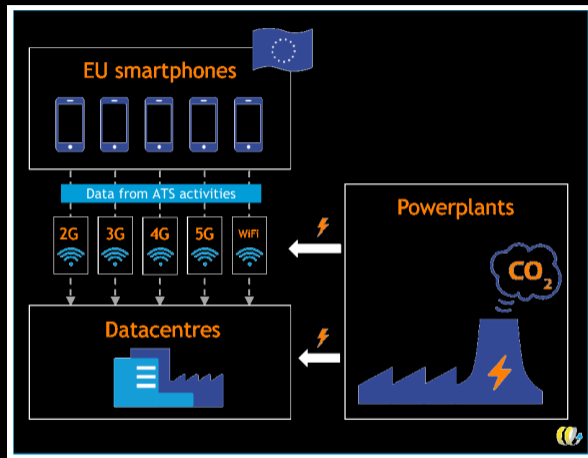
<b>QString: use more rvalue overloads</b> plasma/plasma-workspace!3297 - created 2 weeks ago by FushanWen 5 <b>Efficiency</b>	Merged 4 updated 2 days ago
<b>KAbstractConfigModule: Avoid module include in public header</b> framework/kcmutils!104 - created 3 days ago by AlexanderLohrau KPl <b>Efficiency</b>	Merged Approved 1 updated 3 days ago
<b>Conditionally skip running pip3 in KDECI to speed up tests</b> sdk/welsum-wedlmer-at-spl40 - created 5 days ago by FushanWen <b>Efficiency</b>	Merged Approved 3 updated 5 days ago
<b>plugins/desktopchangeosd: hide osd when Overview effect is active</b> plasma/kwin!4455 - created 5 days ago by FushanWen 5 <b>Bugfix</b> <b>Efficiency</b> <b>Feature</b>	Merged Approved 3 updated 5 days ago
<b>QPixmap: use rvalue overloads more</b> plasma/plasma-desktop!1720 - created 2 weeks ago by FushanWen 5 <b>Efficiency</b>	Merged 0 updated 5 days ago
<b>Use .length() method to check whether a url/string is empty</b> framework/kirigami!1277 - created 1 week ago by Matej Starc KPl <b>Efficiency</b>	Merged Approved 1 updated 1 week ago
<b>Remove clang-format exclusions where possible, reformat project, use QLatin1String in more places</b> framework/kactivities-state!37 - created 1 week ago by AlexanderLohrau KPl <b>Efficiency</b>	Merged Approved 1 updated 1 week ago
<b>Optimize KService internals, emit KSycoca signal when rebuilding in same process</b> framework/kservice!135 - created 3 weeks ago by AlexanderLohrau KPl <b>Efficiency</b> <b>Enhancement</b>	Merged 11 updated 1 week ago
<b>Avoid having multiple webshortcut desktop file reloads</b> framework/kservice!1301 - created 3 weeks ago by AlexanderLohrau KPl <b>Bugfix</b> <b>Efficiency</b>	Merged Approved 11 updated 1 week ago
<b>libtaskmanager: speed up waylandtaskmodeltest</b> plasma/plasma-workspace!3322 - created 1 week ago by FushanWen 5 <b>Efficiency</b> <b>Testing</b>	Merged 0 updated 1 week ago
<b>runners/helprunner: Read icon and description from runner metadata</b> plasma/plasma-workspace!3318 - created 1 week ago by AlexanderLohrau 5 <b>Efficiency</b> <b>Refactoring</b>	Merged 0 updated 1 week ago

[https://invent.kde.org/dashboard/merge\\_requests?label\\_name\[\]=Efficiency](https://invent.kde.org/dashboard/merge_requests?label_name[]=Efficiency)

## Freedom Of Uninstallability & Modularity

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

# Lean Software – Freedom Of Offline Capability / From Advertising



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](https://groenlinks.nl/sites/groenlinks/files/2021-09/CE_Delft_210166_Carbon_footprint_unwanted_data-use_smartphones.pdf)

# KDE Eco – Sustainability Documentation



Okular  
Version 23.11.70

About Components Authors Thanks To **Eco**



Okular follows sustainable software design by focusing on:

**Resource and Energy Efficiency**

Energy Efficiency Data: <https://invent.kde.org/teams/eco/blue-angel-application/-/blob/master/applications/okular/de-uz-215-eng-annex-7-okular.xml>

**Use Autonomy and Flexibility**

Open License: <https://invent.kde.org/graphics/okular/-/blob/master/COPYING>  
Source Code: <https://invent.kde.org/graphics/okular>  
API Documentation: <https://api.kde.org/okular/html/index.html>  
Data Format Documentation: <https://okular.kde.org/formats>  
Install/Uninstall Documentation: [https://userbase.kde.org/Tutorials/Install KDE software](https://userbase.kde.org/Tutorials/Install_KDE_software)

**Ethical Development and Privacy**

KDE's Code of Conduct: <https://kde.org/code-of-conduct/>  
KDE's Privacy Policy: <https://kde.org/privacypolicy-apps/>

Visit <https://eco.kde.org> to learn more about KDE Eco.

X Close

See: <https://invent.kde.org/teams/eco/sustainable-software-goal/-/issues/2>

# Circular Model – Reduce, REUSE, Recycle

FOSS makes it possible to give old hardware new value

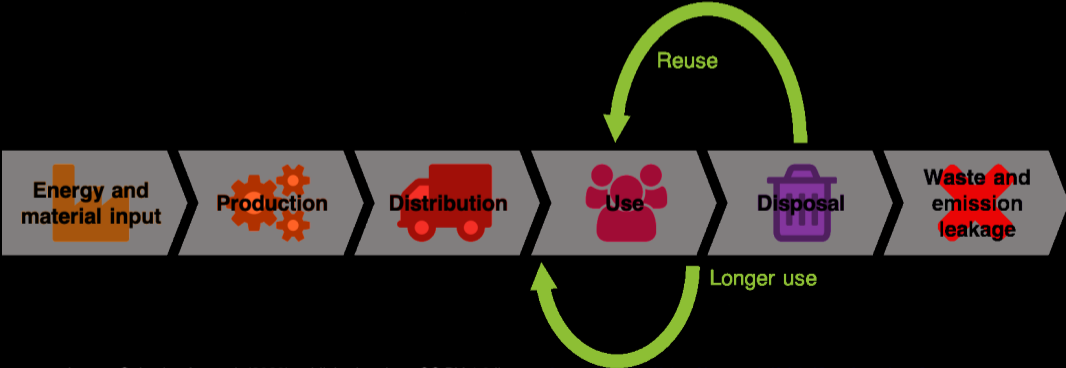


Image: Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# Vendor Independence – Freedom Of Hardware Reuse



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](https://upload.wikimedia.org/wikipedia/commons/6/65/Apple_MacBook_Pro%2C_model_A1278-8109.jpg)

# FOSS – Giving Hardware New Life And New Value



“From a **broken ice-cream machine**, they built a new one that could make ice cream in every imaginable shape and color.”

*Ada & Zangemann - A tale of software, skateboards, and raspberry ice cream (p. 35)*

<https://fsfe.org/activities/ada-zangemann/>

# Circular Model – Need For Software Repairability



“Value is lost when fully or partially functional products are discarded because [...] software is no longer supported[.]”

“Focus on electronics and ICT as a priority sector for implementing the ‘right to repair’, including a right to update obsolete software” (p. 7)

<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN>



# Right To Repair Without Software Freedom?

Open Letter To Legislators In EU, 27 April 2022

(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>

# Circular Model – Reduce, Reuse, RECYCLE

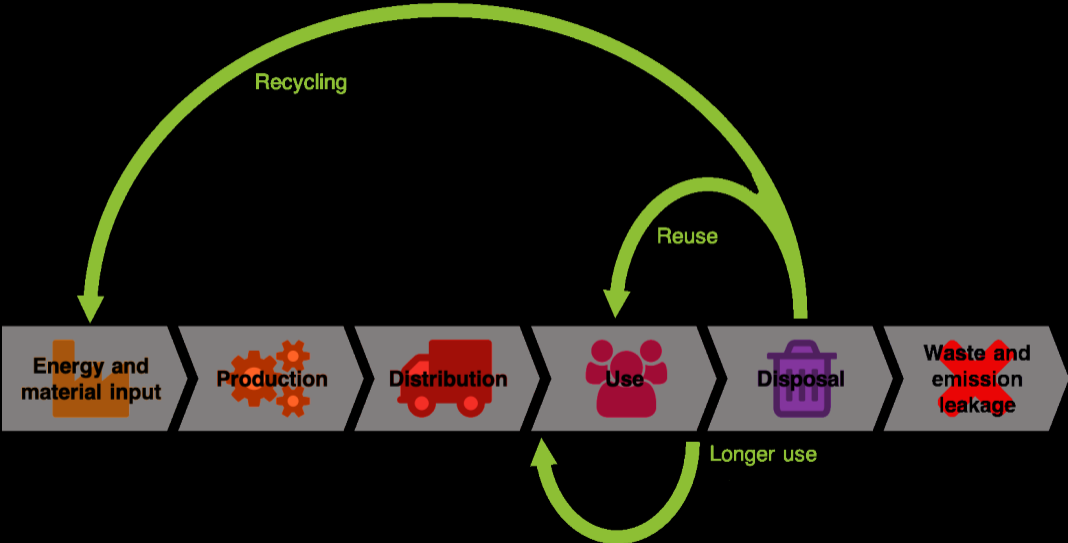



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# Software Recycling – Freedom To Integrate With Existing Code



Ubuntu Summit 2023


Nov 3 – 5, 2023  
Riga, Latvia  
Europe/Riga timezone


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From Asahi Linux to Ubuntu: Running Linux on Apple Silicon ★ 📅

📅 Nov 5, 2023, 2:30 PM  
🕒 50m Talk (50 Minutes) 🖥️ Linux Desktop  
📍 Omega 2 – Plenary (Radisson Blu Latvija)

Speakers

 Hector Martin  
Asahi Linux

 Tobias Heider  
Canonical

<https://events.canonical.com/event/31/contributions/177/>

## Integrating Code For New HW

“[Asahi Linux project] collaborate [...] to make their work available to the wider open source **ecosystem**, and also work together with distributions to help them **integrate support** for these machines.”

# FOSS In A Circular Model – Reduce, Reuse, Recycle

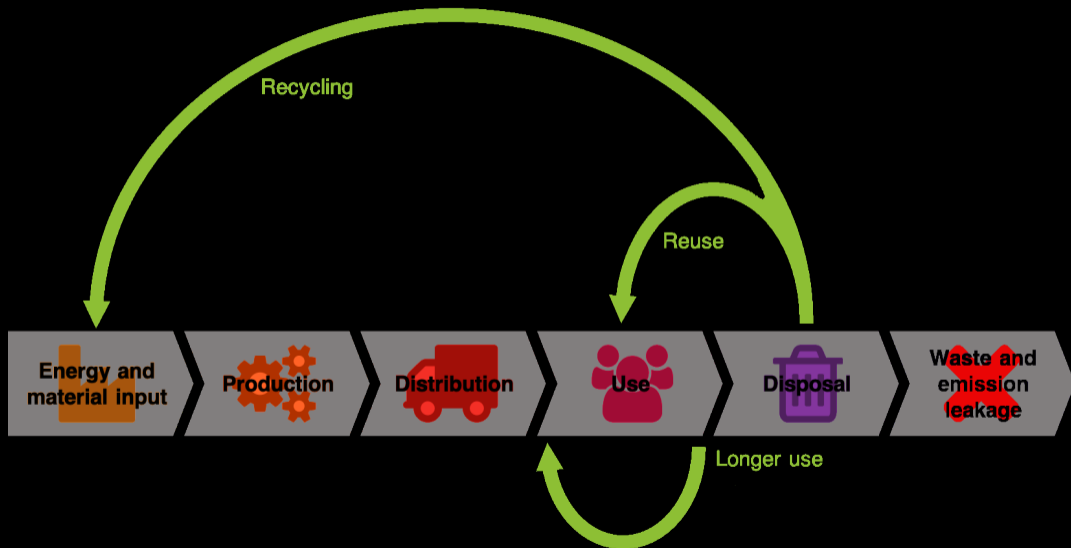


Image: Geissdoerfer et al. (2020) published under a CC BY 4.0 license: [https://en.wikipedia.org/wiki/File:The\\_Circular\\_Economy\\_concept.png](https://en.wikipedia.org/wiki/File:The_Circular_Economy_concept.png)

# Blauer Engel For Desktop Software (2020)

FOSS Advantage

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



## ABC of Certification 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)

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

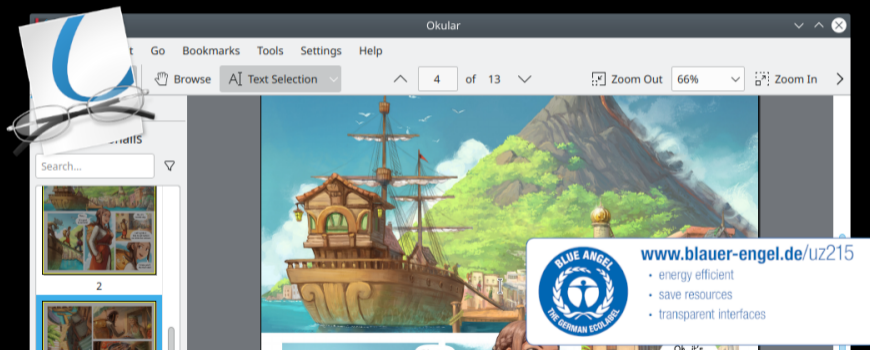
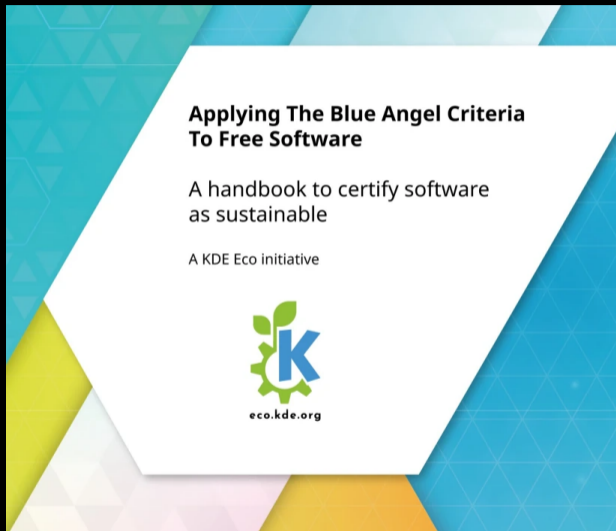


Image from: <https://eco.kde.org/blog/2022-03-16-press-release-okular-blue-angel/>





# KDE Development Goals – Sustainable Software

## KDE's New Goals - Join the Kick Off Meeting

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

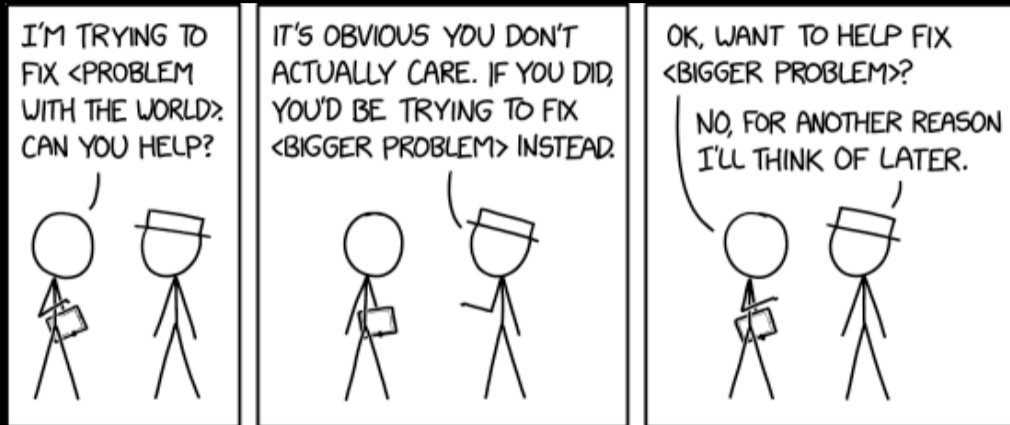
By Adam Szopa



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>

# Is All Of This Worth It?



XKCD comic "2368: Bigger Problem": <https://xkcd.com/2368/>

## 2023 (Oct.) – “Every Little Bit Helps”

APOSTOLIC EXHORTATION

**LAUDATE DEUM**

OF THE HOLY FATHER  
FRANCIS

TO ALL PEOPLE OF GOOD WILL  
ON THE CLIMATE CRISIS

**“[E]very little bit helps, and avoiding an increase of a tenth of a degree in the global temperature would already suffice to alleviate some suffering for many people. Yet what is important is something less quantitative: the need to realize that there are no lasting changes without cultural changes, without a maturing of lifestyles and convictions within societies, and there are no cultural changes without personal changes.”**

Pope Francis, Apostolic Exhortation, 4 Oct. 2023

[https://www.vatican.va/content/francesco/en/apost\\_exhortations/documents/20231004-laudate-deum.html](https://www.vatican.va/content/francesco/en/apost_exhortations/documents/20231004-laudate-deum.html)



## Report From The German Parliament's "Sustainable by Design" Conference

Wednesday, 26 April 2023 | Cornelius Schumacher

In March 2023, a conference on Green Digitisation, "Nachhaltig by Design - für eine klimaneutrale Zukunft", took place at the German Parliament. I was invited as an expert due to KDE's experience obtaining the Blue Angel ecolabel for Okular. The Green Party organized the conference, and participants from a wide range of organizations attended, contributing their views and expertise.

The first part of the conference featured keynotes and panels where subject matter experts and political representatives discussed the challenges surrounding sustainable digitisation. [Cory Doctorow](#) ([Invidious link](#)) spoke about how we lose control of our digital lives as big vendors force changes on users and legal regulations hinder our ability to prevent this. [Mojib Latif](#) ([Invidious link](#)) presented a scientific perspective on climate change, emphasizing the urgency of taking action to mitigate long-term harmful effects on our global living conditions. Germany's Vice Chancellor, [Robert Habeck](#) ([Invidious link](#)), provided insight into current political activities and stressed that energy-efficiency isn't getting the required attention yet.

<https://eco.kde.org/blog/2023-04-26-sustainable-by-design/>

## KDE Eco Outreach – In The House Of Lords



[https://eco.kde.org/blog/2022-12-02\\_guest\\_openuk\\_awards/](https://eco.kde.org/blog/2022-12-02_guest_openuk_awards/)

# KDE Eco Partnership – FOSS Nigeria “Renew Vision Project 2023”



“Climate Resilience Integrated Digital Learning Platform and Energy Solution Project”  
Educational tools for Almajiri children in 13 states across Northwest and Northeast Nigeria

ALMAJIRI children at Kebbi State Nigeria (CC BY-SA 4.0) by Muhammad Idris Tetengi,

[https://en.wikipedia.org/wiki/File:ALMAJIRI\\_children\\_at\\_Kebbi\\_State\\_Nigeria\\_2.jpg](https://en.wikipedia.org/wiki/File:ALMAJIRI_children_at_Kebbi_State_Nigeria_2.jpg)

# KDE Eco Outreach – Season of KDE In Heise.de

## 3 Projects – 3 Mentees

- ▶ **KdeEcoTest** – Mohamed Ibrahim
- ▶ **Blue Angel** – Rudraksh Karpe
- ▶ **Selenium Scripting** – Nitin Tejuja

heise online > Linux und Open Source > Season of KDE 2023: Weitere Schritte zur nachhaltigen Desktop-Umgebung

## Season of KDE 2023: Weitere Schritte zur nachhaltigen Desktop-Umgebung

Acht Studierende haben in zwölf Wochen die Benutzerfreundlichkeit einiger KDE-Anwendungen verbessert und an der Energiemessung von Software gearbeitet.

Lesezeit: 3 Min.  In Pocket speichern    2



(Bild: lovelyday12/Shutterstock.com)

08.05.2023 11:55 Uhr  
Von Tim Schürmann

<https://www.heise.de/news/Season-of-KDE-2023-Weitere-Schritte-zur-nachhaltigen-Desktop-Umgebung-8989974.html>

# Three KDE Goals – In One Project (Selenium Scripting)

[Sustainable Goal](#)[FEEP](#)[Handbook](#)[Blog](#)[Get Involved](#)[Donate](#)

## SoK 2023 Selenium-AT-SPI KDE Eco Power Measurement Proof Of Concept: Achieving Three KDE Goals With One Stone!

Thursday, 4 May 2023 | Emmanuel Charruau

### Why Use Selenium-AT-SPI

Last year, Okular, KDE's advanced document reader, became the first software product ever to receive the Blue Angel eco-label. This certification recognises Okular as having a sustainable software design.

<https://eco.kde.org/blog/2023-05-04-sok23-kde-eco-selenium-sum-up/>



# KDE Eco – Sustainable Software Awesome List

Teams > KDE Eco > Sustainable Software Goal

## Resources

### Software

#### Lists

- [Open Sustainable Technology](#) - Comprehensive list of open source projects in environmental sustainability
- [Green Software](#) - List of research, tools, code, libraries, and training for building environmentally sustainable software by Green Software Foundation
- [DDSC's Sustainable Data Science Guide](#) - List of resources on sustainable data science

#### Projects

- [kube-green](#) - Kubernetes addon that automatically shuts down resources
- [CO2.js](#) - Tool for estimating emissions of apps, websites, software by Green Web Foundation
- [Mojo](#) - New programming language meant to be a more efficient version of Python for AI developers, by creator of LLVM and Swift

## 🔗 Software-Driven Energy Consumption

### Sustainable Software Design

- [The Karlskrona Manifesto for Sustainability Design](#) - Thoughts about principles and commitments for sustainable design
- [The era of green software](#) - Talk about sustainability in the world of software and computing

### Green Coding

- [Green Coding](#) - Paper about green coding concepts

### Measurement Tools

- [Green Coding Measuring Tools](#) - Overview of tools to measure energy consumption and carbon emissions of software
- [Green Metrics Tool](#) - Tool to measure resource usage of software by Green Coding Berlin
- [German: "Energieverbrauch von Software: Eine Anleitung zum Selbermessen"](#) - Instructions how to do a basic measurement of energy consumption of software

<https://invent.kde.org/teams/eco/sustainable-software-goal/-/blob/master/awesome-sustainable-software.md>

Tired of replacing your smartphone every other year?  
Renew and keep using your phone with Free Software!



## How to upcycle your phone and extend its usage lifetime



Select a Custom ROM:  
some focus on full user  
freedom, others on privacy,  
on usability, and more!  
Free choice.



Take ownership  
and flash your phone.



Get F-Droid  
and enjoy the largest  
Free Software app store  
in the Android world!  
Browsers, maps, games,  
music, chats and more!  
Everything in one place.  
<https://f-droid.org/>



**UPCYCLING**  
Android

This project is financially supported by



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... since you are here – want  
to get rid of Google Play  
Services as well? Install  
MicroG and get the best of  
your hardware without!



Congratulations!  
Your phone is updated,  
upgraded and upcycled!  
Enjoy the look and feel  
of a brandnew device.

### Looking for help?

Find more information  
and workshops on  
[www.upcyclingandroid.org](http://www.upcyclingandroid.org)



CC-BY-SA 4.0

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

## SDIA Green Coding Summit

23-24 November 2023, Berlin

Get your ticket

Add to calendar

Bringing the leading-edge expertise within the software community, both European and International, all together in one place will amplify knowledge sharing, debate, and create unity during our conference hosted at Berlin's iconic **Französischer Dom** on 23-24 November 2023. The summit is **entirely in English**.

<https://sdialliance.org/green-coding-summit/2023/>

# Measuring Software – Green Coding Berlin



Mission: “research the energy consumption of software and its infrastructure, create open source measurement tools, and create a community and ecosystem around green software.”

<https://www.green-coding.org/>

# Measuring Websites – Green Web Foundation



NEWS PUBLICATIONS TOOLS ▼ SERVICES ▼ PARTNER UP ABOUT ▼

DATASET LOGIN

Towards a fossil free internet by 2030

## Is your website hosted **green**?

One day the Internet will run entirely on renewable energy. The Green Web Foundation believes that day should be within reach, and develops tools to speed up the transition towards a green Internet

CHECK

<https://www.thegreenwebfoundation.org/>

# Get Involved – <https://eco.kde.org>

## Contact

- **Email:** [joseph@kde.org](mailto: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/>

