

MINUTES OF CEDaCI TRANSNATIONAL WORKSHOP ON NOVEMBER 19, 2020

Date: 19/11/2020	Where: Zoom meeting
Start time: 10h00	End time: 12h30

Object: Transnational workshop session for the CEDaCI project – Key Findings of End of Life

Organisers: WeLOOP

Presents:		Excused:
Naeem Adibi	Thierry Hanau	Nermeen Baker
Carolina Szablewski	Leonieke Mevius	Makrem Cherni
Gwendoline Stechele	Bruno Fouquet	Parastoo Soleymani
Soline Pereira	Christian Traisnel	Gary Griffiths
Clément Bolle	Sascha Denner	Astrid Wynne
Stella Lapalus	Ben Tongue	Kristine Kearney
Bahattin Bademci	Andreas Vater	Carissa Amash
Victor Carpentier	Michel Robin	John Laban
Nil Atmaca	Kurt Van Der Hertten	Leigh Greatorex
Kristina Kerwin	Nicolas Saintherant	Clément Marquet
Deborah Andrews	Yves Grandmontagne	
Sarah Reddig	Manoj Ponugubati	
Jodie Bricout	Joris Van Mol	
Michel Ramez	Fernando Coelho	
Antoine Garandeau		
Paudy O'Brien		

This document presents a summary of the Workshop session for the CEDaCI project – Circular Economy for the Data Centre Industry.

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1 – Presentations

1.1 – Introduction to the CEDaCI project

The introduction was given by Carolina Szablewski (WeLOOP). The following topics were presented:

- The goals of the CEDaCI project:
 - ➔ Increase in the recycling rates,
 - ➔ Increase in the equipment's service life for their reuse,
 - ➔ Promotion of the eco-design,
 - ➔ All these goals are involved in the context of a circular economy.
- The European partners of the project,
- The state of progress of the project:
 - ➔ A 6 month-extension was granted,
 - ➔ The Compass tool should be finalised at the end of January 2021.
- A reminder of the upcoming event:
 - ➔ ICEC 2020 on December 3, 2020 (<https://www.circulus-project.de/icec-2020/>)

1.2 – Data centre equipment' composition and characterisation

This presentation was given by Victor Carpentier (TND). The following topics were introduced:

- Server dismantling:
 - 5 main streams: metallic stream (27% of the total of server), PCB (21%), plastic (7%), cables (2.5%) and batteries (0.5%),
 - precious metals are inside PCBs.
- PCBs preparation and characterisation:
 - manual cutting, pyrolysis, shredding, sampling, acid digestion and ICP analysis.
- PCBs composition results:
 - mainstreams: copper, tin, nickel, lead, tantalum
 - precious metals: gold, silver
- HDDs composition:
 - different chemical elements in comparison with PCBs,
 - HDD often removed from the server.

Points to be discussed about the equipment characterisation & composition

- The process to recover the components of HDDs already shredded is not yet established but is ongoing.
- The SSDs composition is different from the HDDs composition because permanent magnets were removed from SSDs: there are no REEs (Rare Earth Elements) in SSDs.
- There are significant quantities of different metals in the shredded parts, but they were not all mentioned in the table because not all of them are considered as hotspots.

- TND characterises many servers (vast quantities of elements).
- TND has tested different generations of equipment and studies on how the sector has been progressing.
- TND is now working on a more recent generation of a server (DELL) from LSBU.

1.3 – Data centre equipment’ recycling solution – focus on CRM and their recovery rates

This presentation about the server’s metal recovery process was also given by Victor Carpentier (TND). The following topics were introduced:

- Mechanical processing steps for PCBs:
 - manual dismantling, shredding, magnetic separation and eddy current separation to put out 90% of aluminium and iron,
 - sieving at 5mm to recover tantalum from <5mm parts.
- Pyrometallurgical processing steps for >5mm parts:
 - pyrolysis, melting, oxygen furnace, electrolysis/reduction.
- Metal recovery results:
 - efficient process: TND can recover most of the gold, silver, indium and most of the metals with recovery rates close to 90-95% (even 99% for some of them),
 - ongoing work separating gold and silver and also to separate indium from the other two metals, lead and tin,
 - ongoing work to recover tantalum in oxide or metallic form.

Points to be discussed about the equipment recycling solution
<ul style="list-style-type: none"> • Economic assessment must be done even if this recycling solution seems economically viable, looking at other similar recycling processes. • Manual dismantling is the hotspot in terms of life cycle costing: it is a costly stage of the recycling process. An idea would be to automate it and use robots.
<ul style="list-style-type: none"> • Ongoing work on the separation process to recover indium by oxidation of tin and indium. • TND can concentrate indium by manual dismantling as indium is mostly in one part of the server.
<ul style="list-style-type: none"> • Energy consumption assessment to be done. • The project is viable beyond the financial perspective compared to traditional extraction because the EU wants to be independent and is thus interested in the project. The gold concentration is also higher in WEEE than in raw gold minerals.

1.4 – Data Centre equipment’ environmental assessment and criticality approach

Soline Pereira (WeLOOP) introduced the indicators that are used in the « Compass » tool and the planning steps dedicated to the development of these latter. There are environmental, criticality, social and cost indicators.

At present, the recycling process is being modelled based on specific data collected from stakeholders. The equipment characterisation is still in progress: TND will characterise more recent items of equipment.

Criticality indicators are the most advanced and a tool allowing the assessment of the criticality for different types of DC equipment is created. Environmental indicators are calculated based on the EF 3.0 method recommended by the European Commission. Their modelling based on the recycling process from TND is in progress, and the first draft results should shortly appear as WeLOOP is

currently collecting data from stakeholders. In this way, normalised, weighted and single score results will be generated.

CEDaCI is currently drafting a document to harmonise the practice and provide transparency and traceability about the project. This document entitled “Product Category Rules (PCR)” is, to our knowledge, the first recognised PCR for Data Centre equipment.

1.5 – CDCC Compass tool – focus on reuse and recycling

The presentation about the CDCC (Circular Data Centre Compass) decision-making tool was given by Bahattin Bademci (LSBU). It is a tool named « CDCC » whose primary function is to help and guide the manufacturers in their decision-making about the end of life scenarios of the Data Centre equipment. “Compass » tool may be used to support the producers and designers with their decision-making, contributing to eco-design.

For now, two sections are available in the tool:

- The “Compare” section that allows comparison between two servers based on different indicators. Then, it is possible to export the results in a PDF where numerical information about the indicators can be found. From 25% to 50% of progress have been made in this section.
- The “Eco-design” section that provides graphical results by answering a set of questions about fields such as security, software, chemical content, and firmware.

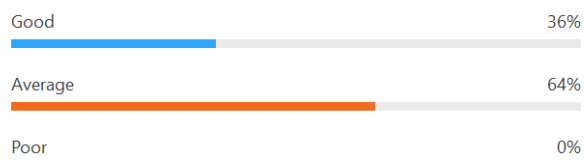
Data Centre equipment is either recycled at the end-of-life or sent to reuse for a second life. Naeem Adibi (WeLOOP) briefly introduced the different decision-making points to consider at the end-of-life of Data Centre equipment including the purpose of use, energy consumption but above all the environmental, criticality, social and cost benefits of reuse and recycling.

2 - Poll and discussions

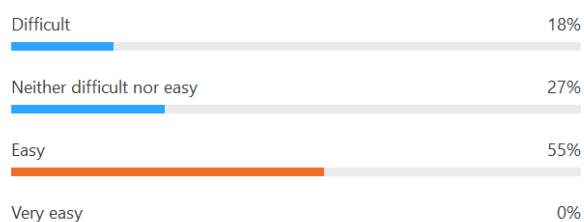
2.1 – Results of the poll about the CDCC tool

Below, the results of the poll sent by Naeem Adibi about the decision-making tool are listed:

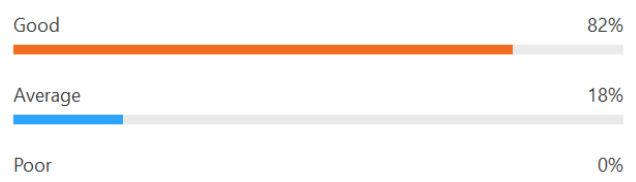
1. What has been your experience with the Circular Data Centre Compass?



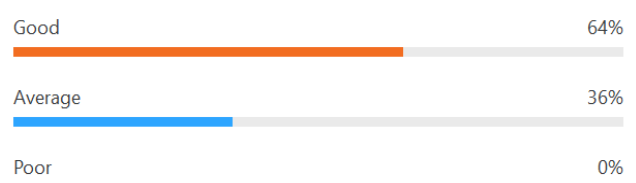
2. How easy or difficult it was to navigate?



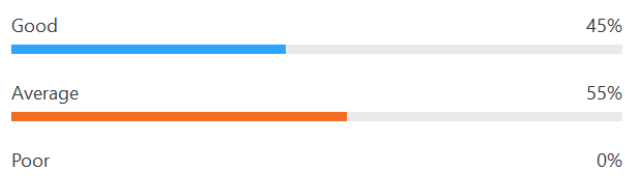
3. What are your thoughts on the language used?



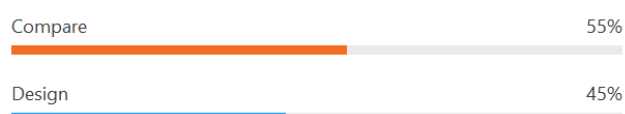
4. What are your thoughts on the design?



5. What do you think about how information and features are laid out?



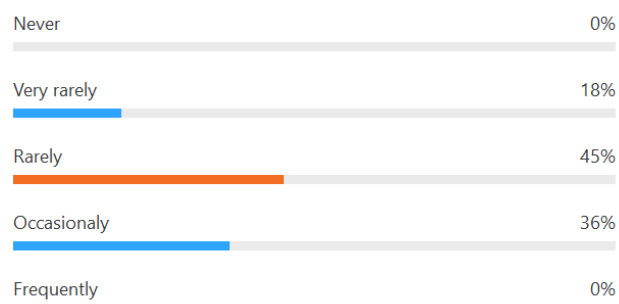
6. Which section of the tool did you spend time most?



7. Did you generate your results on the compare page? If yes, did you find the explanation sufficient?



8. How frequently would you use the Circular Data Centre Compass?



Points discussed after the poll

- The results generated on the compare page are not sufficient for most of the participants.
- The end-of-life page is not available yet. We must think about the way to deal with it.

2.2 – Results of the survey about the social LCA

Naeem Adibi sent a survey about the social LCA during the session. This survey was intended to the stakeholders and aimed to collect issues from the participants concerning social issues related to Data Centre equipment.

Twelve participants filled out the survey during the session. WeLOOP will analyse the results and present them in the next Working Group Meeting. Survey results will be shared with the Wuppertal Institute team to support their social LCA work.

3 – Next steps:

The next transnational workshop session for the CEDaCI project should be organised in February 2021. During the next CEDaCI working group meeting, social LCA results will be presented.