

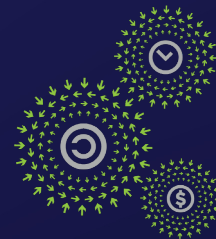
OPEN POSSIBILITIES.

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



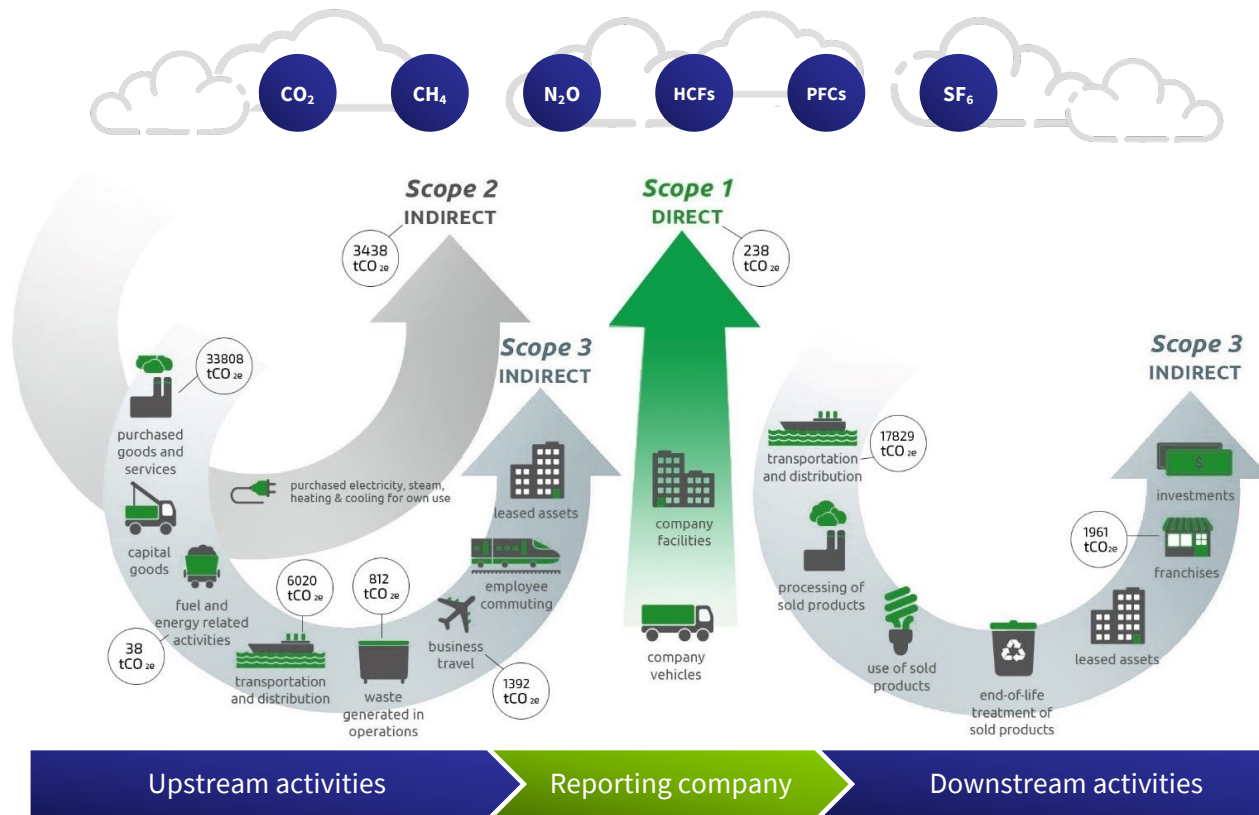
OCP
GLOBAL
SUMMIT

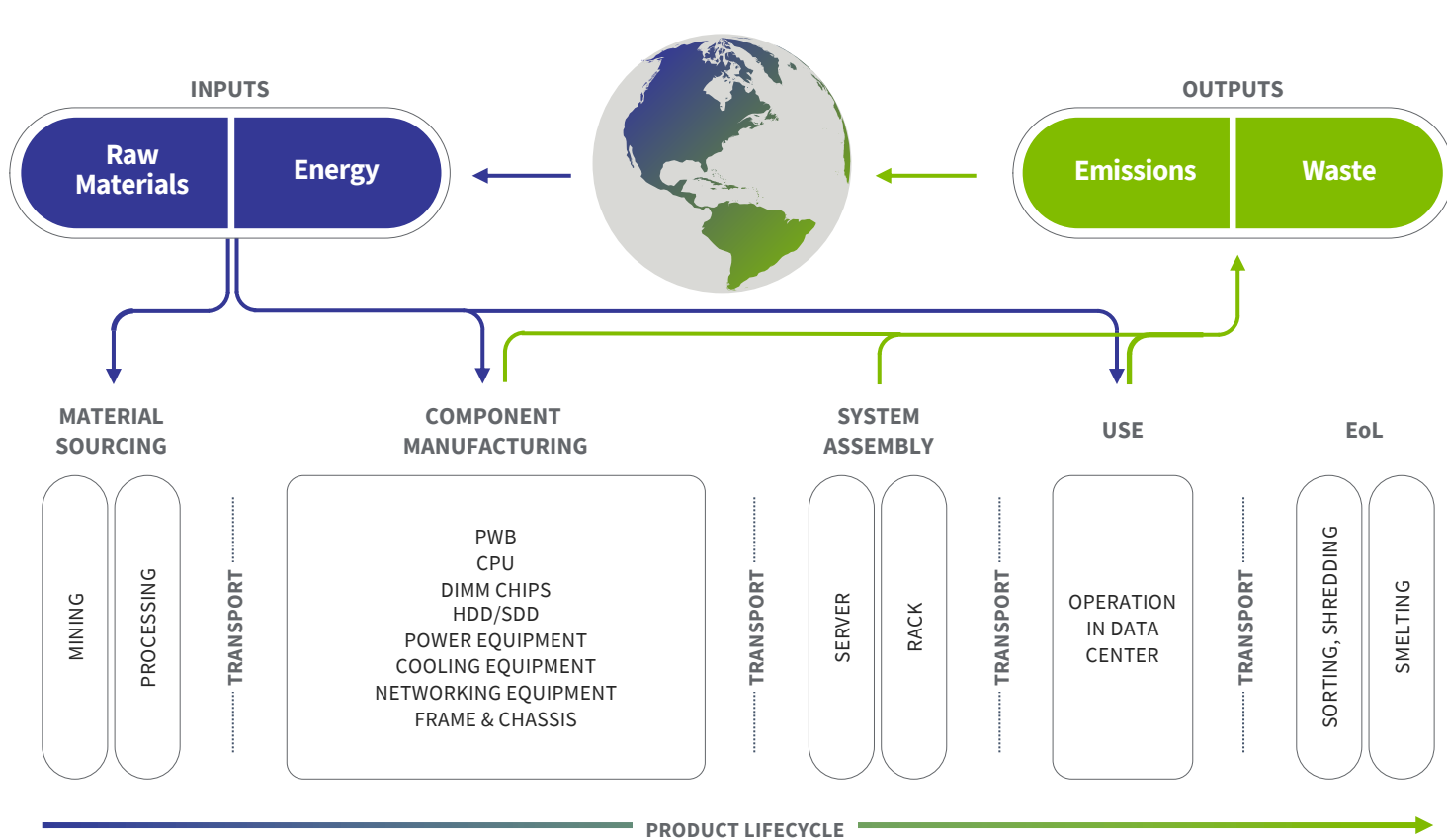
NOVEMBER 9-10, 2021

Understanding Scope 1, 2 & 3



SUSTAINABILITY





OPEN POSSIBILITIES.



Sesame by ITRenew and Circularity



SUSTAINABILITY



We are in the sustainability business. Sustainability is a value that informs how we execute every day, and is demonstrated through our vision for our customers, company and community

CARBON IMPERATIVE

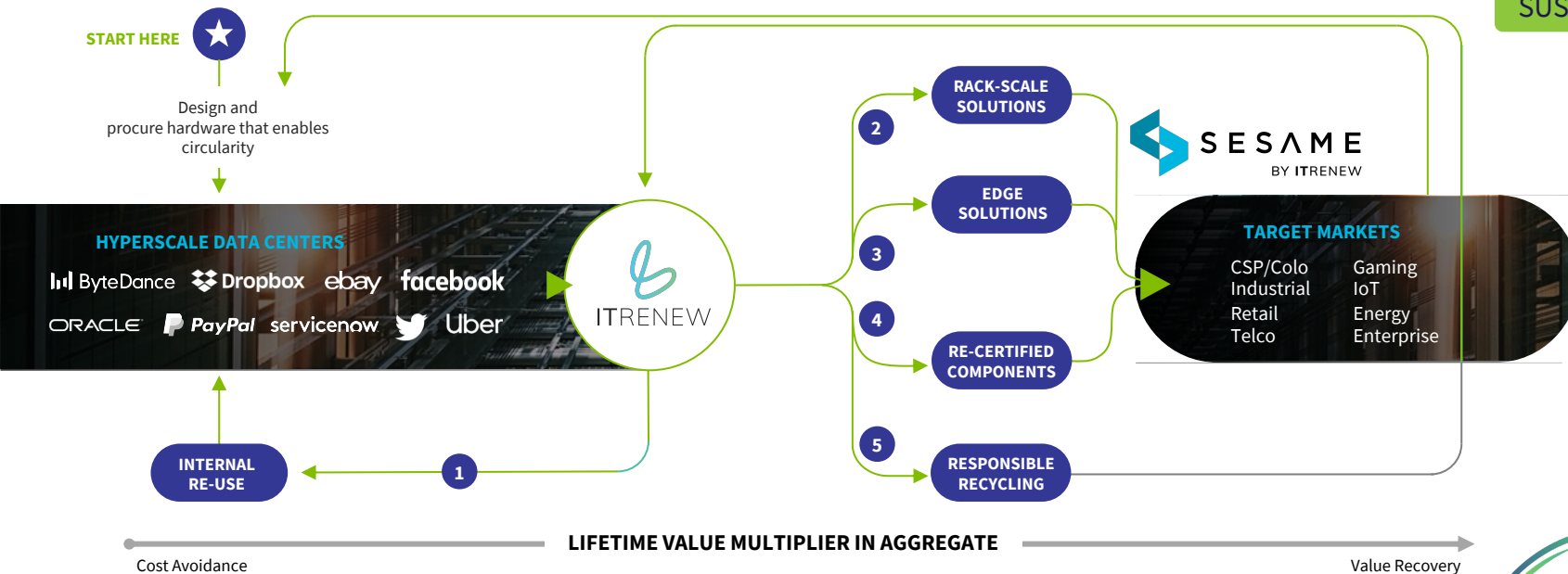
- ✓ Scope 3 is about more than upstream supply chain
- ✓ 75%+ of carbon tied to IT is Scope 3 from mfg.
- ✓ Huge opportunities through creation of second lives
- ✓ Ecosystem collaboration and standards are essential
- ✓ Measurement and credit is key



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



\$94M

Equivalent
Carbon Offset

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 ₂ e (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

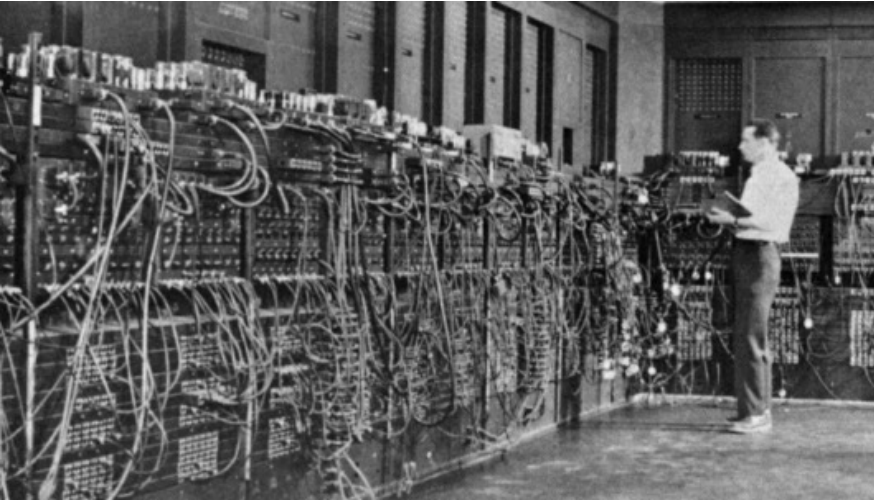
Sustainability



OCP
GLOBAL
SUMMIT

NOVEMBER 9-10, 2021

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



Data Centres

7.2M

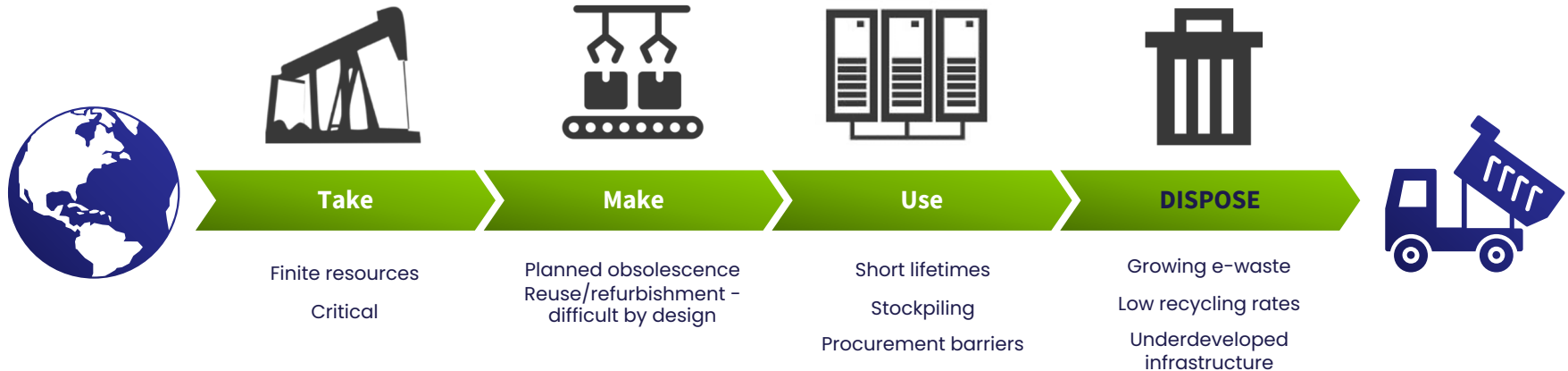
globally / concentration in EU - UK,
Germany, France & Netherlands

\$100bn

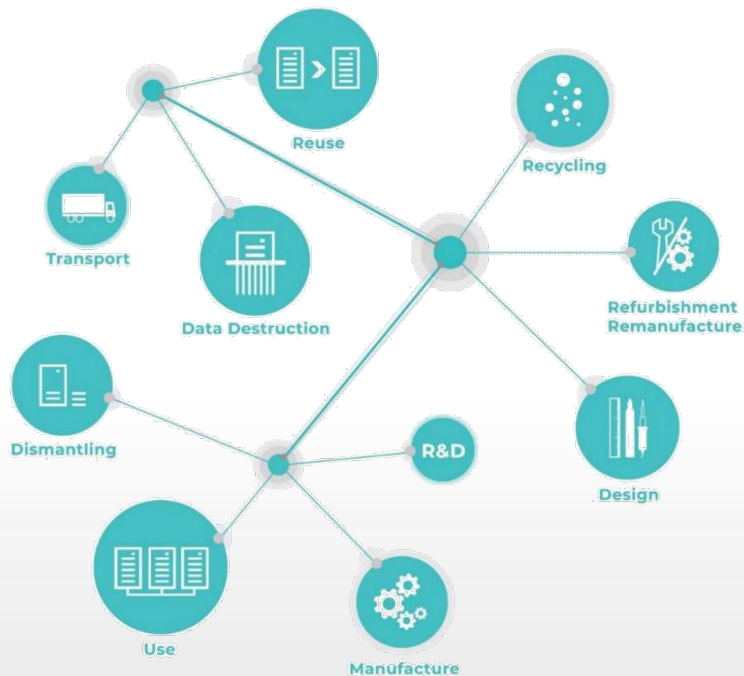
Investment in sector
(2010-2020)



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

CDCC

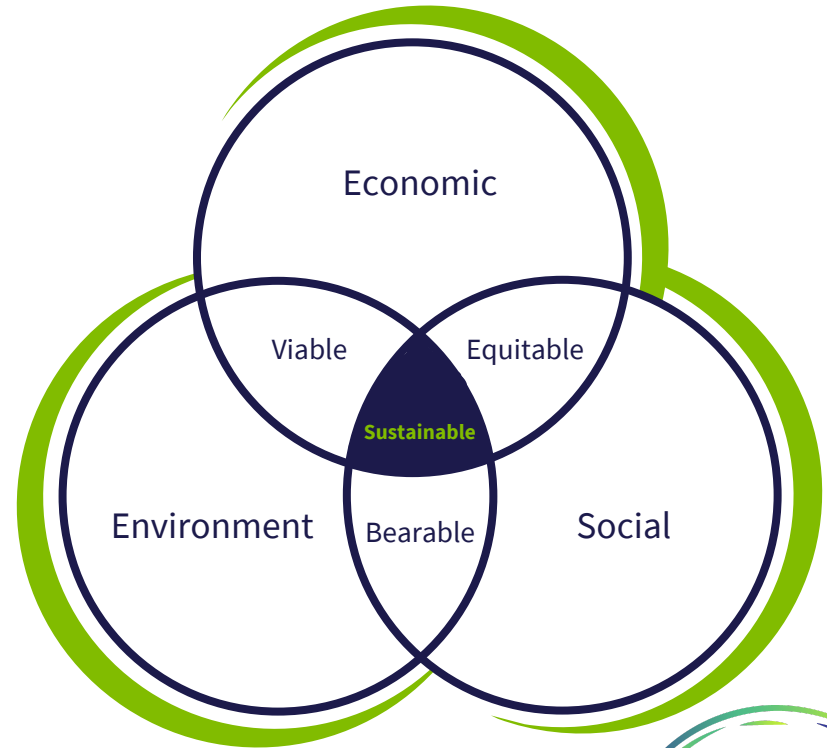
Circular Data Centre Compass

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 ►



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

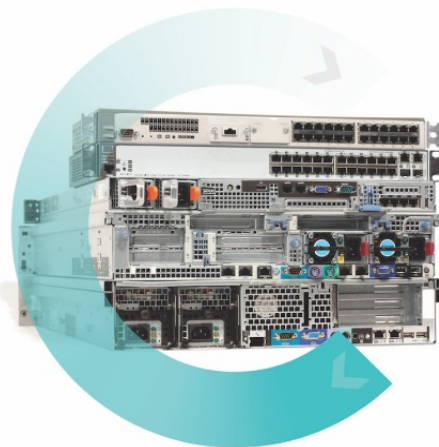
[CEDaCI home](#)

[▼ Compass](#)

[Log In](#)

[Register](#)

Welcome to Compass



Username

Exampleuser

Password

Login

or

Sign up

[Forgot your password?](#)





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](#)[Evaluator](#)[End of life](#)

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

Configure the server

Processor

Default processor details.

Change

Configure the processor

Qty: Select Processor: Select

+ Add

Default hard drive details

NIC

Default NIC details.

Change

Configure the server

Processor

Default processor details.

Change

Memory Type

Default memory type details.

Change

Hard Drive

Default hard drive details.

Change

NIC

Default NIC details.

Change

Configure the server

Processor

Default processor details.

Change

Configure the processor

Qty: Select Processor: Select

Qty: Select Processor: Select

+ Add

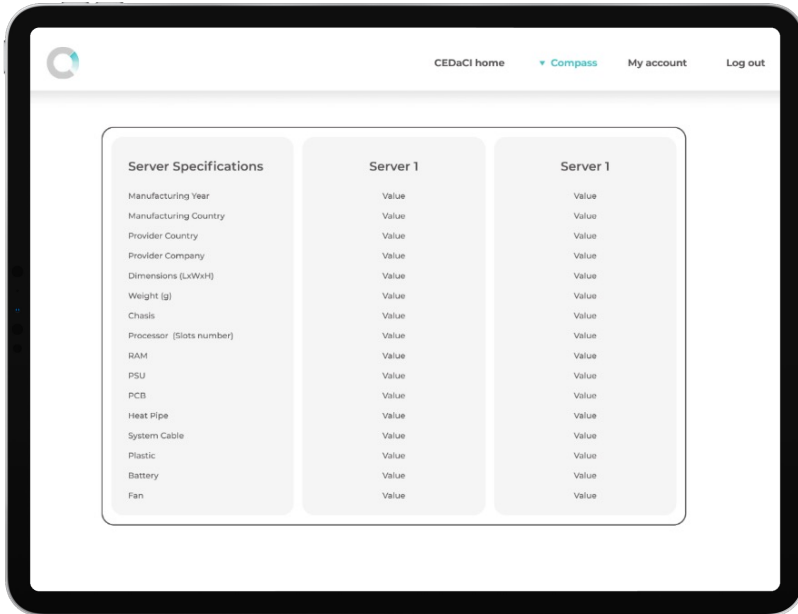
Default NIC details.

NIC

Default NIC details.

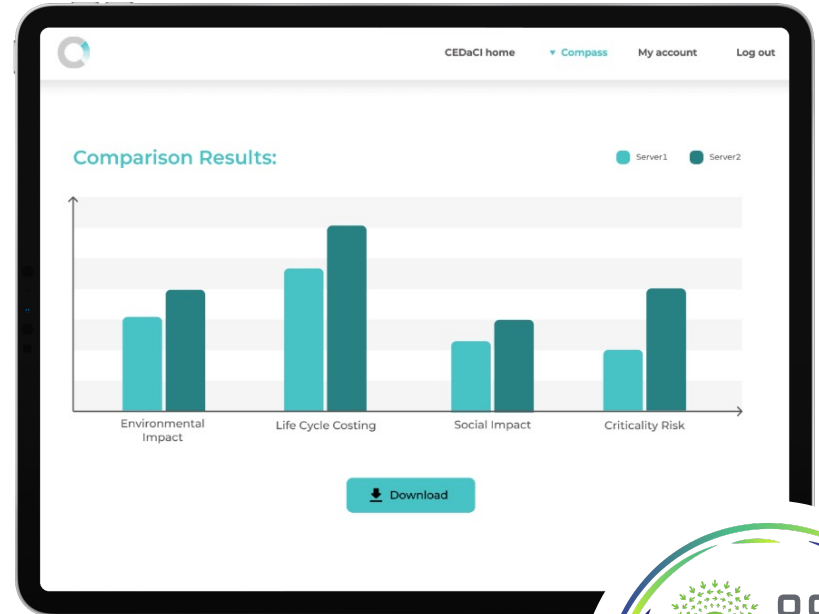
Change

Compare Specifications and Impacts and Download the Full PDF Report



The screenshot displays the 'Server Specifications' section of the CEDaCI web application. It features a table with three columns: 'Server Specifications', 'Server 1', and 'Server 1'. The table lists various specifications such as Manufacturing Year, Manufacturing Country, Provider Country, Provider Company, Dimensions (LxWxH), Weight (g), Chassis, Processor (Slots number), RAM, PSU, PCB, Heat Pipe, System Cable, Plastic, Battery, and Fan. Each specification is followed by a 'Value' placeholder.

Server Specifications	Server 1	Server 1
Manufacturing Year	Value	Value
Manufacturing Country	Value	Value
Provider Country	Value	Value
Provider Company	Value	Value
Dimensions (LxWxH)	Value	Value
Weight (g)	Value	Value
Chassis	Value	Value
Processor (Slots number)	Value	Value
RAM	Value	Value
PSU	Value	Value
PCB	Value	Value
Heat Pipe	Value	Value
System Cable	Value	Value
Plastic	Value	Value
Battery	Value	Value
Fan	Value	Value





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

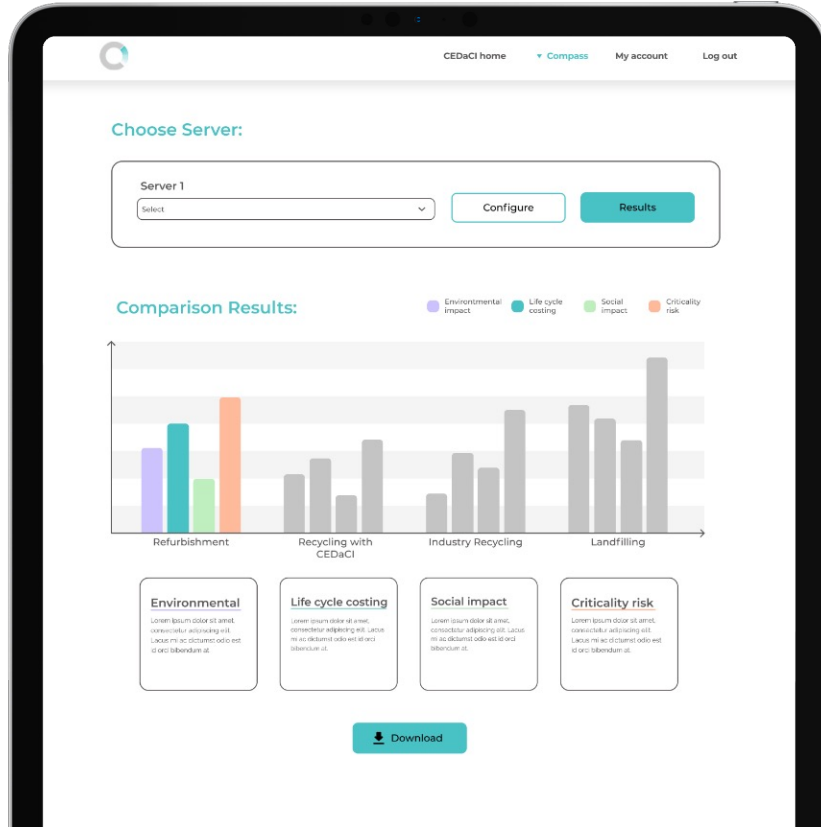
Compare the end-of-life options

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.

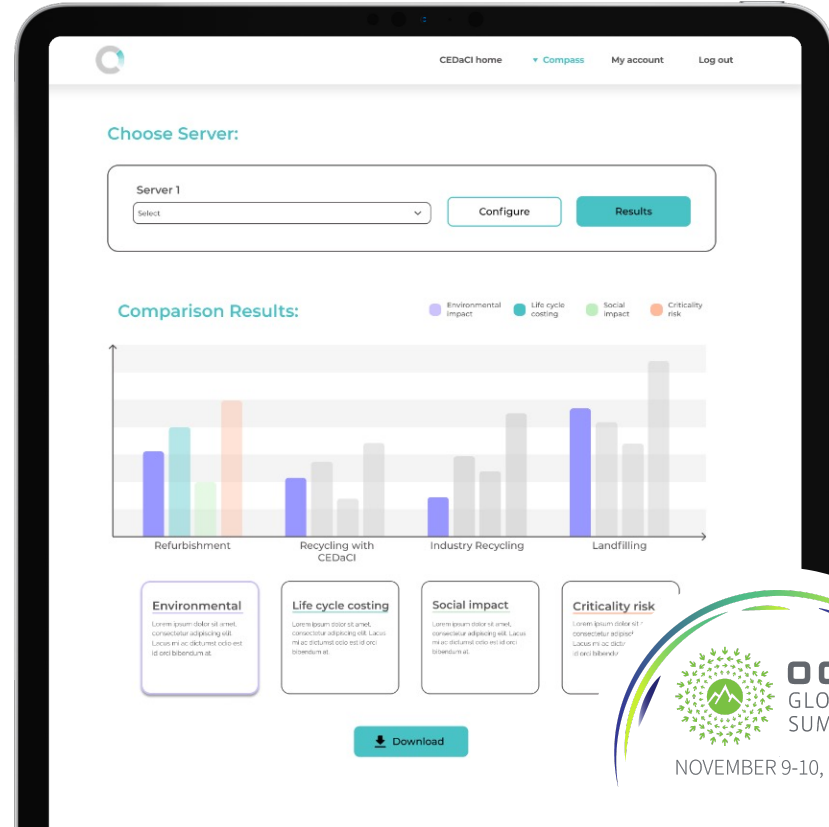
Compare



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

Eco-design Evaluator

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Non et, at ultricies commodo ac eget. Tincidunt tortor elementum ullamcorper odio. Ornare amet tempus parturient praesent cursus non, eget ut id. Habitasse tempus, nunc eget feugiat faucibus. Dui eu tempus at pellentesque faucibus magna.

[How to use it?](#)

Availability of Product Specific Informations

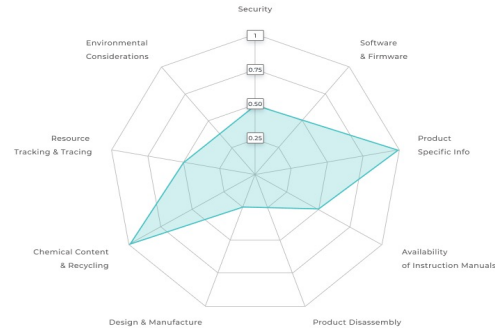
Is there information on these components?

How long is recycler specific information available for
after the end of sale?

Is recycler specific information available for the
indicative weight range of cobalt batteries?

Is recycler specific information point available for the
indicative weight range of neodymium in HDDs?

< >



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

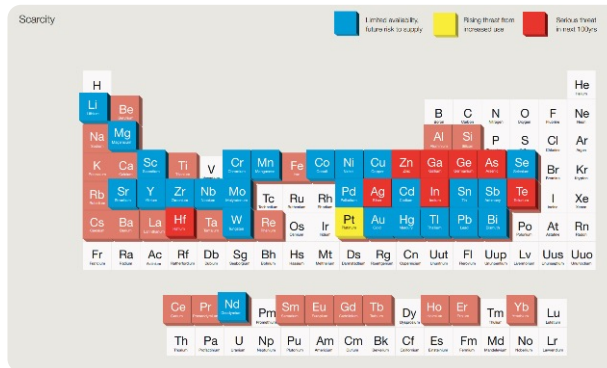
7-10

Critical Raw
Materials

Export of e-waste

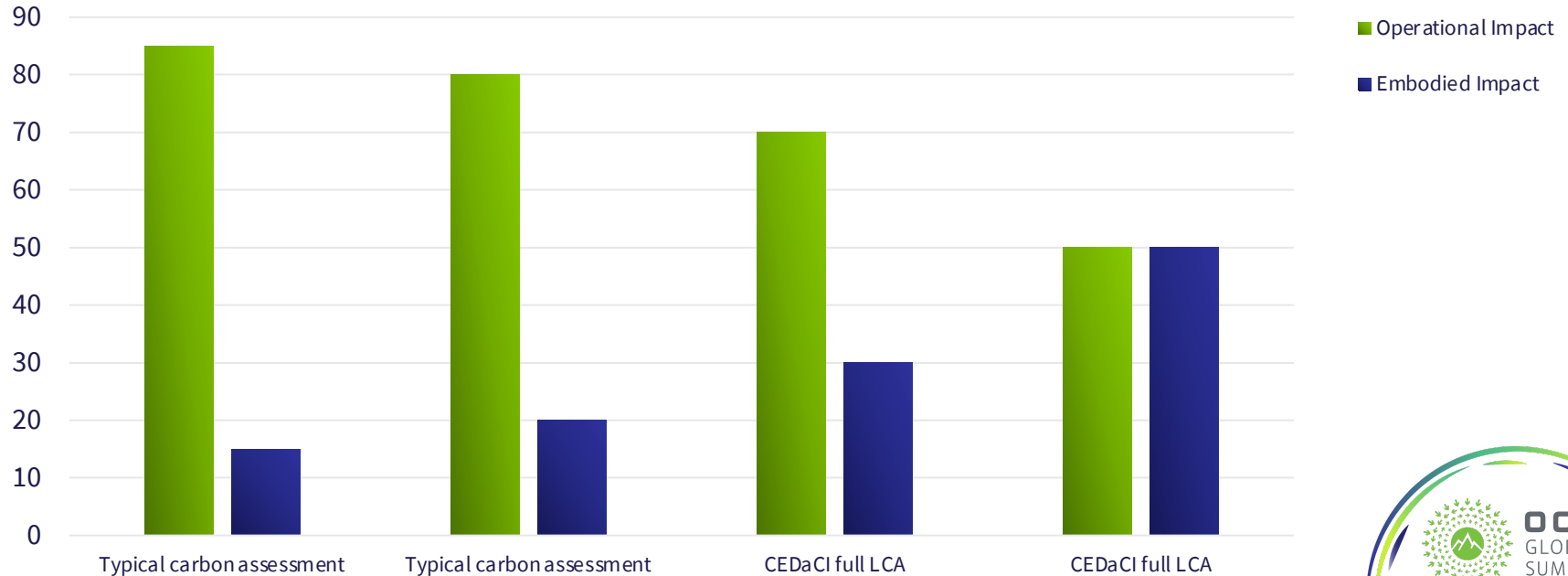


Source: Greenpeace, Basel Action Network

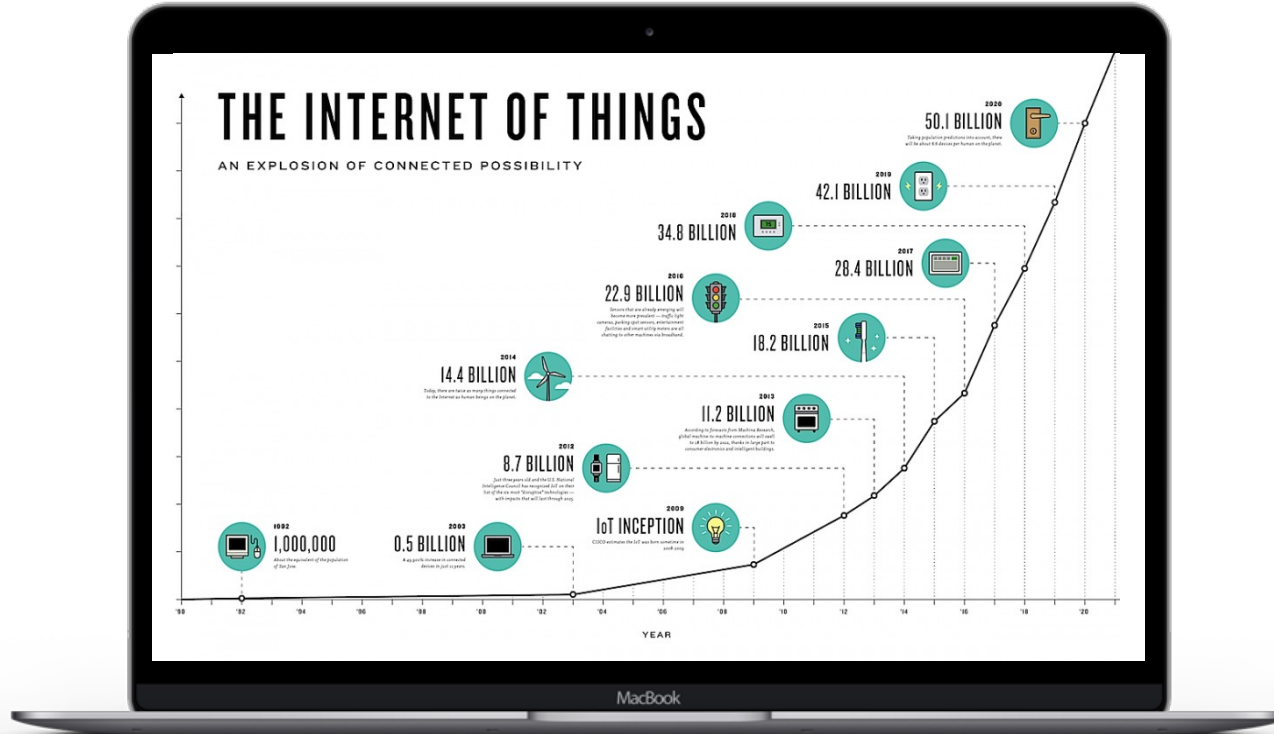


Compare Carbon Assessments / Preliminary LCA Results – Indicate Much Higher Embodied Impact

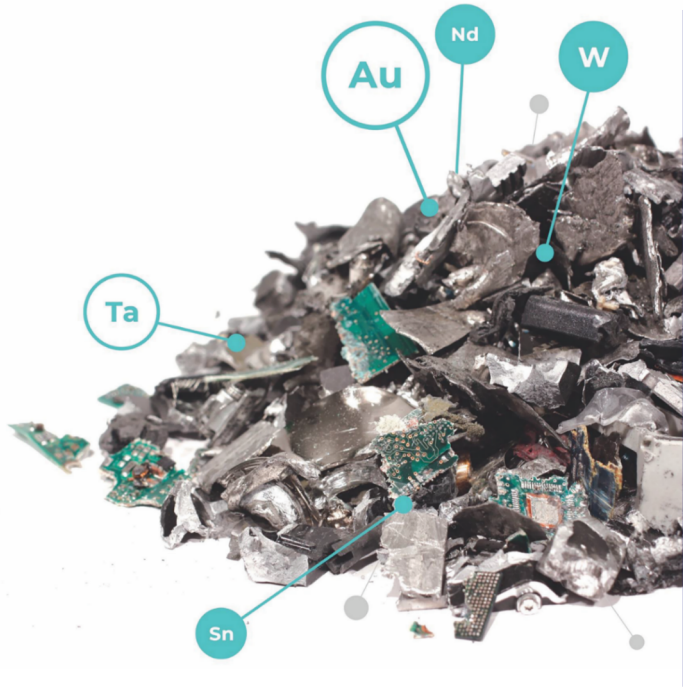
Environmental impact of servers



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



CEDaCI – Runs Until Sept 2023



Follow us cedaci.org

 <https://www.linkedin.com/company/cedaci>

 https://twitter.com/cedaci_project



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/OCF 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>

OPEN POSSIBILITIES.

Thank You!



NOVEMBER 9-10, 2021