

Welcome!

Circularity as a driver of competitiveness, resilience and strategic resources
Where do the Swedish Electronics Industry stand today?

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Linköping University
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Circular electronics has become an industrial competitiveness issue

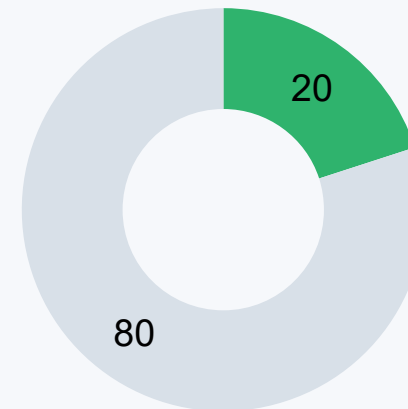


62 Mt

of electronic waste generated globally in 2022

>\$137bn

estimated economic and environmental cost from e-waste



■ Formally recycled ■ Not formally recycled

Only around one fifth is formally recycled—leaving materials, components and strategic value outside controlled loops.

Resource efficiency, supply resilience and net-zero performance now reinforce each other.

THE COST OF THE LINEAR MODEL

Too much value still ends here

The challenge is to retain products, components, and materials before their value is destroyed.

Image: El-Kretsen



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The world is moving. Sweden risks falling behind on circular electronics.



Competitiveness

- Retaining products, components and materials keeps value in the business
- New offerings: service, exchange, take-back

Resilience

- Chip shortages and geopolitics have exposed dependencies
- Access to critical raw materials is a strategic European issue

Climate and environment

- Circularity is a route to net zero, lower emissions and less e-waste
- Customers and regulators increasingly expect it

EU regulation is moving upstream

- Circular Economy Act, Ecodesign (ESPR), Right to Repair
- Battery Regulation (DPP), Critical Raw Materials Act
- Focus shifts from waste treatment to design, durability, repairability and information

Others have structured roadmaps

- Finland: national roadmap since 2016, pilots and collaboration
- Netherlands: fully circular by 2050, with electronics in sector agendas
- France: EUR 5 billion electronics strategy under France 2030

SVENSK ELEKTRONIK

We lead

reloop electronics

To help member companies
and the entire ecosystem —
transition from linear models to circularity.

Tools • Case studies • Shared roadmap

LEARN MORE AND JOIN THE TRANSITION

www.svenskelektronik.se



About ReLoop Electronics



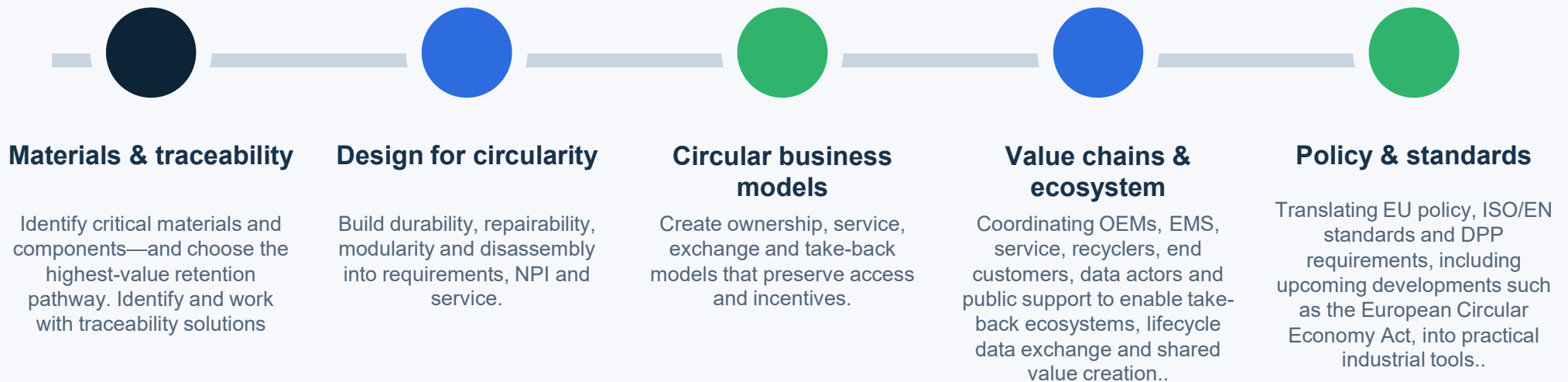
Circular Strategies for a Resource-Efficient and Resilient Electronics Industry

Project period: 2025–2028

Initial Project Parties
Svensk Elektronik
Linköping University
Eskilstuna Elektronik Partner
EXMA Låssystem
Cirtag / Solai
Ragn-Sells



ReLoop Electronics mission is to support the electronics industry toward net-zero by integrating circularity.



From fragmented circular initiatives to value-retaining systems across the Swedish electronics industry.

Project Structure

WP1

Current State Assessment.

Identifying the challenges and opportunities.

WP2

Development and Operationalization of Circular Strategies.

WP3

Case Studies In and Around the Project.

- 3.1 Implement and assess strategies
- 3.2 Apply strategies where past efforts failed
- 3.3 Ensure transparency and traceability
- 3.4 Enable repair, remanufacturing and recycling

WP4

Project leadership, coordination, and dissemination.



WP1

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Net Zero
Industry
impact innovation

Supporting Swedish Industry toward Net-Zero, Circularity, and Competitiveness.



Jelena Kurilova
Associate Professor

Remanufacturing,
Value retention
strategies, Circularity



Tomohiko Sakao
Sakao
Full Professor

PaaS, AI in
production, Circular
Manufacturing



Erik Sundin
Full Professor

Remanufacturing, EoL
EoL Strategies,
Circular
Manufacturing



Marianna Kambanou
Assistant Professor

Lifecycle costing,
Circular Business



Annelie Carlson
Förste Folng

Lifecycle Assessment

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Net Zero
Industry
impact innovation

Supporting the Swedish Manufacturing Industry toward continued and growing competitiveness through a circular future.

tekn. dr. Johannes Matschewsky

Associate Professor in Circular Industrial Transformations;
Scientific Lead of the ReLoop Electronics project.

Product-as-a-Service
Design and
Deployment

Circular economy
indicators for
manufacturing

Circular business
models enabling
value retention.

Value-retention in
manufacturing

Circular plastics in
healthcare

Circularity in the
building and interior
sector.



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Industry
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Scientific Lead of the ReLoop Electronics project.

Toyota Material
Handling, Siemens
Energy

Alimak, Huskvarna

Danfoss, Grundfos,
Schneider Electric,
Kvadrat

Volvo CE

Stockholms stad,
Region Stockholm,
Essity, J&J, B.Braun

Vasakronan, H&M,
Platzer



Circular ambitions meet industry practice.

Ambition

- Goals + Pilots**
- Sustainability targets
 - Circular initiatives
 - Political incentives

≠

Practice

Sell → ? → Recycle
High-value loops exist, but mostly as isolated cases rather than established practice.

Circular ambitions meet industry practice.

MISSING LINK

REPAIR / SERVICE

REUSE /
MULTIPLE LIVES

TESTING AND RE-
QUALIFICATION

TRACEABILITY
PILOTS

MATERIAL
RECYCLING

STRUCTURED
TAKE-BACK

USABLE
LIFECYCLE DATA

CLEAR
OWNERSHIP &
RULES

REPEATABLE
COMMERCIAL
LOGIC

AMBITION → OPERATIONAL CAPABILITY

Materials without information lose value.

FUNCTIONING PRODUCT

Highest functional and economic value

TESTED MODULE/COMPONENT

Condition, history?

SEPARATED MATERIAL

Necessary when other strategies cannot be applied

Information + Functional Value Lost.

"All the metals - the copper and the gold and silver and so on - is highly valued scrap today. So, the scrap of the electronics we do, it finances the transport and the destruction of the other materials."

R12 • EMS Quality & Sustainability Manager

Practical implication:

Define the minimal data needed for every strategic decision.

CONSIDER: Do you know the composition, condition and best next use for your product without reverse engineering?

You cannot close a loop you cannot access.

LINEAR



CIRCULAR



We have introduced the battery as a service. So, meaning we own the battery and we use them, and we already have got a plan when they reach the end of life - what we do with them in a more sustainable way.

R7 • Mining OEM Sustainability Specialist

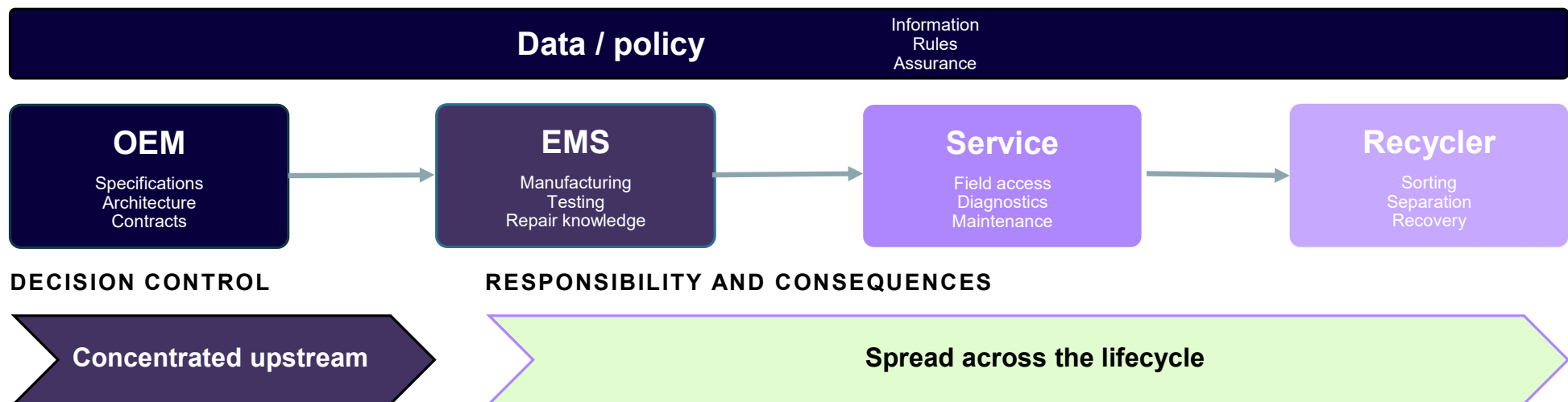
Practical implication:

Consider the access mechanism!

Who will receive the product back, under what conditions and who bears the risk?

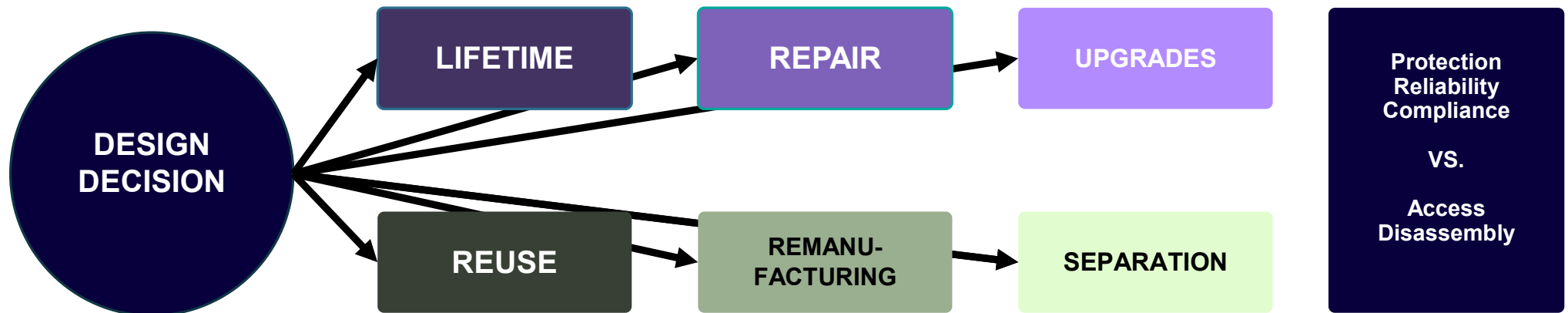
WHAT'S HARDER? To continue to own the product, or to ensure the return of a product you no longer own?

Collaboration is not enough when control is unevenly distributed



CONSIDER: Are you a downstream actor? Are you included in upstream decision making?
Are you upstream? Do you include suppliers in your decision making?

Circularity is designed in or designed out.



REFLECT – How do you make decision? Where do you sacrifice disassemblability, repairability, re-usability for other requirements? How do you document and follow up these decisions?

[...] we managed to install 5G on equipment that was sent out for 4G because we sort of had the flexibility [...] and could offer our customers just with the software upgrade to move [...]

R6 • Telecom OEM Technology Director

Circularity is designed in or designed out.

TRANSLATION GAP

ESPR + DPP

Durability and information

WEEE / EPR

Collection and responsibility

ISO 59000

Language - Transition - Measurement

EN 45553–45557

Repair – Remanufacture - Recycle

SPECIFICATIONS

What needs to change in the product/offering?

CONTRACTS

Ownership, data ownership and provision, end-of-use?

TESTS

How is performance and value determined in circularity?

INVESTMENT

What stability is needed at the outset? When to act?

WP1 result

Regulation was a major external enabler, but also associated with uncertainty and implementation burden.

No respondent explicitly mentioned the ISO 59000 series or electronics-specific circular standards.

WHAT IS YOUR BIGGER CHALLENGE? - Is it insufficient requirements or lack of clarity for implementation?

Circularity is designed in or designed out.



Where do we go from here – Together?

WORK PACKAGE 2

Development and operationalization of circular strategies.

WORK PACKAGE 3

Casework and strategy deployments in and around ReLoop Electronics.

WHAT WE CAN DO.

Pilot Circular strategies (remanufacturing, reuse, refurbish), find bottlenecks, and act on them.

Map your value creation ecosystem, find challenges, missing links, or lacking information flows, and define ways forward.

Co-develop your digital product passport roadmap.

And more!

Where do we go from here – Together?

- A product, component, or material flow with unrealized value.
- A failed or stalled repair, reuse, remanufacturing, or recycling initiative.
- A bottleneck in data, design, take-back, standards, or collaboration.
- Access to the actors needed to test an improved configuration.

“We lose access to our product after...”

“We could retain more value if...”

“Our circularity initiatives stall because...”

CASE INVITATION CANVAS

PRODUCT OR FLOW | R-STRATEGY | BROKEN
CONNECTION | PARTNERS NEEDED

How can we co-create value toward Net-Zero and Resilience in the Swedish Electronics Industry?

By 2035, circularity should be built into Sweden's electronics ecosystem

2035

A resilient industry that preserves functional value, secures critical resources and supports net-zero goals.

01

Circular by design

OEM requirements and EMS/NPI decisions include repair, disassembly, reuse and recovery.

02

Products remain accessible

Ownership, service contracts and take-back provide predictable return flows.

03

Data drives decisions

Product history, condition and material data support the best next-life pathway.

04

Capability stays close

Testing, repair, remanufacturing and high-quality recycling strengthen resilience.

A roadmap and a permanent collaboration platform can turn separate projects into enduring industrial capability.

The way forward

1

Shared ambition

Define a clear shared ambition for the Swedish electronics industry

2

Gap analysis

Identify the gap between today's capabilities and the desired position

3

Industry roadmap

Remove barriers, align actors, and pinpoint where policy and industry can accelerate

Objective: an industry that uses resources more intelligently, retains more value in the economy, and strengthens its long-term competitiveness and resilience.

Circular electronics is a competitiveness strategy - not a waste project

Sweden can still lead—but only if the industry turns shared ambition into shared operating capability.

If we coordinate now, circular capability can become a Swedish industrial advantage.

Workshops

Join our workshops to discuss **Vision 2035** that together with the cases studies in WP 3 will form the project's strategy – Industry roadmap.

Stockholm
November

19

Göteborg
November

30