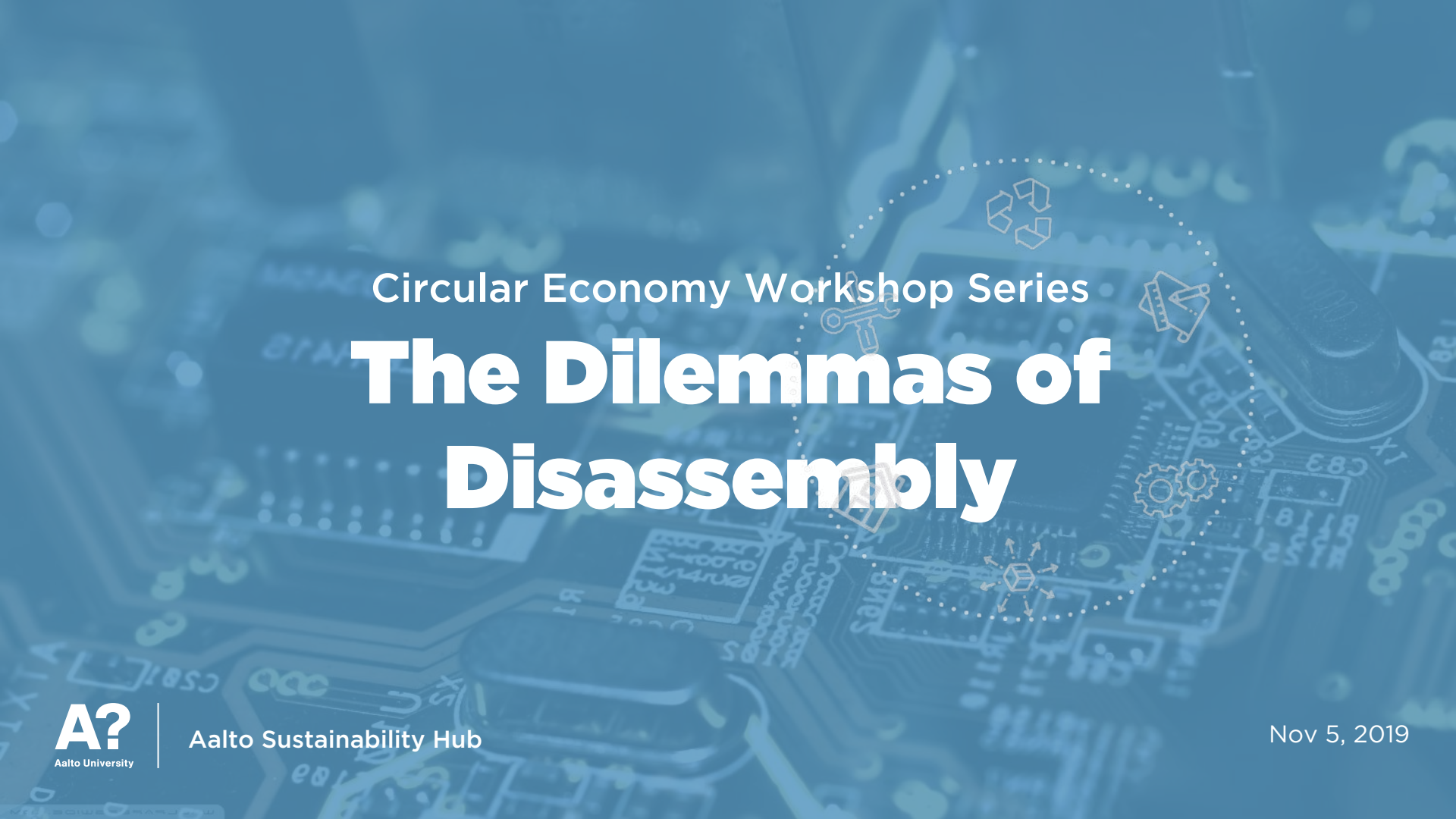


Circular Economy Workshop Series

The Dilemmas of Disassembly

Aalto University

Aalto Sustainability Hub

Nov 5, 2019

The Project

CIRCULAR ECONOMY

WORKSHOP SERIES

A forum for knowledge sharing in circular economy and cross-disciplinary communication for successful collaborations

1st: Business Hooks for Closing Loops
Oct 1, 2019, 13:30-16:30
Väre F102

2nd: The Dilemmas of Disassembly
Nov 5, 2019, 13:30-16:30
Sähkömiehentie 4 J
*A group will be leaving from Brooklyn Cafe at 13.10

3rd: Building Circular Economy Language Skills
Nov 12, 2019 9:30-12:30
Väre M202

Aalto University | Aalto Sustainability Hub

The Team

Professor
Minna Halme
Dept. of Management Studies
School of Business

Assistant Professor
Annukka Santasalo
Dept. of Mechanical Engineering
School of Engineering

Researcher
Elizabeth Miller
Dept. of Management Studies
School of Business

Master Student
Karelia Dagnaud
Creative Sustainability
School of Business

Master Student
Nikhil Bhole
Advanced Energy Solutions
School of Engineering

Master Student
Hai Anh Tran
Creative Sustainability
School of Business

Workshop Agenda

1. **Recycling stories**
2. **Before dismantling**
   - Why dismantle?
   - Safety & guidance
3. **Dismantling in the lab**

---------- break ----------

4. **Discussion**
   - Value calculation & real-life practices
5. **Materials of the phone**
   - Recycling ability of e-waste
6. **Feedback**

Aalto University | Aalto Sustainability Hub

Aalto University

Aalto Sustainability Hub


LH30

Our stories

Trash

to

Cash

Aalto University

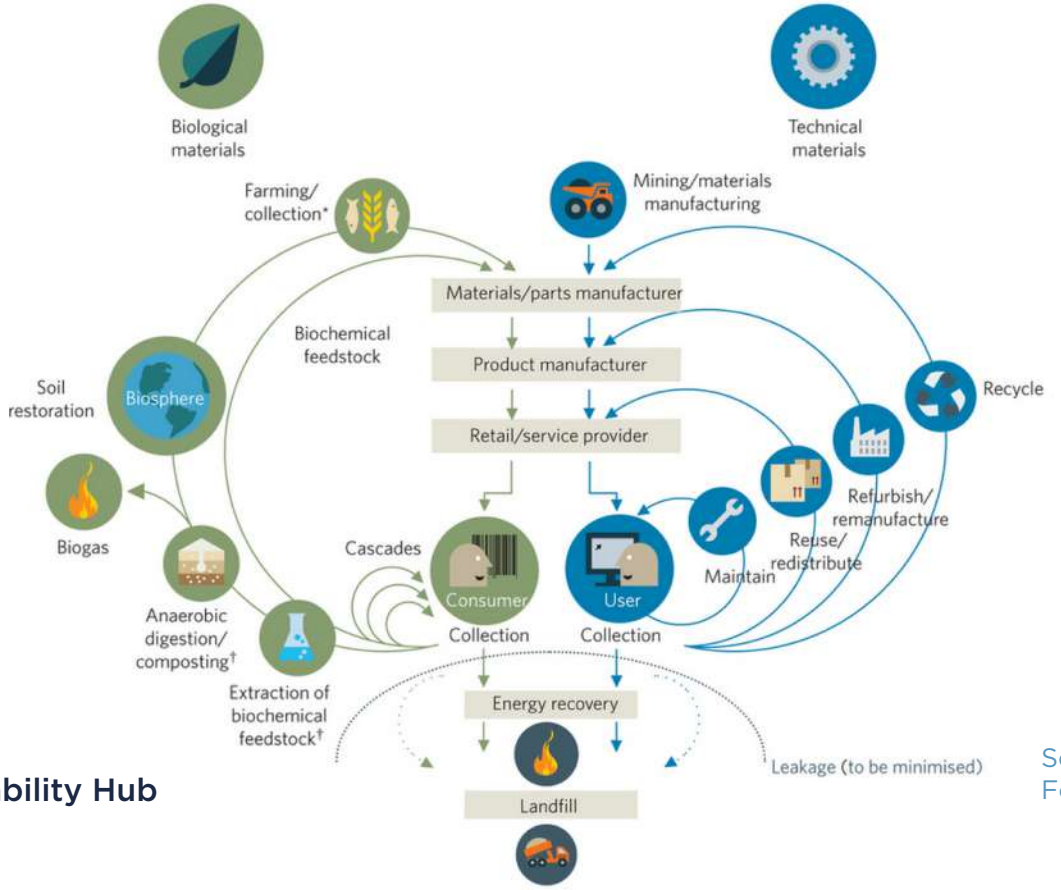
Aalto Sustainability Hub

*Photos were taken at Kuusakoski Heinola

Our stories

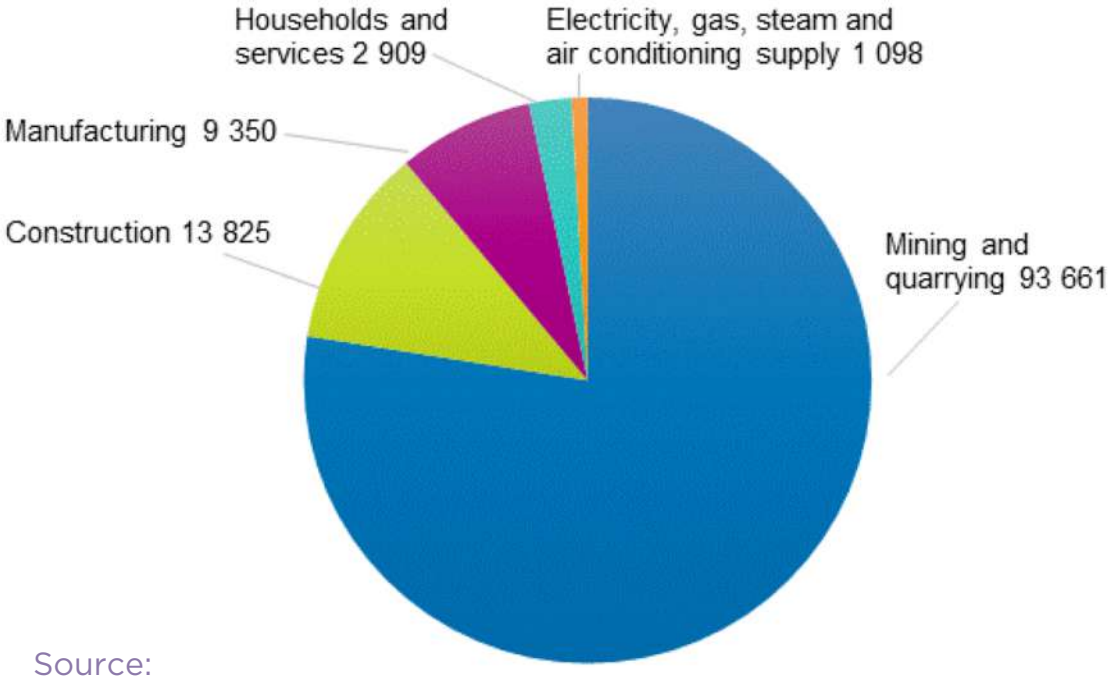
- The enormous volume of waste that we produce.
- How the products we use are not designed for recycling - they are crushed.
- Recycling takes special equipment and skills - it is a crude, loud, dusty process.
- What gets recycled is what has economic value once separated or processed.

Recycling: “The Loop of Last Resort”?



Source: Ellen MacArthur Foundation, 2017

Waste generated by sector and type In 2016



Source:
Statistic ofFinland

Total amount of waste:

123 millions tonnes

Aalto University

Aalto Sustainability Hub

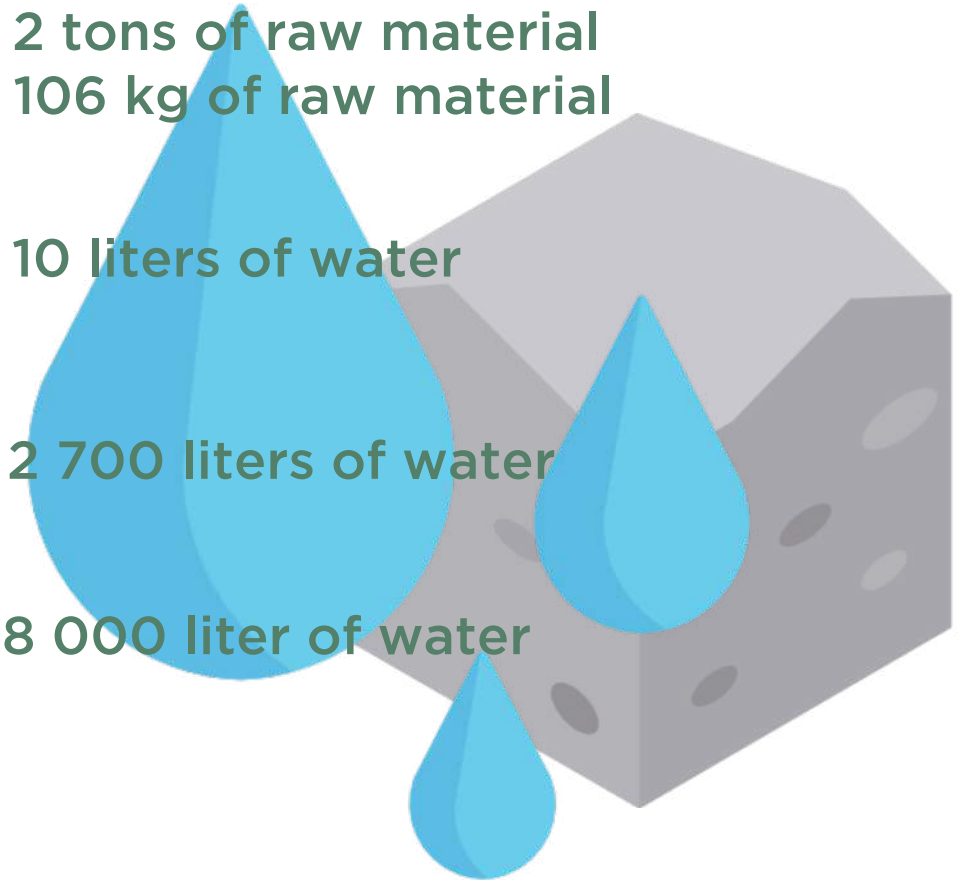
Convenience vs Consequence

5 g golden ring = 2 tons of raw material
2 g of diamond = 106 kg of raw material

1 A4 sheet of paper = 10 liters of water

1 t-shirt = 2 700 liters of water

a pair of shoes = 8 000 liter of water



Aalto University | Aalto Sustainability Hub

Why Dismantle?

To understand how:

- Dismantling is **actually done**
- **Many different pieces and materials** there are in **only one single device**
- Every material types requires its **own type of treatment** and has its **own recycling economic value**
- Difficult it is to **separate** materials from each other
- **Time-consuming** dismantling is

Aalto University | Aalto Sustainability Hub

Safety & Guidance

Let's dismantle | 40 minutes

Aalto University

Aalto Sustainability Hub

Time for
a 10 mins break
Enjoy some
refreshments!

Value Calculation

Battery	-2 € /kg
Plastic components	0 € /kg
Glass	0.2 €/kg
Printed circuit board	5 € /kg
Copper cables	1 € /kg
Other metals	0.5 €/kg

Can you guess how much you just made?

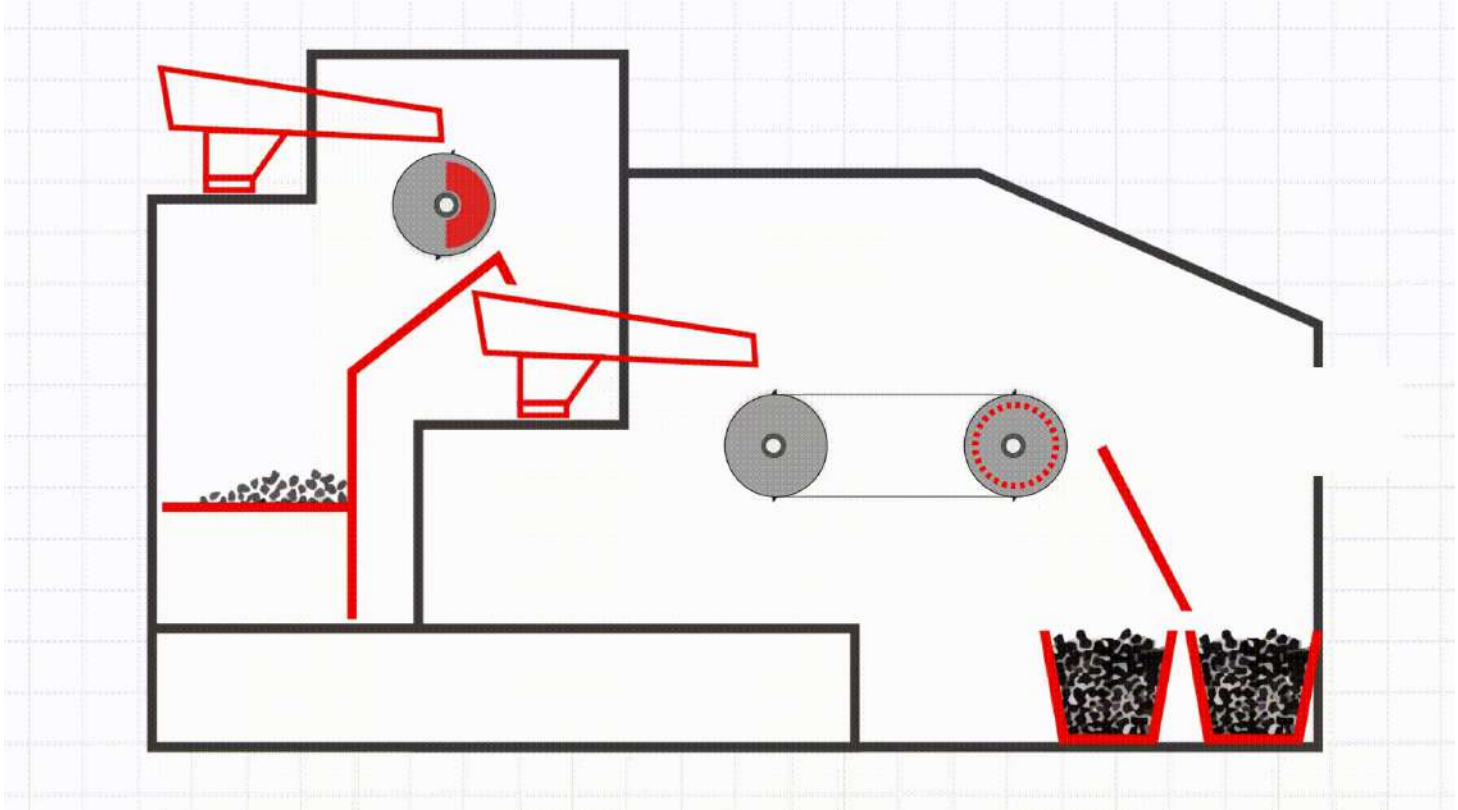
Disassembly Experience

Discussion

- How did the experience feel?
- What surprised you in the process?
- What was difficult? What was easy?
- Has your view about recycling changed as a result of this exercise?

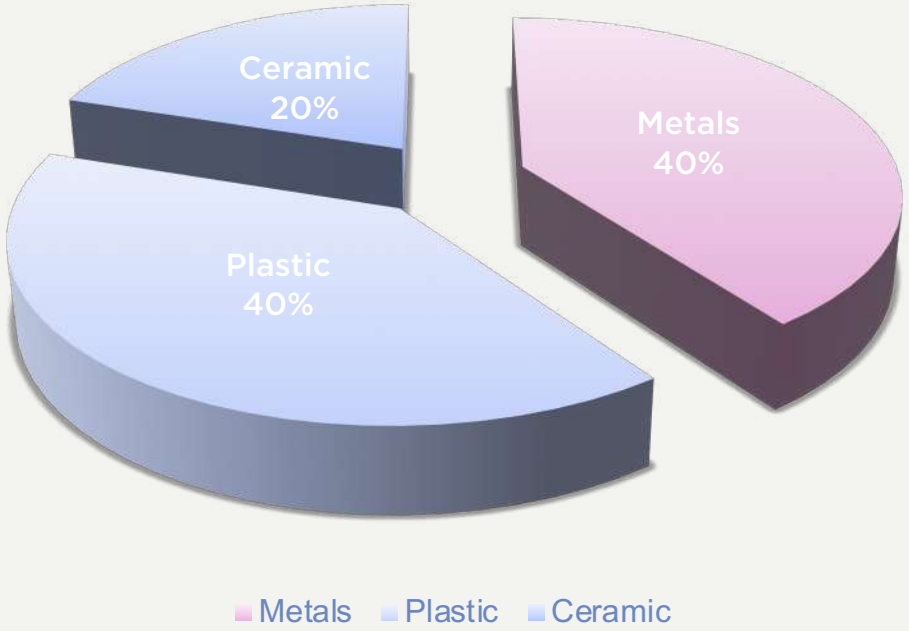
Real-life practices

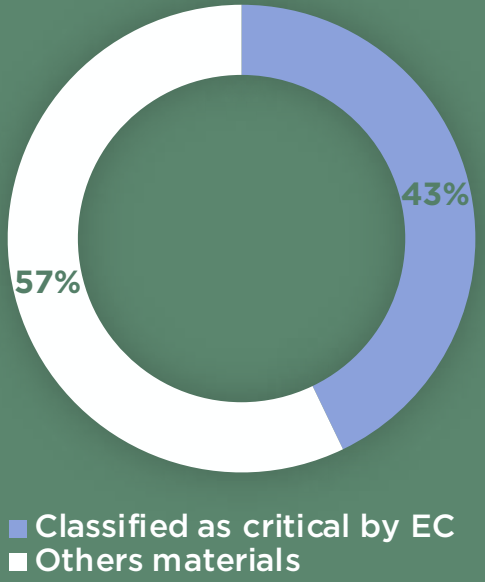
Aalto University | Aalto Sustainability Hub



Source: Mastermagnets

Materials of the phone





Of the 70 materials used in a smartphone, 30 are classified as **critical** by EC

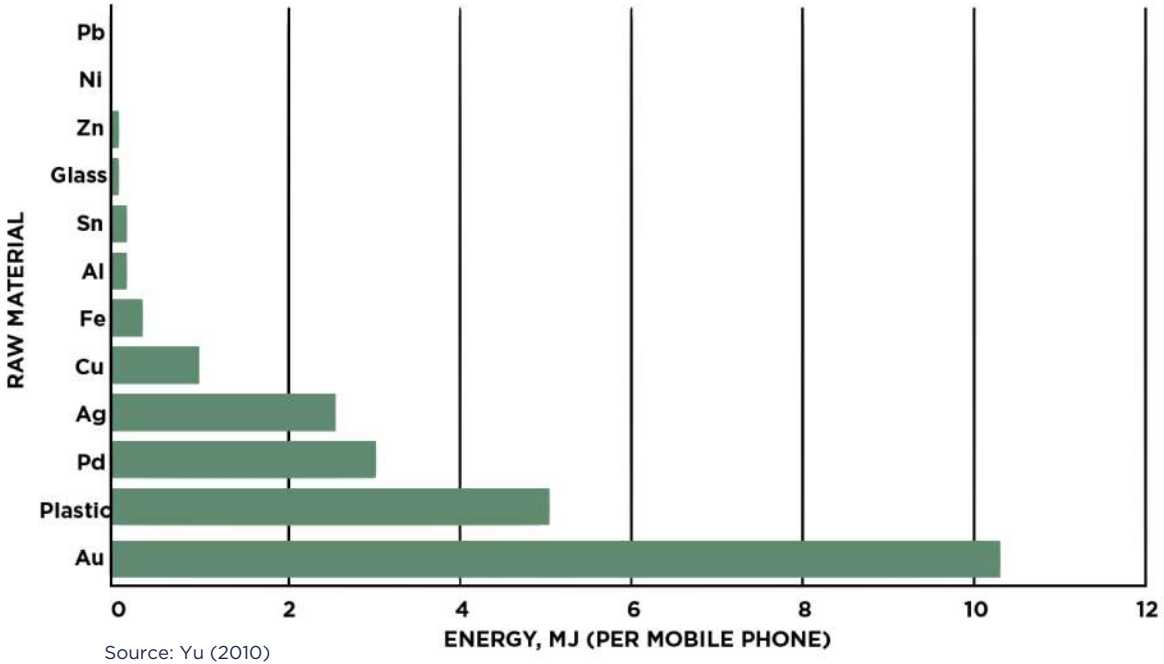
iPhone 6:
0.034g of gold,
0.34g of silver
0.015g of
palladium and
traces of platinum

Material	Percentage Composition	Potential to Recycle from Electronic Waste
Aluminum	14.17%	High
Gold	0.05%	High
Silver	0.25%	High
Copper	6.93%	High
Iron	20.47%	High
Platinum	Traces	High
Nickel	0.85%	High
Palladium	0.01%	High

Source: Fairphone

Energy

- 90% of rock mined contributes to just 5% of the phone's weight
- According to 2016 sales of Apple's iphone, about 37 million tons of rock mined from the earth



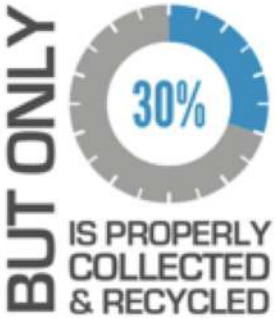
Source: Yu (2010)

Approximately 22 MJ of energy is consumed in extraction of raw materials for a single phone

1 phone = Light **110 households** at once

Electronic Waste in EU

Potential value of raw materials in e-waste in 2016 was estimated at **55 Billion Euros.**



Exploring another examples of challenges for recycling

Aalto University

Aalto Sustainability Hub

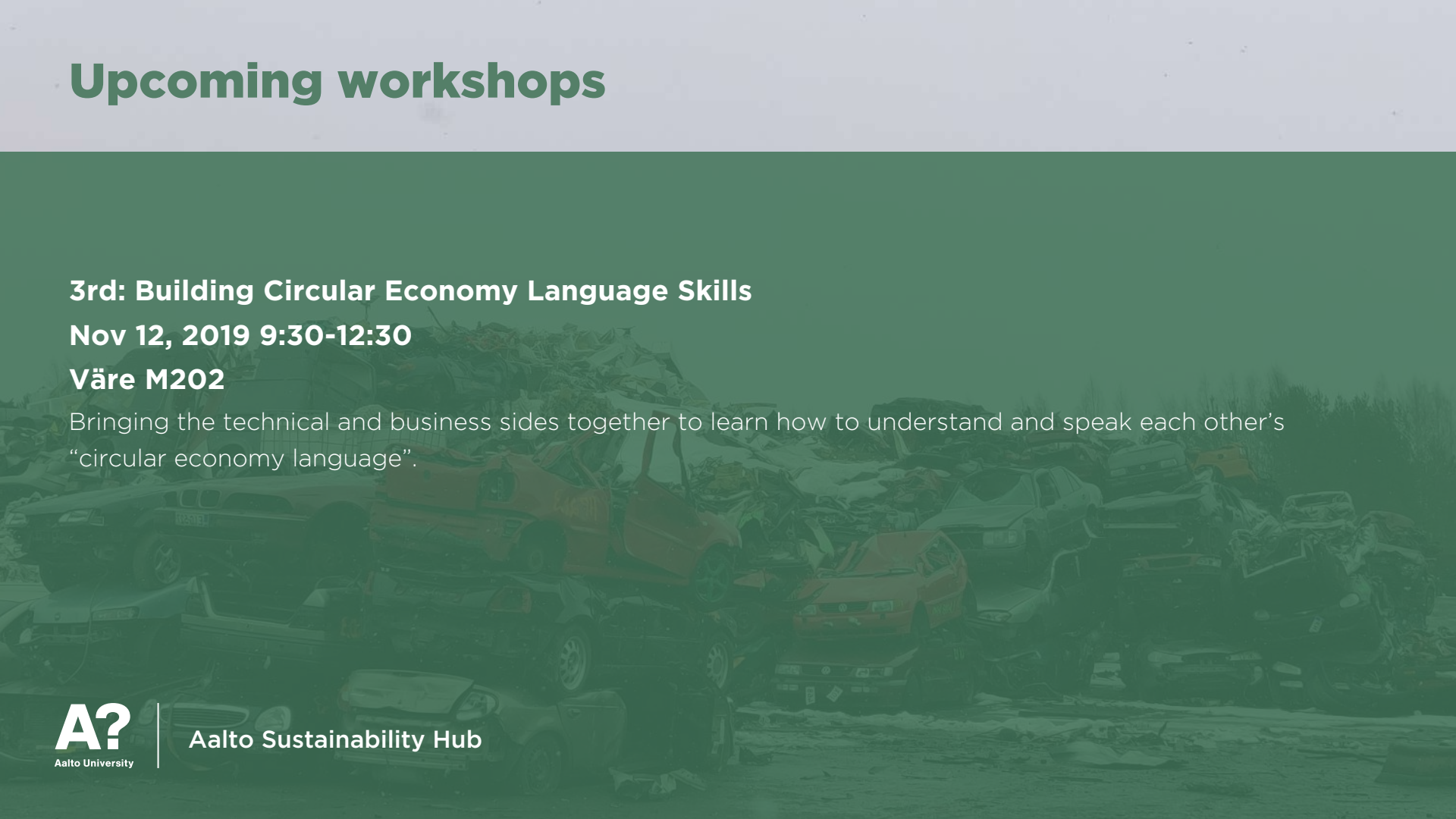
Upcoming workshops

3rd: Building Circular Economy Language Skills

Nov 12, 2019 9:30-12:30

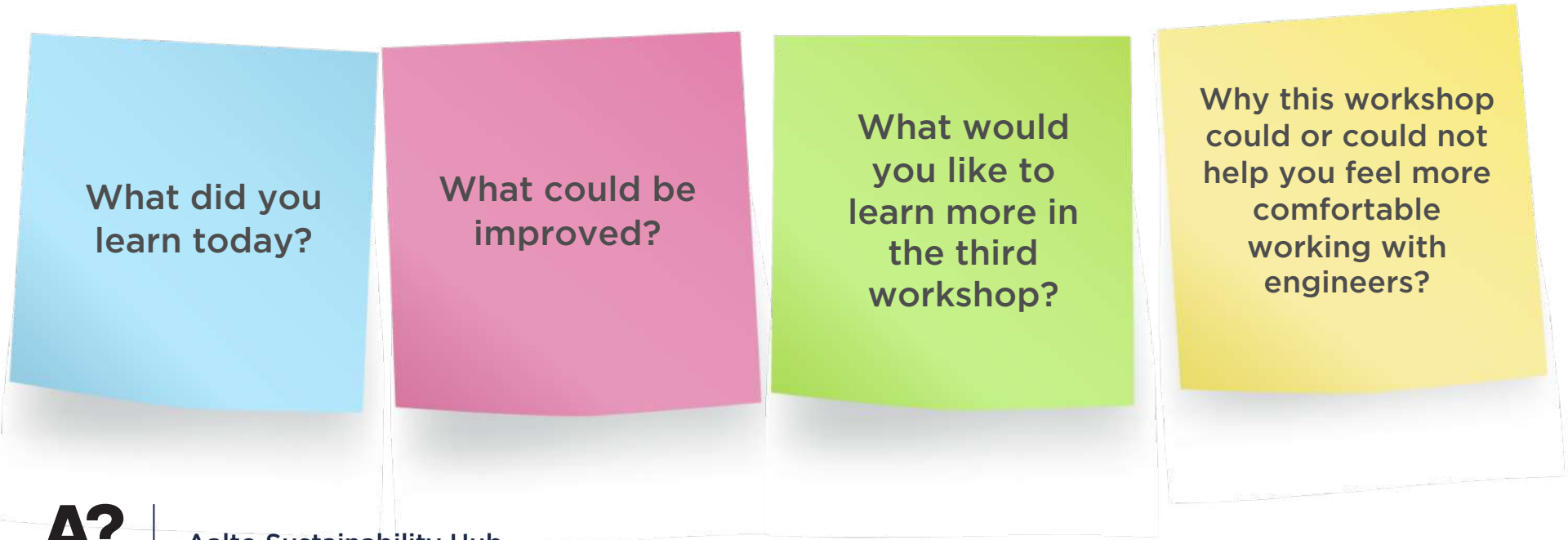
Väre M202

Bringing the technical and business sides together to learn how to understand and speak each other's "circular economy language".



Aalto University | Aalto Sustainability Hub

We appreciate your feedbacks!



Thanks for participating!

Questions and Comments?