OPEN POSSIBILITIES.

Circularity – Planning for Carbon Reduction

Mohan Gandhi, Head of Research, SDIA Alliance
Sriram Ramkrishna, Principal Ecosystems Engineer, Sesame
Dr Deborah Andrews, Associate Professor of Design, London South Bank Univ.

OPEN PLATINUM™

Sustainability

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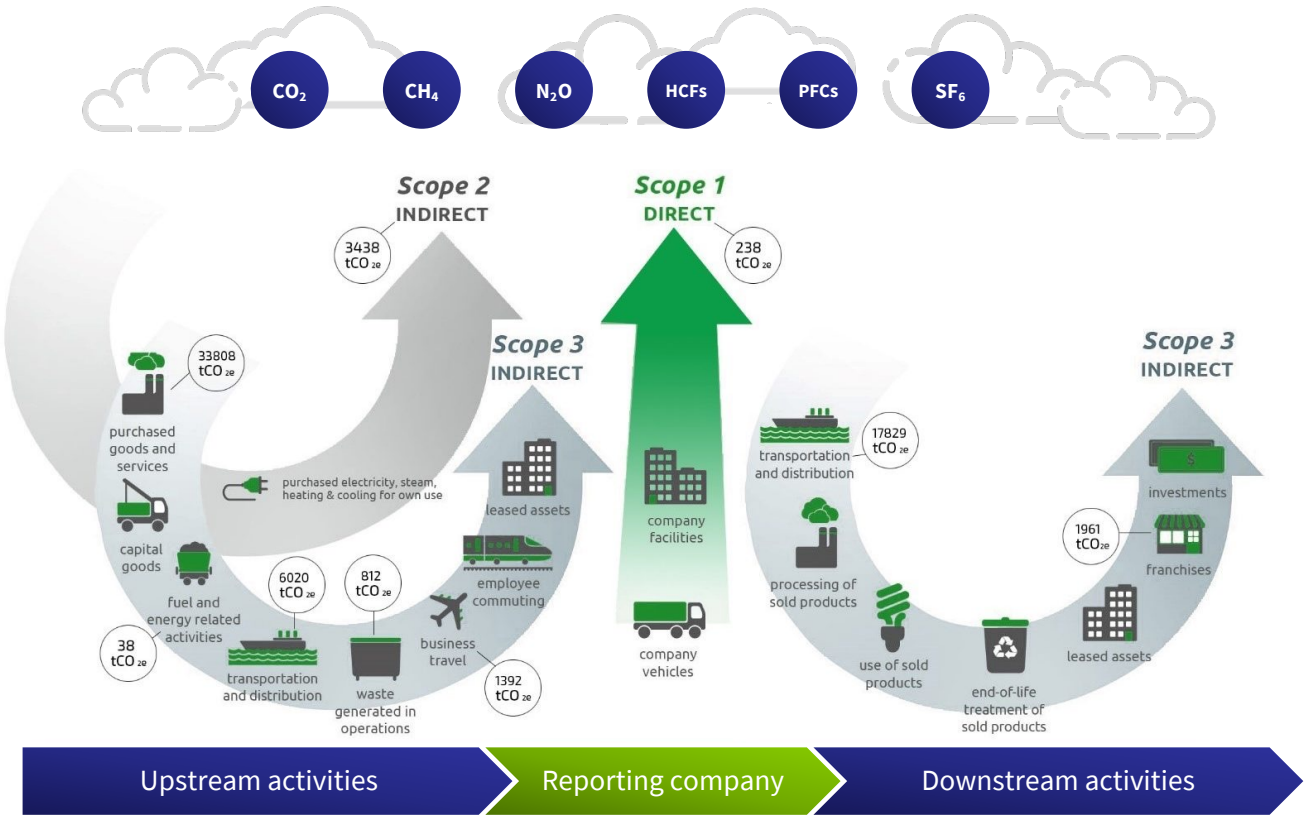
Understanding Scope 1, 2 & 3

SUSTAINABILITY



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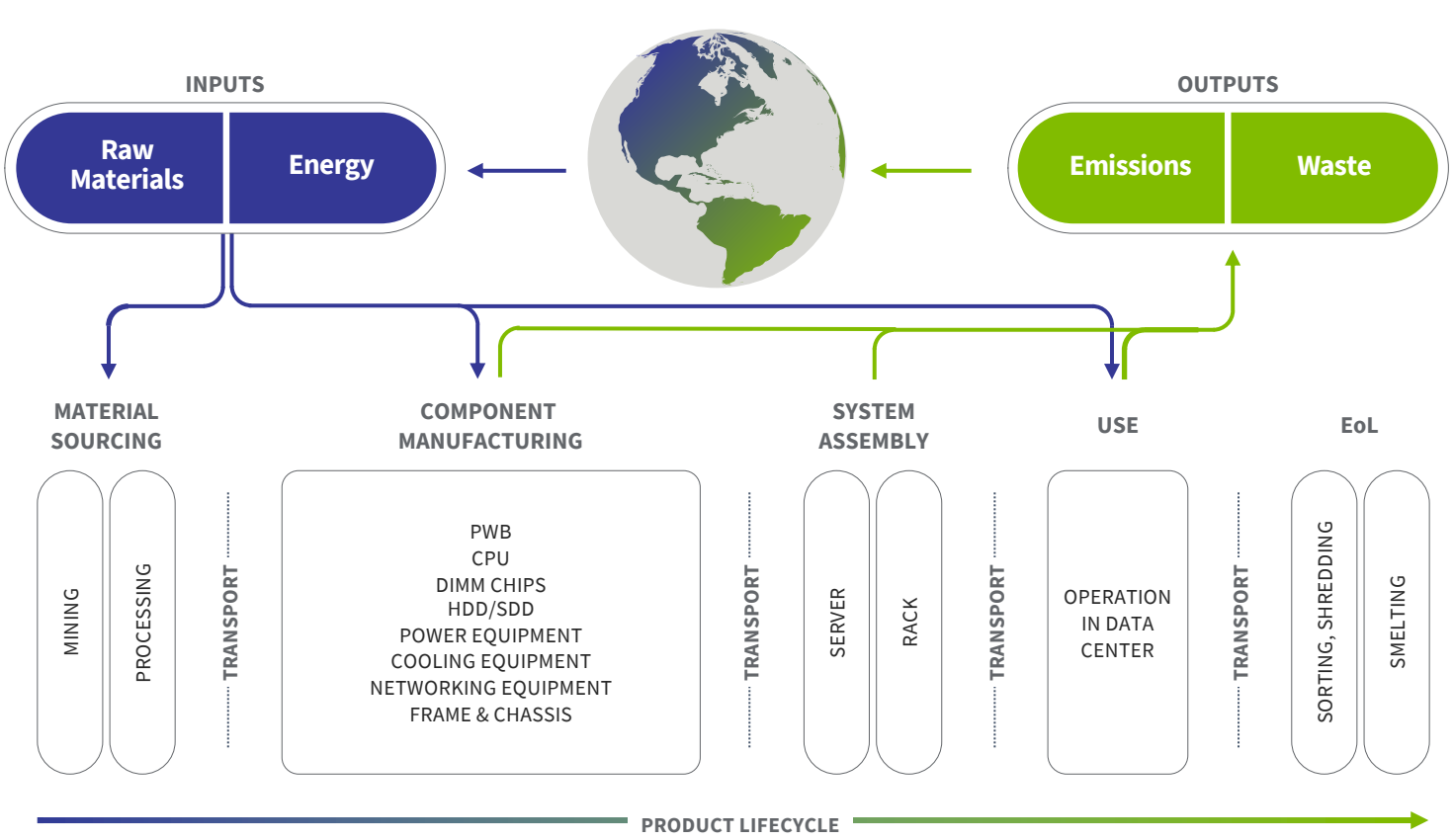

SUSTAINABILITY

OPEN POSSIBILITIES.

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Sesame by ITRenew and Circularity

SUSTAINABILITY

CARBON IMPERATIVE

- Scope 3 is about more than upstream supply chain
- 75%+ of carbon tied to IT is Scope 3 from mfg.
- Huge opportunities through creation of second lives
- Ecosystem collaboration and standards are essential
- Measurement and credit is key

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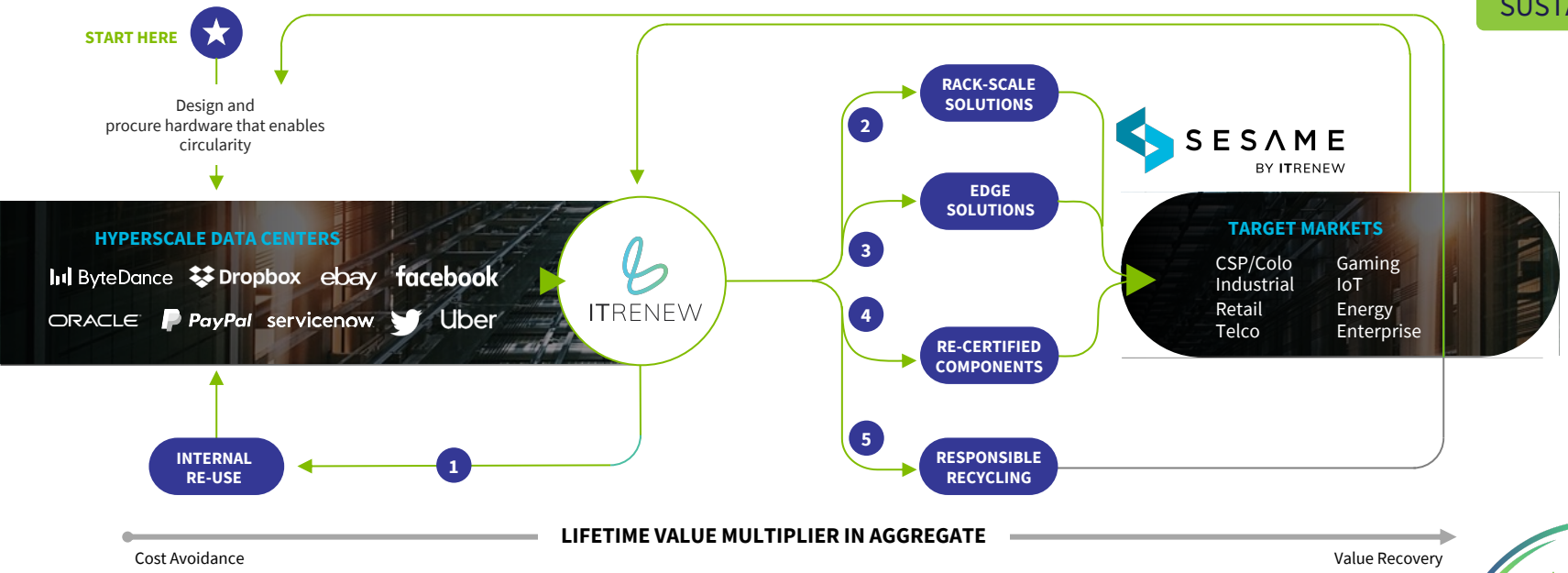
Circularity Business Model

SUSTAINABILITY



Circular Economy Enables Carbon Savings & Optimized Supply Chain

- ITR LCA analysis indicates ~2100kg CO2e/ server spec'ed (minus SSD)
- As compute capacity scales, so does the carbon impact of recertified solutions
- … server supply chains are big and visible and this is an opportunity to lead

	2021
Total Racks Deployed	24
Total Servers Deployed (48 servers / rack)	1,152
Total Cores Deployed	46,080
Cumulative metric tons CO2e	**2,415**
Equivalent cars on the road	466
Equivalent acres preserved from deforestation	17
Equivalent $ carbon offset	**$130,388**

2,400 tons
of carbon

Cumulative millions of Sesame impact

=

CO_2

$94M
Equivalent Carbon Offset

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A Small Case Study in Circularity

SUSTAINABILITY

	SESAME BY ITRENEW
Total nodes per rack	48
Cores per rack	1,344
Memory per rack	24.6 TB
Storage per rack	737 TB
Capex per rack (cost)*	$505,059
Electricity consumed per rack	9.8 kW
3-year Total kg CO_2e (operational)	72,000
3-year TCO per rack	$584,783

OPEN POSSIBILITIES.

CEDaCI and the Circular Data Centre Compass - a Digital Tool to Model and Assess Data Centre Sustainability

Dr Deborah Andrews
London South Bank University

Sustainability

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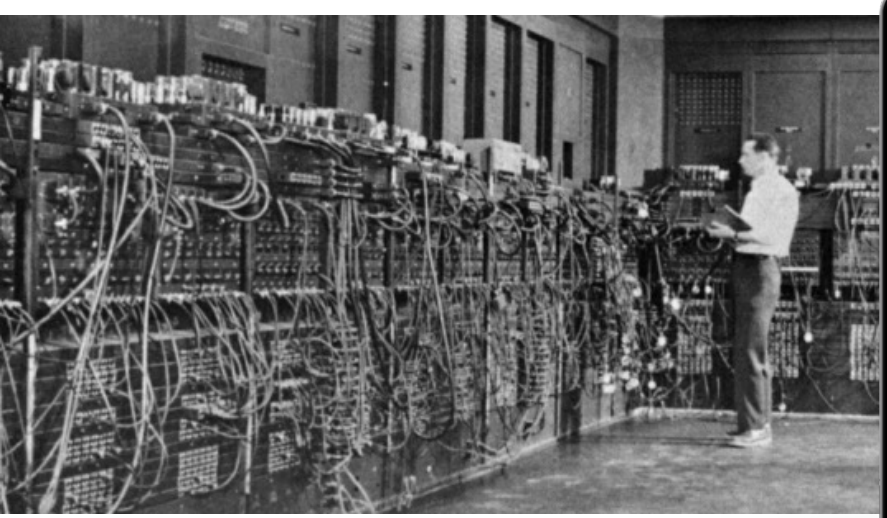
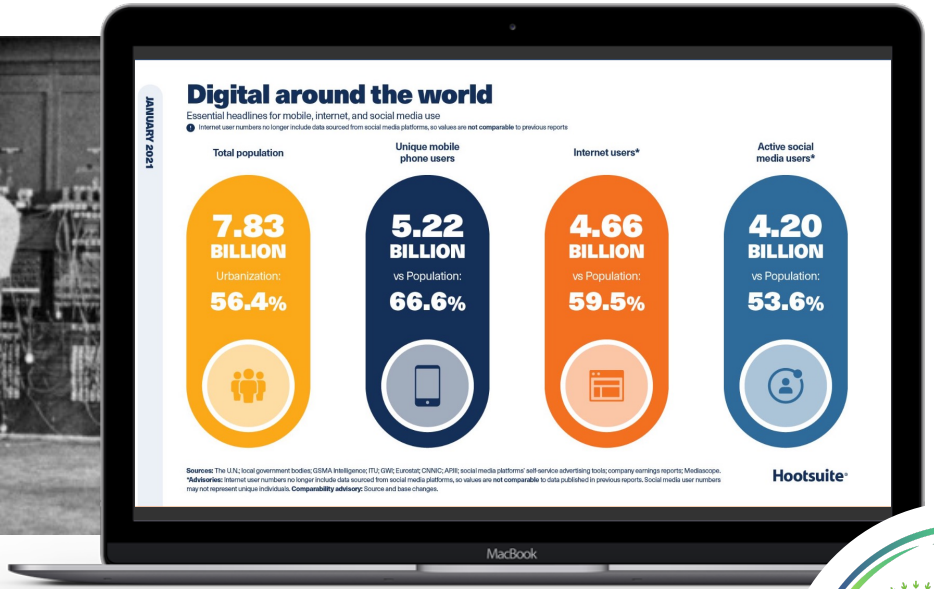
Connectivity – 60% Global Population / Data Traffic = 4.2 Trillion Gigabytes / Yr



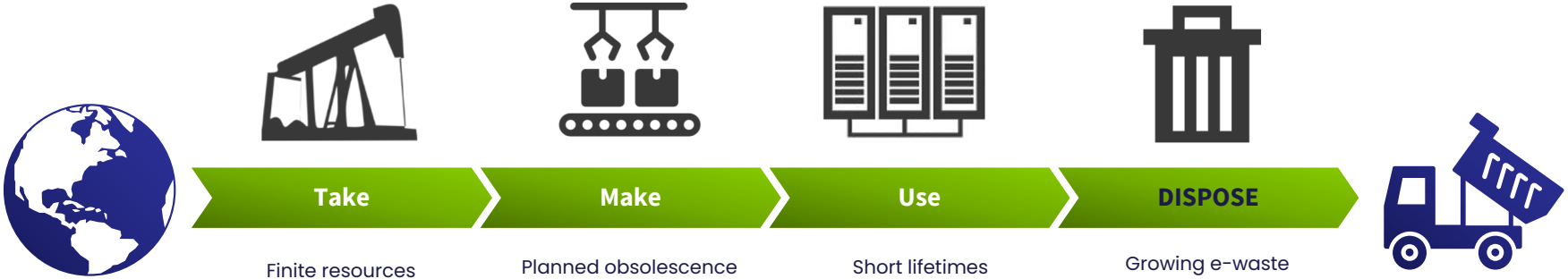


Data Centres

7.2M globally / concentration in EU - UK, Germany, France & Netherlands

$100bn Investment in sector (2010-2020)

Speed of Sectoral Development & Emphasis on Service Provision… Linear Model Of Consumption



CEDaCI

- Unique, interdisciplinary, multi-output initiative
- Uses **whole-life thinking**
- **Brings together representatives from all DCI sub-sectors** to share knowledge
- Accelerating development of sectoral Circular Economy

IT WILL

- Reduce waste
- Prevent supply chain problems
- Secure uninterrupted DC operation and service

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CDCC

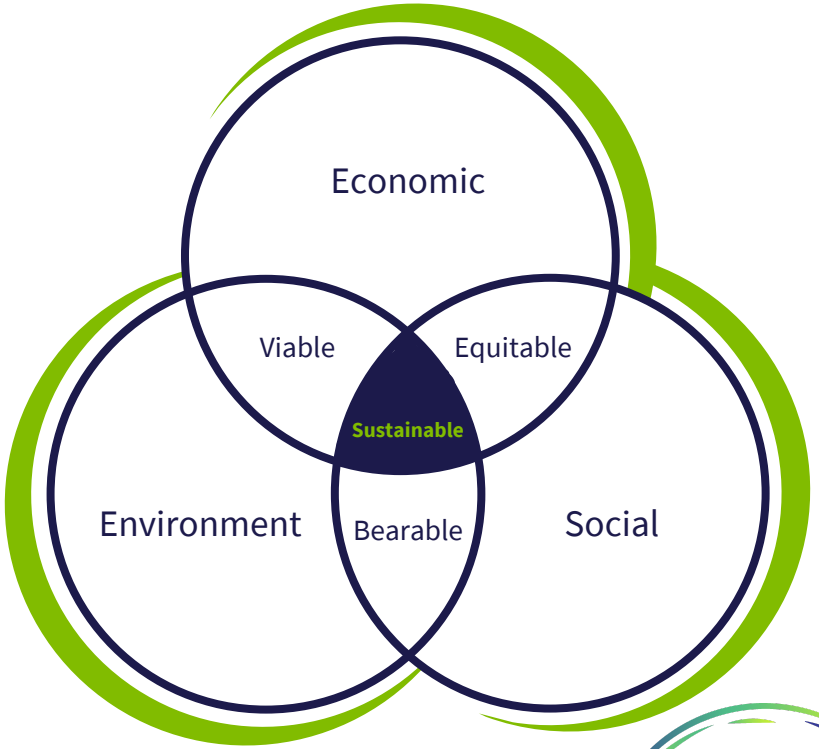
Circular Data Centre Compass

KEY OUTPUT – FREE ONLINE RESOURCE

Product Sustainability and Circularity Indicator
Enables business to compare environmental, social and economic impacts and materials' criticality of different servers

Identify preferred Circular business option based on company and/or performance requirements

Life Cycle SUSTAINABILITY Assessment + Criticality Indicator ▶



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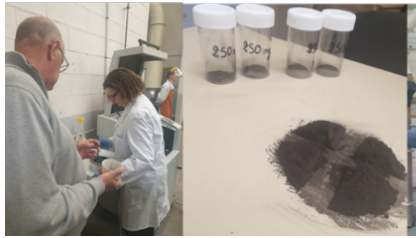
Primary Source Data Collection – All Partners

Inventory building / improving recycling / CRM reclamation / building LCA, LCC and S-LCA models for Pilots (design / manufacture, second-life, end-of-life) and CDCC



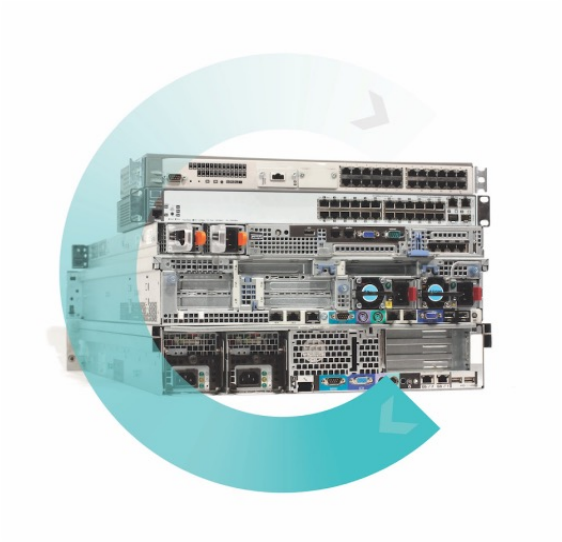


CDCC

Circular Data Centre Compass

CEDaCI home | Compass | Log In | Register



Welcome to Compass

Username

Exampleuser

Password

Login

or

Sign up

Forgot your password?

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Compare
Evaluator
End of life

Tool Options

Welcome to the Circular Data Centre Compass (CDCC). Choose from the following tool options: Compare, Ecodesign Evaluator and End-of-Life to assess your Data Centre equipment at various stages of its life.

All options were developed in-line with **the EU Circular Economy Action Plan 2020** and other eco-design directives and regulations as well as the **empirical data collected by CEDaCI** from the material breakdown and assessment of various server models.

Compare

Compare the specifications and environmental, social and economic impact of two servers based on a chosen configuration and generate a free PDF report.

Start

End-of-Life

Explore end-of-life options for a given server and choose the most beneficial outcome from a social, economic, and environmental perspective.

Start

Eco-design Evaluator

Check the circularity of your server design in compliance with Ecodesign and Design for Circularity guidelines.

Start

Compare

The CDCC Compare tool uses **Life Cycle Assessment** (LCA) to assess the entire life cycle of the equipment including the extraction of raw materials, manufacturing/assembly, transportation, use and end-of-life stages. **The Circular Footprint Formula** is used to account for benefits and burdens, resulting from the use of secondary and virgin materials, and recycling and energy recovery.

To find out which equipment is most circular, **select and configure** two servers, **compare** the specifications and impacts and **download** the full PDF report.

How do I use it? ↗

Compare tool uses LCA to assess entire life cycle of the equipment – extraction of raw materials, manufacturing/assembly, transportation, use and end-of-life stages

Circular Footprint Formula - accounts for benefits and burdens, resulting from the use of secondary and virgin materials, and recycling and energy recovery.

Choose Servers to Compare:

Server 1

Select

Configure

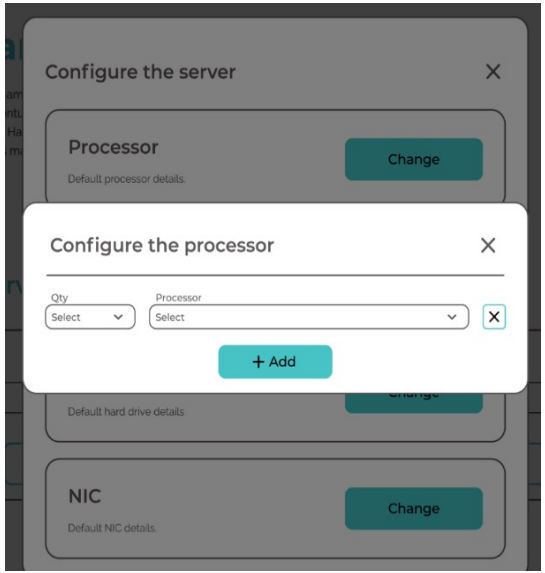
Server 2

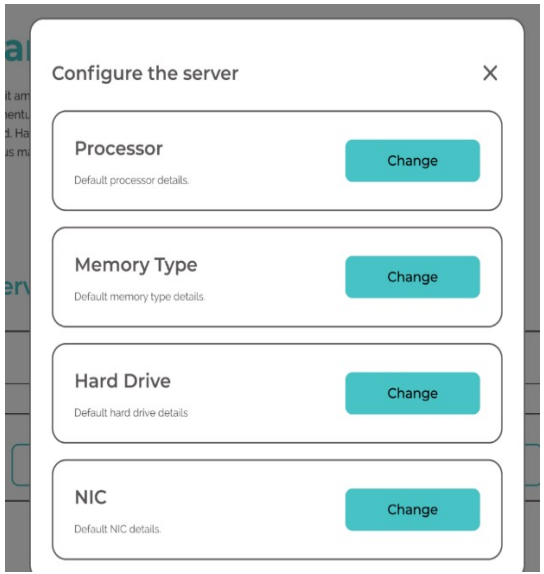
Select

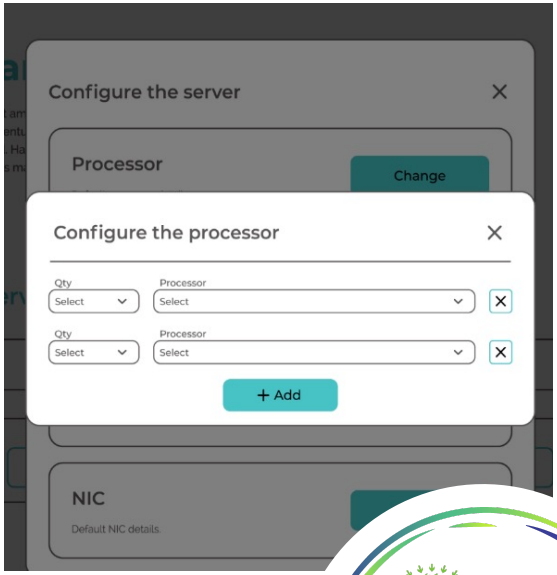
Configure

Compare

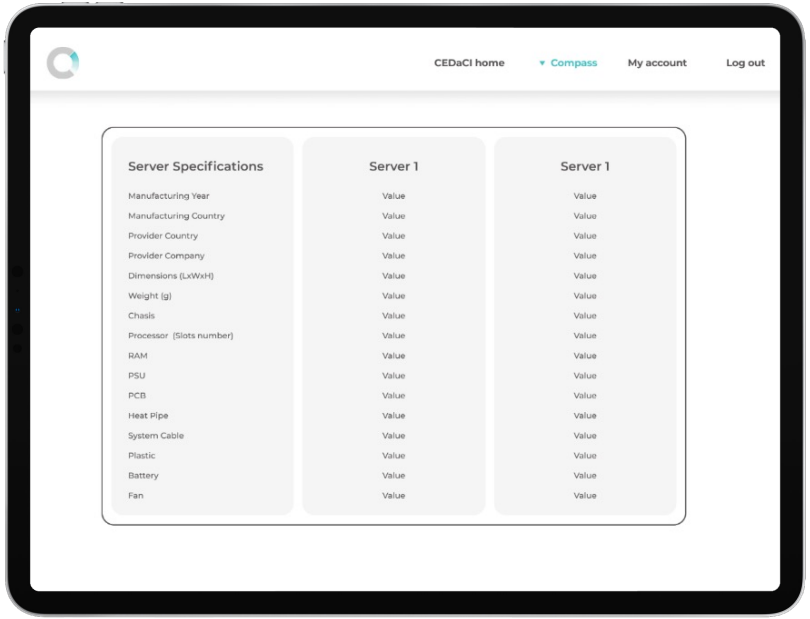
Compare to Find Out Which Equipment is Most Circular - Select and Configure Two Servers

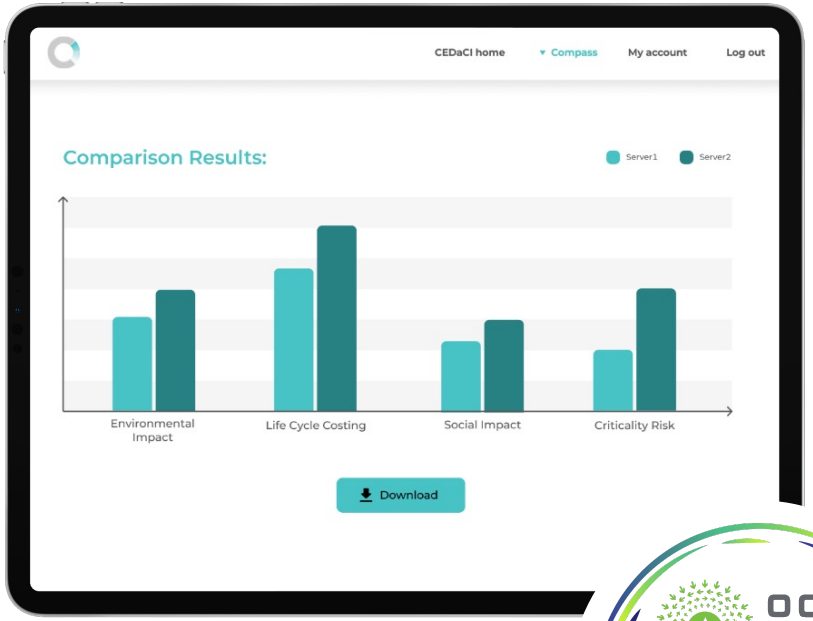






Compare Specifications and Impacts and Download the Full PDF Report





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End-of-Life

The End-of-Life (EoL) tool aims to encourage more sustainable considerations once a server reaches the end of its usable lifetime for a given user.

Assess and compare impacts and criticality risk of different end-of-life scenarios, including refurbishment, recycling using current industry methods, recycling using CEDaCI recommendations and landfill.

How do I use it? ↗

End-of-Life (EoL) tool encourages more sustainable considerations once a server reaches the end of its usable lifetime for a given user.

Assess and compare impacts and criticality risk of different end-of-life scenarios

- refurbishment / reuse
- recycling - current industry methods
- recycling - CEDaCI recommendations
- landfill

Compare reuse options

Are you considering buying a new server to replace an existing product? Compare server models across social, economic, and environmental impacts and criticality risk.

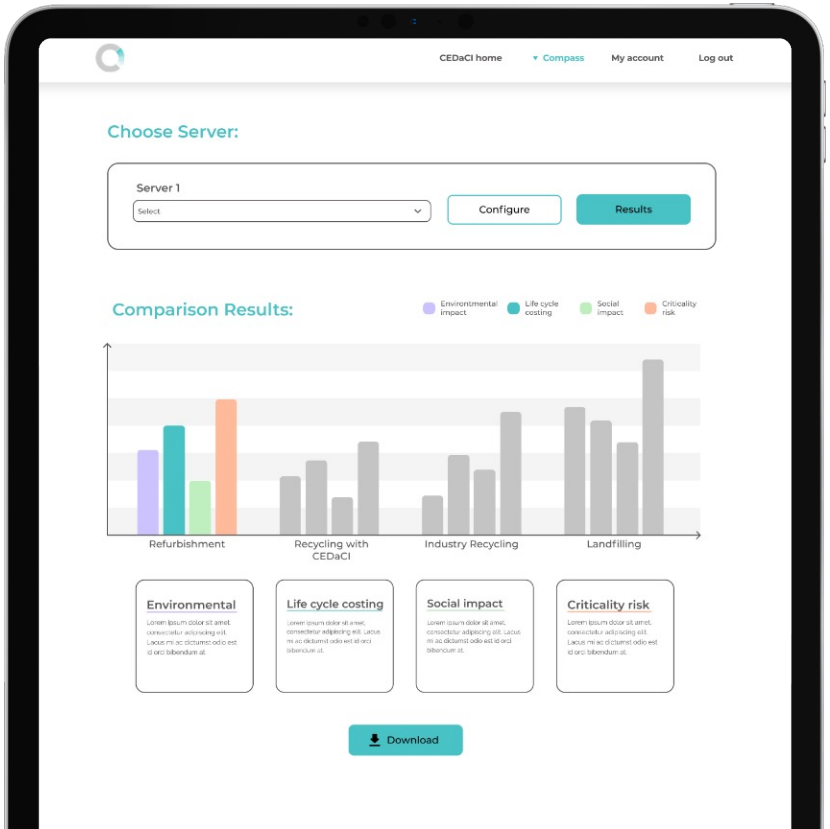
Compare

Compare the end-of-life options

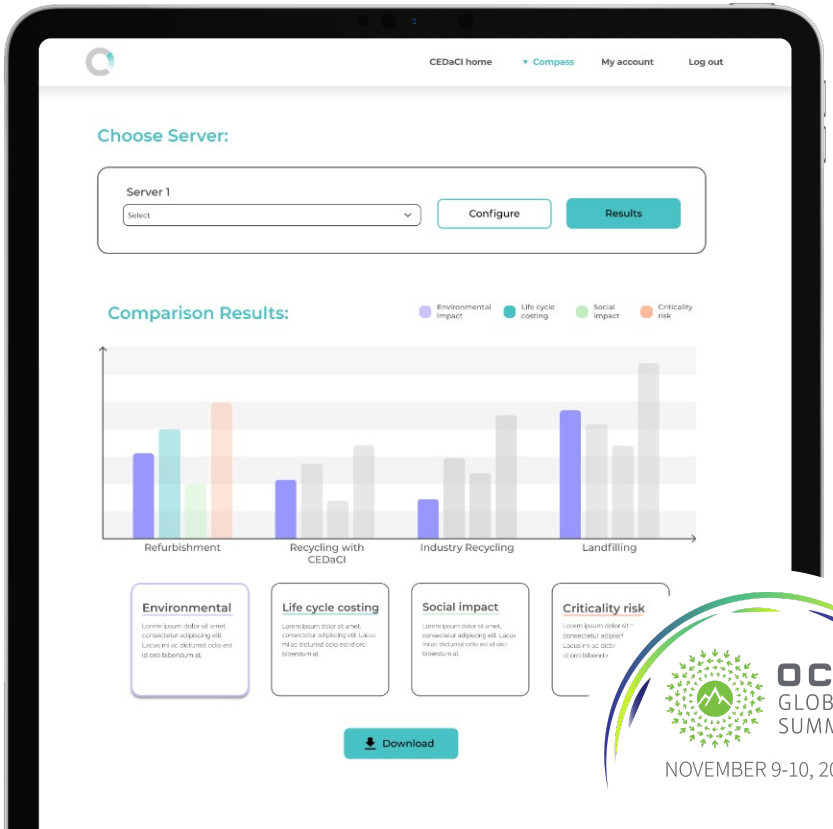
The server has reached the end of its first life.
Compare the total impacts of various disposal options: refurbishment, recycling using CEDaCI recommendations, recycling with current industry methods and landfill.

Compare

Compare Sustainability Categories

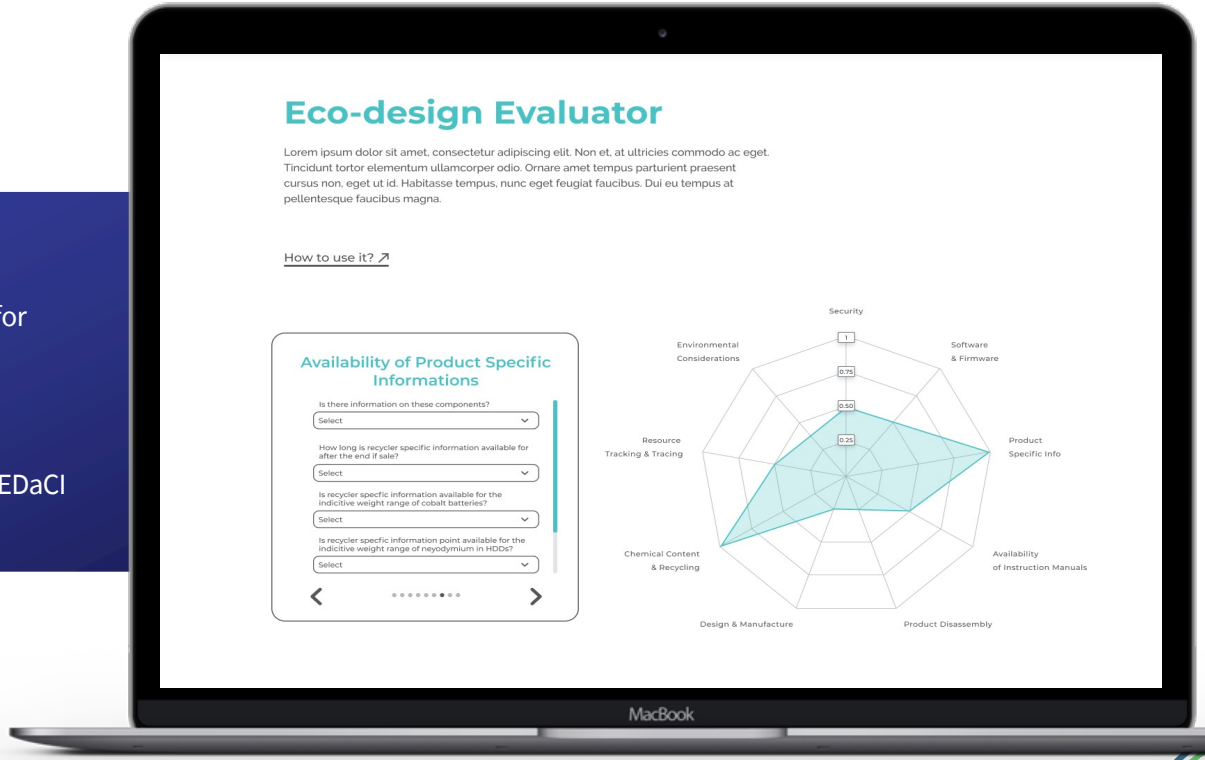


Compare Impact of E-o-L scenarios



Ecodesign Evaluator consolidates EU Ecodesign Criteria in one place – easy for designers to follow

Tool includes Ecodesign guidelines from EU Circular Economy Action Plan and CEDaCI recommendations



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Benefits / Value of CDCC

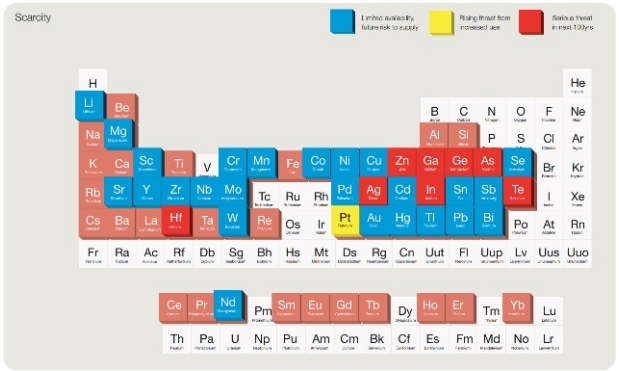
E-waste

Annual – 2020 ~50 million tonnes – 6kg per person
Business as usual - 2050 – 120 million tonnes

Global - < 20% is formally collected and recycled
Current value - >$62.5 billion

69 elements in EEE

7-10 Critical Raw Materials



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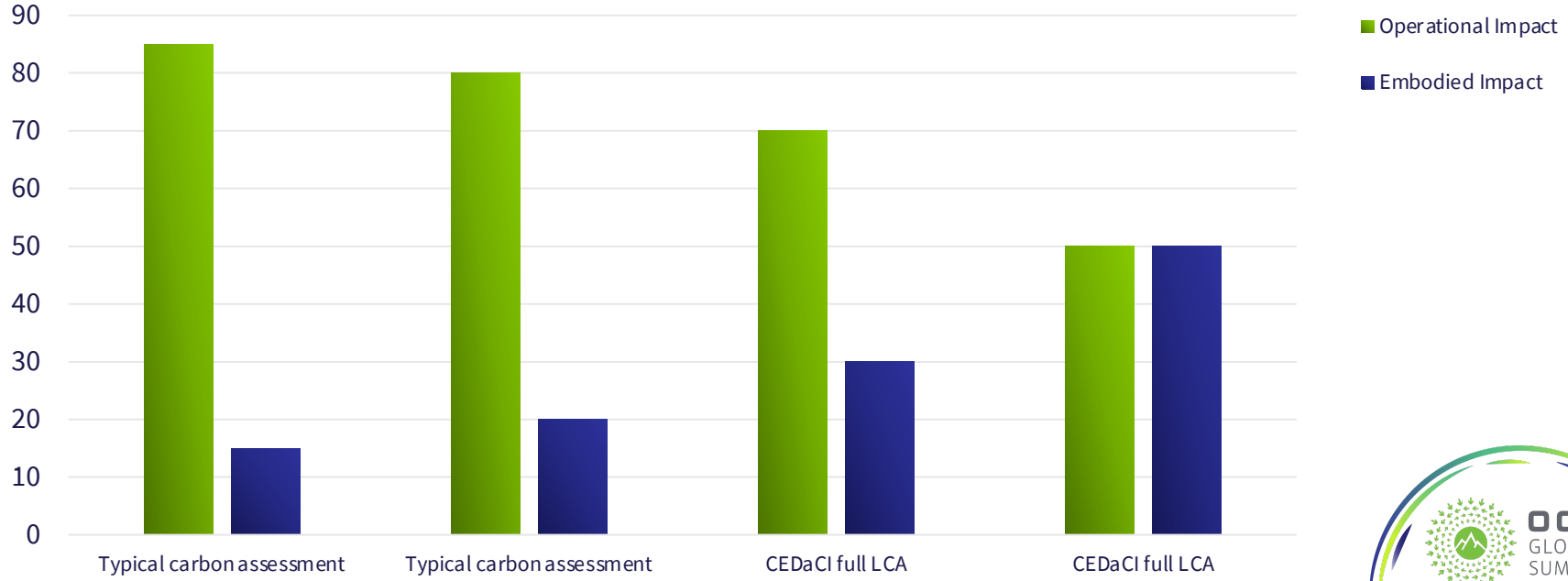
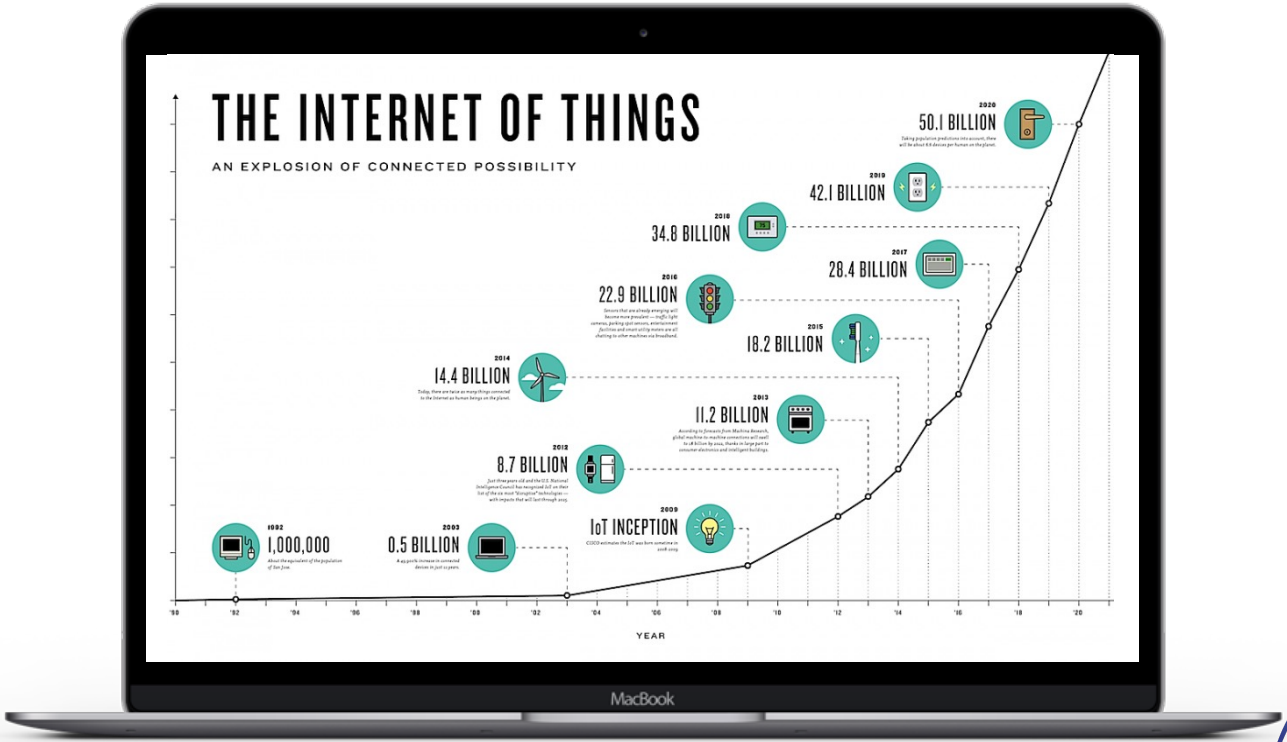
Compare Carbon Assessments / Preliminary LCA Results – Indicate Much Higher Embodied Impact

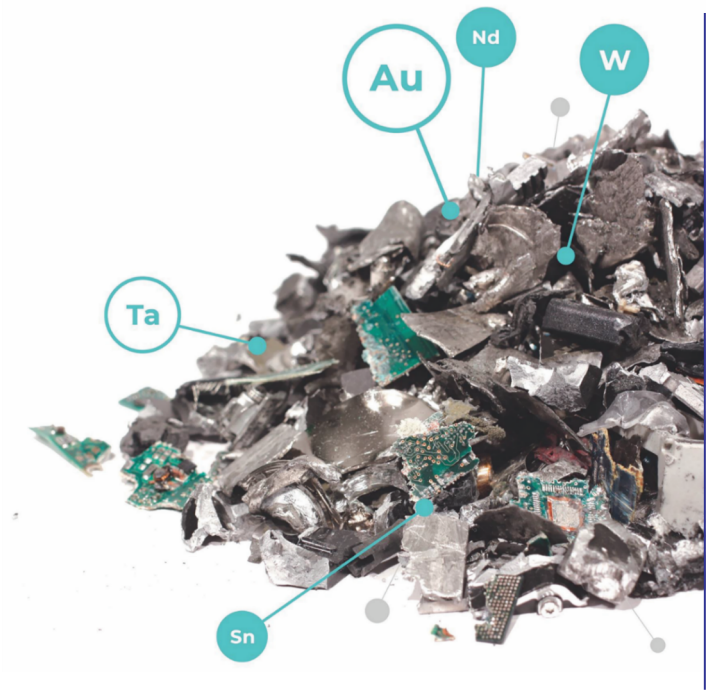
Environmental impact of servers



DC Growth – 300% in EU by 2025 / 500% Global 2030



CEDaCI – Runs Until Sept 2023



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https://twitter.com/cedaci_project

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Call to Action

- How to get involved in the Project/ Sub-Project Community
- Timeline for Contribution Availability
- Timeline for Product/Facility Availability
- Link to Contribution DB/OCP Marketplace
- Where to find additional information (URL links)

→ **Where to buy:** https://www.opencompute.org/products

→ **Project Wiki with latest specification:** http://www.opencompute.org/wiki/Server/Mezz

→ **Mailing list:** http://lists.opencompute.org/mailman/listinfo/opencompute-mezz-card

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Thank You!

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