Before we start, please make sure

- Your speakers are turned on
- Keep your mic muted if you are not speaking
- To ask questions, use the Teams chat at any time or raise your hand virtually during the Q&A
- Please note that the webinar will be recorded

Funded by the European Union

TREASoURcE

Session agenda

Circular Batteries

12:00 – 12:05	Session opening *Pirkko Eteläaho, Business Tampere*
12:05 – 12:35	Barriers and drivers for repurposing of EV batteries *Mathias Winther Thorsen, ECO STOR*
12:35 – 13:00	Repurposing of EV batteries: Stakeholder engagement activities overview *Jan Bakke, Østfold, Tiina Laiho, CLIC Innovation & Jari Saukko, Ekokumppanit*
13:00 – 13:15	Circular batteries: policy recommendation overview *Tran Ngo, VTT*
13:15 – 13:30	Supporting the replication of the systemic CE solutions for batteries: TREASoURcE Replication Handbook *Kaisa Sibelius, Forum Virium Helsinki*
13:30 – 13:45	Q&A

Funded by
the European Union

Speakers

Pirkko Eteläaho
Senior Business Advisor,
Circular Economy
Business Tampere
Session host

Mathias Winther Thorsen
Lead Engineer
ECO STOR

Jan Bakke
Project Manager
Østfold

Tiina Laiho
Head of Services and
Communication
CLIC Innovation

Jari Saukko
Project Manager
Ekokumppanit

Tran Ngo
Research Scientist
VTT

Kaisa Sibelius
Project Manager
Forum Virium Helsinki

TREASoURcE

Funded by
the European Union

Start
01.06.2022

Duration
4 years

Total budget
9,9 M€

Consortium
16 partners + 1 AE
Coordinator VTT

CCRI project

The treasure in resources

TREASoURcE aims to initiate systemic change by developing technologies and systemic circular economy (CE) solutions in cities and regions for currently underutilized or unused plastic waste, end-of-life electric vehicle batteries and bio-based side and waste streams.

Implementing these solutions together with companies, societies (including citizens, consumers, communities and regional actors) and experts in the field is expected to significantly increase product and material circulation in the Nordic and Baltic Sea Regions.

Project objectives

- Replicated locally tailored systemic CE solutions in the Baltics and Poland and beyond
- Demonstrated environmental, social, economic and political impacts of the systemic CE solutions (Circular plastics, batteries, and biobased side and waste streams) in the Nordics
- Inclusive and just transition to CE for all supported by high level cooperation with all relevant stakeholders

Systemic Circular Economy Solutions

Key Value Chain Demonstrations

- Circular plastics
- Circular batteries
- Circular biobased side and waste streams

+ Stakeholder Engagement Demonstrations

Local and regional economies and actors have a big role in **TREASoURcE.** The implemented demonstrations will formulate new value chains and business opportunities reaching through the urban-rural settings. The combination of the cities and regions will enable large reach and bigger impact and boost the replicability and scalability potential of the developed solutions.

Demonstration areas
Finland, Norway, Sweden, Denmark

Replication areas
Estonia, Latvia, Lithuania, Poland, Northern Germany

Funded by the European Union

Barriers and drivers for repurposing of EV batteries

Mathias Winther Thorsen, ECO STOR

Funded by
the European Union

WP objectives and main tasks

TREASoURcE

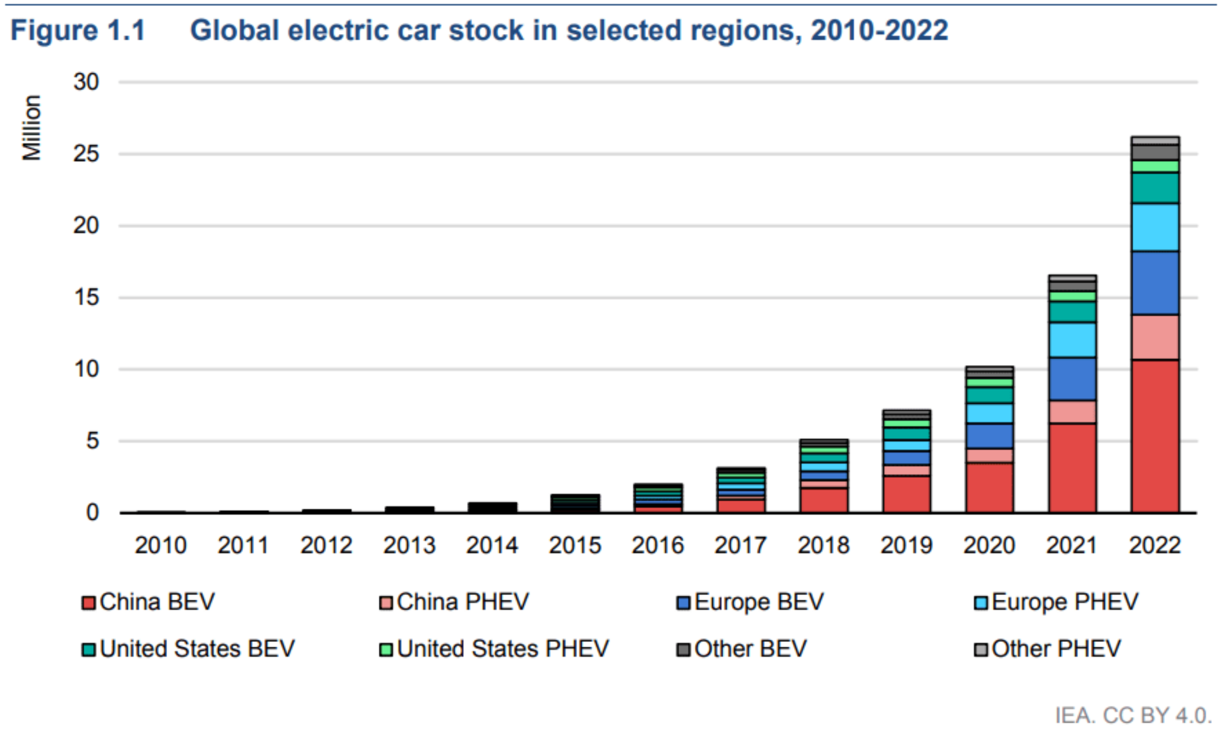
Objective:
To evaluate possibilities and potential for use of 2nd life EV batteries as energy storage systems.

- Main activities for the first half of the project period
    - Identifying challenges and barriers for battery 2nd life
    - Setting up 3 battery demonstration systems in Norway and Finland

Funded by the European Union

Background and motivation

- To buffer the supply and demands, energy storage systems are needed
- By 2030 it is expected to reach 358 GW and 1028 GWh
- In 2019, the worldwide annual sales of EVs reached 20 MWh
- By 2030, the worldwide annual sales of EVs is expected to reach 20 GWh



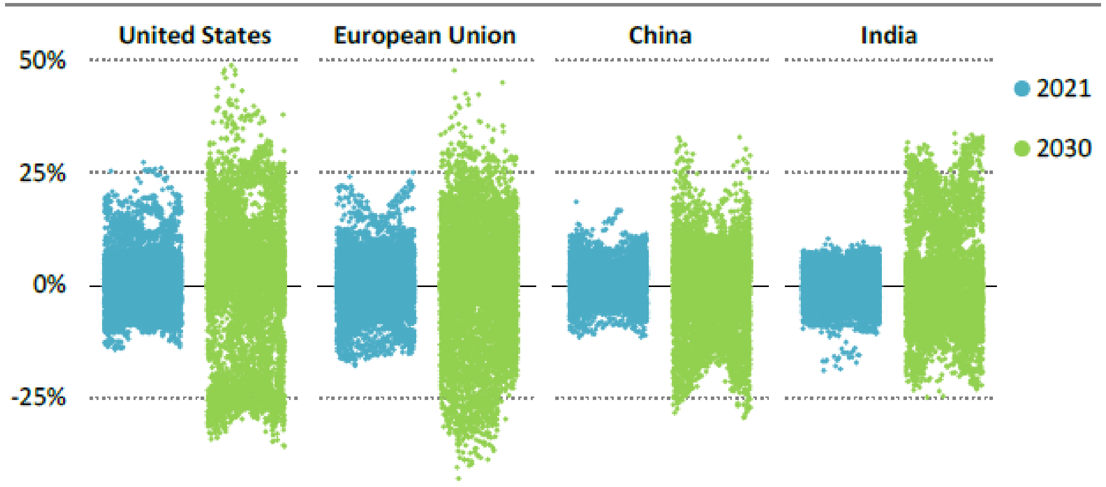
The total number of passenger light-duty EVs worldwide has increased rapidly from 2010 to 2022 (IEA, 2022).

Funded by the European Union

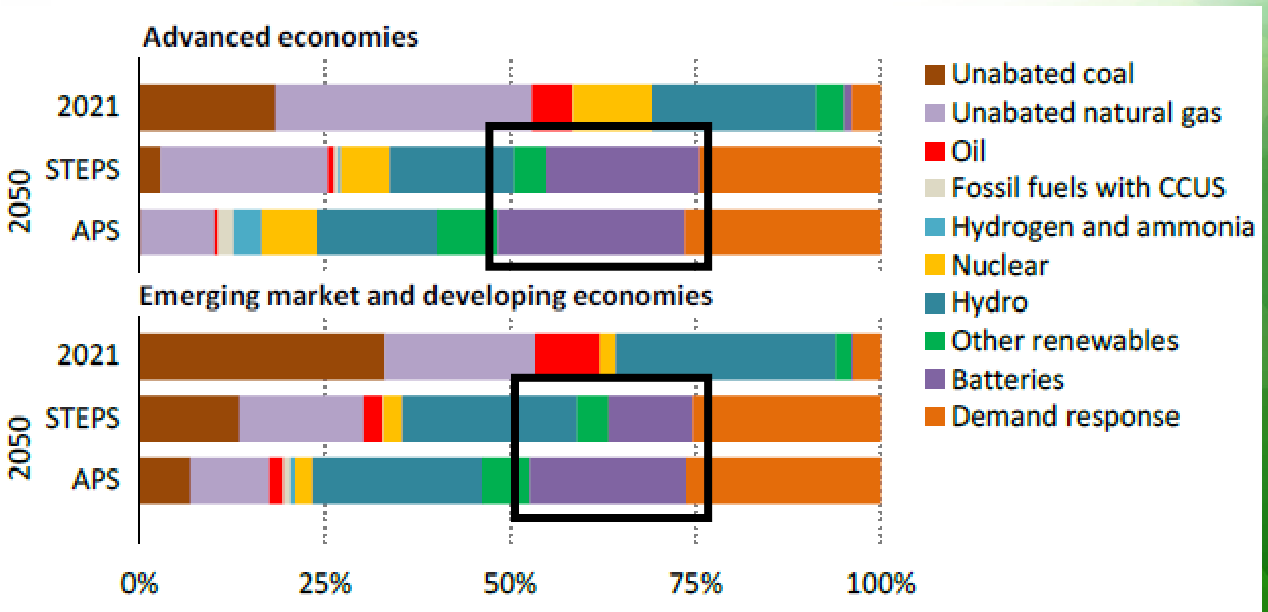
Batteries provide power system flexibility

TREASoURcE

Hour-to-hour flexibility needs per region (APS)



Flexibility supply by source, region and scenario



Funded by the European Union

Source: IEA World Energy Outlook 2022

Circular EV battery value chain

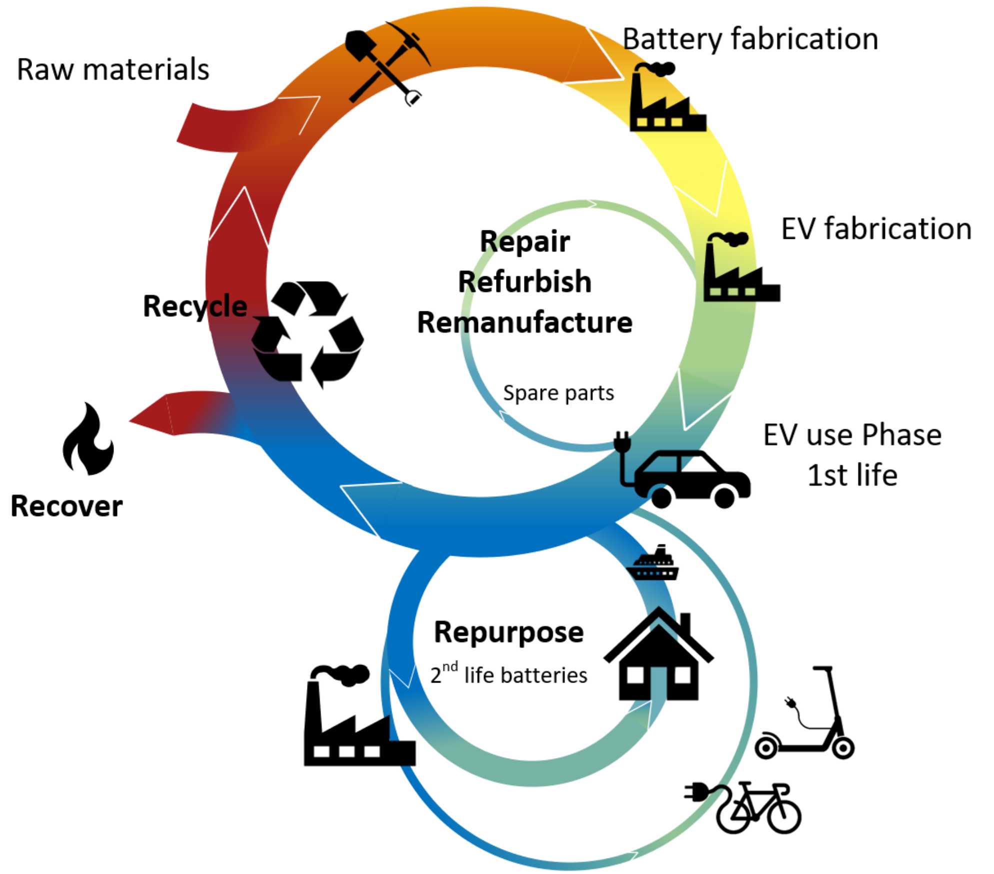
Increasing circularity

R4 Repair: Repairing faulty battery components for use in EVs.
R5 Refurbish: Updating a battery with new technological advances to increase its performance for use in EVs.
R6 Remanufacture: Combining functional components of several faulty battery packs to produce one functional battery pack for use in EVs.

R7 Repurpose: Use discarded product or its parts in a new product with a different function

R8 Recycle: Process materials to obtain the same (high grade) or lower (low grade) quality

R9 Recover: Incineration of materials with energy recovery

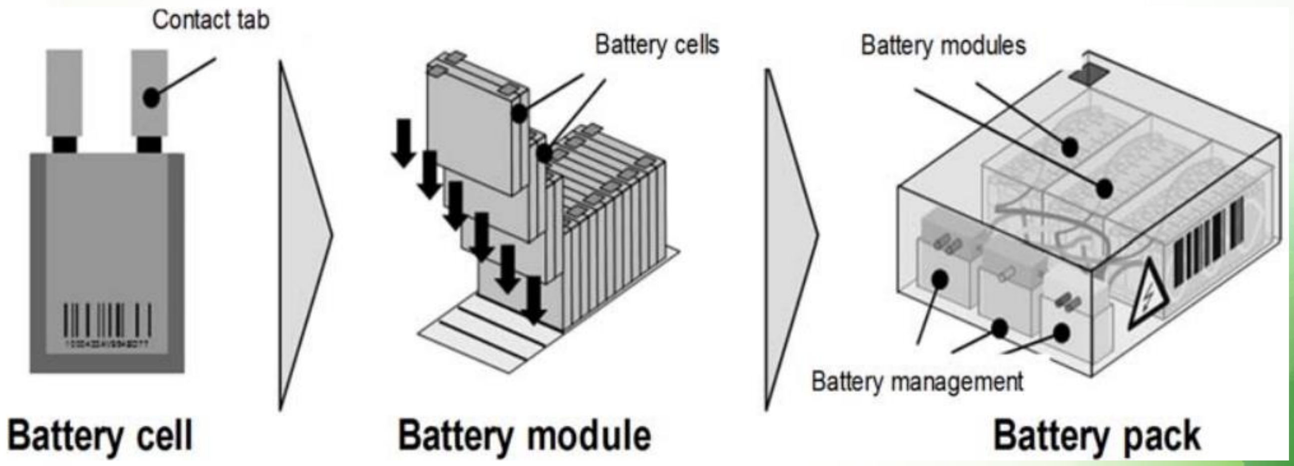


Funded by the European Union

Potting, J., Hekkert, M. P., Worrell, E., & Hanemaaijer, A. (2017). Circular economy: measuring innovation in the product chain. *Planbureau voor de Leefomgeving*, (2544).

Circular business models

- Repair
- Refurbishing
- Remanufacturing
- Repurposing
  - Disassemble down to cell level
  - Disassemble down to module level
  - Reuse the battery pack as is
- Recycling
  - Use materials in new products



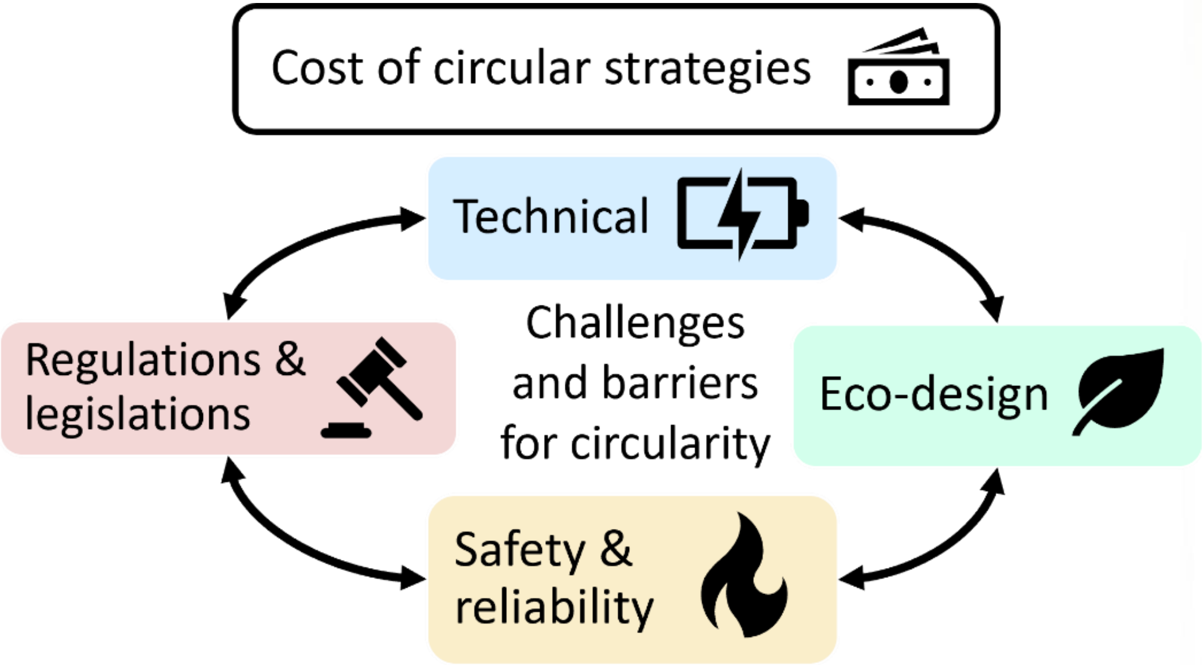
The assembly from battery cells to a battery pack (A. Kampker, 2016)

The cost and time of disassembly of pack, module, and cell (H. Rallo, 2020).

	Pack	Module	Cell
Time	500 min	800 min	965 min
Cost	52 €/kWh	60 €/kWh	76 €/kWh

Funded by the European Union

Challenges and barriers for 2nd life battery use



Technical: Battery degradation knowledge

Regulations & legislations: Repurposing, access to BMS, recycling

Eco-design: Reduce environmental impacts of EVs during its entire lifetime

Safety & reliability: In operation, logistics and remanufacturing

Funded by the European Union

Regulations and legislation

TREASoURcE

<u>Excerpt from Nina McDougall's thesis:</u>

"The operational environment for repurposing electric vehicle lithium-ion batteries for energy storage applications in the EU"

Challenge 1

Lack of regulatory environment, testing and safety standards for repurposing electric vehicle batteries.

Challenge 2

The upcoming EU battery directive favours battery recycling of materials above lifetime extending circular activities, as it requires a certain amount of materials in new batteries to come from recycled sources.

Recycling targets set in the Battery Regulation

	Year	Cobalt	Copper	Lead	Lithium	Nickel
Minimum recovered content in new batteries	2031	16 %	-	85 %	6 %	6%
	2036	26 %	-	85 %	12 %	15%
Material recovery targets for waste batteries	2027	90 %	90 %	90 %	50 %	90%
	2031	95 %	95 %	95 %	80 %	95%

Funded by the European Union

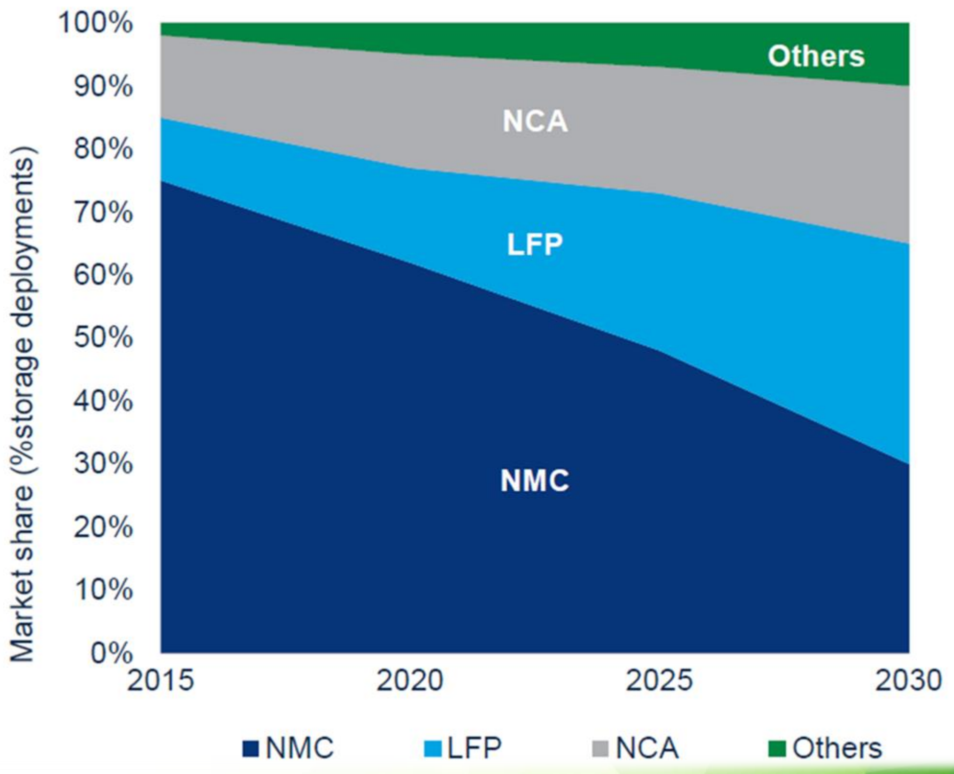
Technical challenges

Challenge 3

The historical data stored on the battery management system is not accessible for other actors than the original equipment manufacturer.

Challenge 4

Batteries have a vast range of different cell chemistries, cell form factors, and battery pack designs, and new technological advances are developing rapidly. Life extending circular activities must be tailored to a specific battery manufacturer and must continuously develop at the same rapid pace.



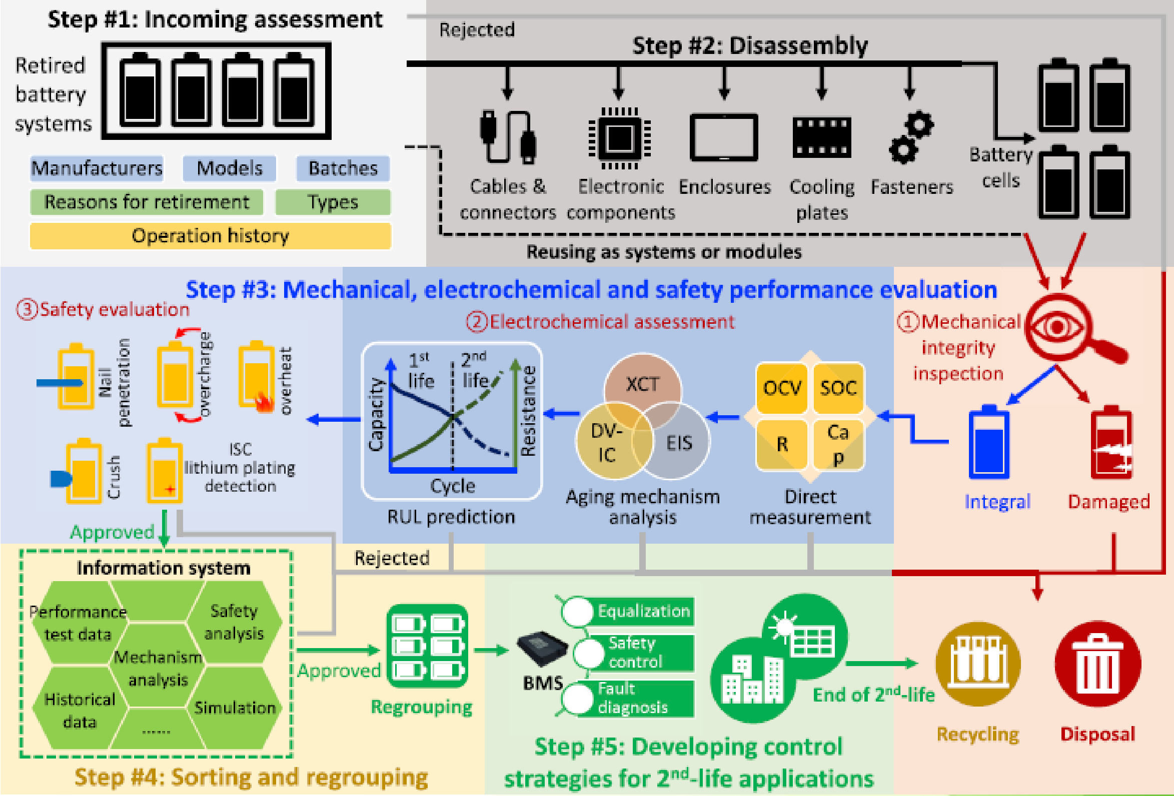
Market share of cathode materials in battery energy storage systems, now and in the future. (Wood Mackenzie, 2020)

Funded by the European Union

Technical challenges

Challenge 5

EV battery evaluation requires time consuming procedures, and advanced diagnostic and prognostic algorithms of battery state of health and safety, and remaining useful lifetime.



A general overview of the repurposing process ant its steps (Zhu J, 2021)

Funded by the European Union

Eco design

- Eco-design directive has been implemented in the EU to improve energy efficiency in the product design phase

- March 2022 – Eco-design for Sustainable Products regulation proposed
  - Will include EV batteries
  - Provide products with minimal environmental impact

Cutaway of the 2019 Nissan leaf e+ (bottom) battery pack and (top) battery module (Nissan Motor Corporation, 2023).

Funded by the European Union

Eco-design possibilities

- Disassembly
  - Currently done manually due to large variations in design as well as methods of assembly (i.e. glue, welding, etc.)
  - Standardisation in battery cell and battery pack- and module design will be necessary to make eco-design a reality in the future
- Monitoring of the battery state
  - No way of easy access to the historical user data
  - Challenging to determine state of health
- Digital battery passport
  - Will be implemented as part of the new EU Battery Regulation and become effective from February 2027

Challenge 6

Electric vehicle battery packs are designed for low cost and weight. As a result, they are difficult to remove from the vehicle and to disassemble for repairs, remanufacturing, and repurposing.

Funded by the European Union

Safety and reliability

TREASoURcE

- Thermal runaway

Challenge 7

The public may have a negative opinion of EV battery repurposing for BESS, as the opinion is that the fire risk and hazards are especially prevalent and dangerous.

- For used EV batteries there is a greater risk of reaching the knee point where the user will experience a sudden loss of energy capacity

Challenge 8

Reliability of 2nd life BESS is a concern due to the potential for sudden loss of energy capacity in lithium-ion batteries.

Funded by the European Union

Safety and reliability

TREASoURcE

- Safety in the logistics phase
  - There are several regulations restricting and controlling transportation of LIB
  - Challenges related to transporting damaged batteries

Challenge 9

End of life batteries may be damaged and a fire hazard. Before they are evaluated, they must be collected and stored. During this phase, there is a high risk of handling batteries.

- Safety in the user phase
  - No standards or recommended best practice for battery rooms
  - No standards or templates for safety assessment of BESS in buildings

Challenge 10

Insufficient knowledge regarding design requirements for battery rooms, including construction materials, fire extinguishing systems, ventilation, size of room, access and location in building.

Funded by the European Union

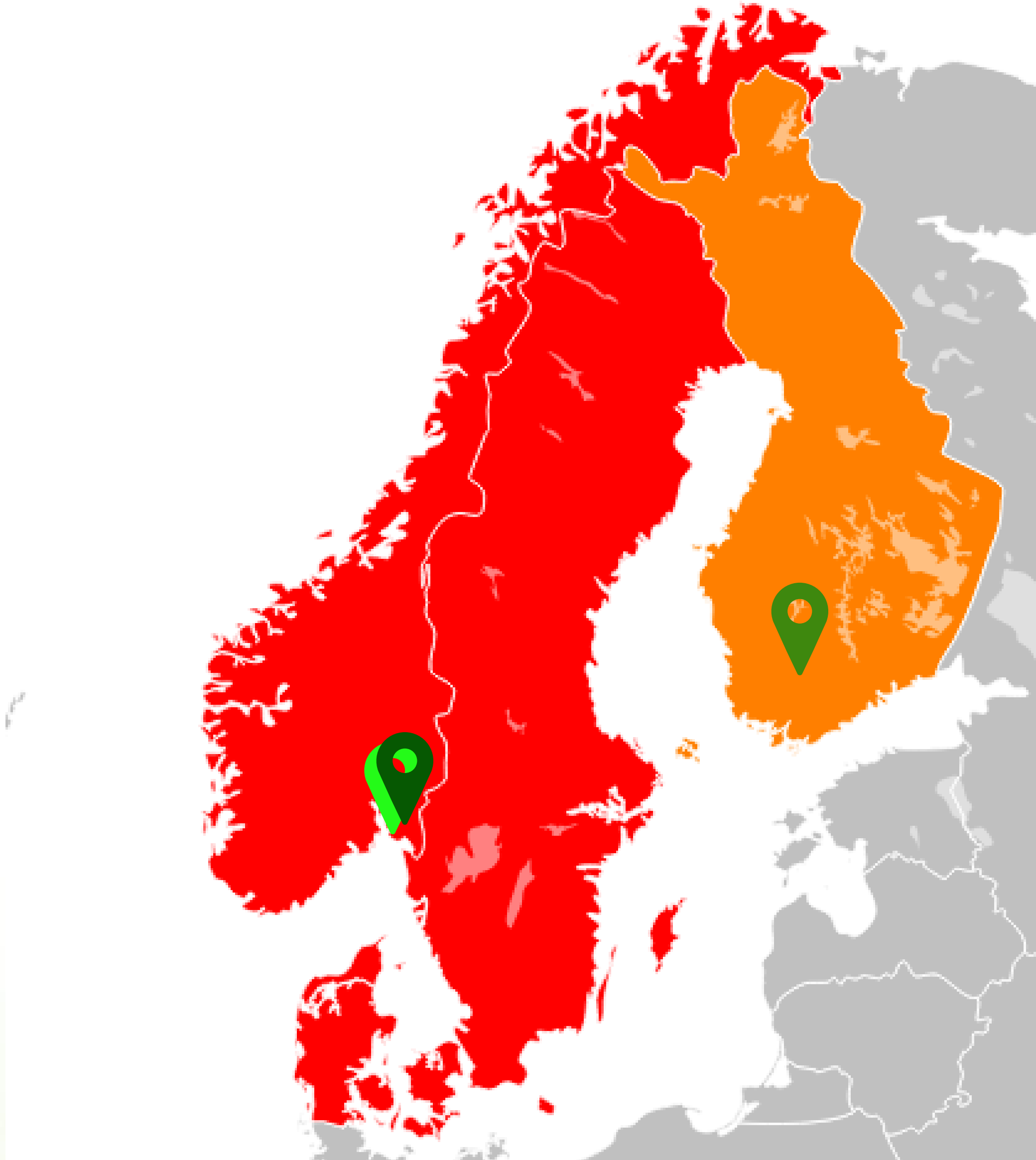
Demonstration sites

Norway

- Rudskogen Motorsenter
  - National motorsports arena located in Rakkestad
- Trosvik Skole
  - Elementary school in Fredrikstad municipality

Finland

- Lempäälä-talo
  - Multi-purpose building in Lempäälä municipality housing a public library, a restaurant, public offices, and other services



Funded by the European Union

Rudskogen Motorsenter

TREASoURcE

- Battery energy storage system
  - Energy storage capacity: **120 kWh**
  - Power capacity: **60 kW**
- Plans installation of solar panels
- Primary use of batteries
  - Peak shaving
  - Grid support/frequency services
  - (Store surplus energy for solar panels to optimize self-consumption)

Photo: Thomas Engeset

Funded by
the European Union

Rudskogen Motorsenter

- Battery system installed in air conditioned container outdoors
- Equipped with signs for informing the public about the battery system and the project
- Event-based power consumption gives interesting case for a battery system

Photo: Stein Cato Røsnæs

Funded by the European Union

Trosvik School

- Battery energy storage system
  - Energy storage capacity: **80 kWh**
  - Power capacity: **40 kW**
- 44 kWp solar panels on the roof
- Primary use of batteries
  - Store surplus energy for solar panels to optimize self-consumption
  - Peak shaving
  - Grid support/frequency services

Photo: Solcellespesialisten

Funded by the European Union

Trosvik School

- Battery system to be installed in separate fire cell within a small garage
- Easy access from the outside in case of emergency
- School with consistent power usage pattern
- Summer months with high solar production and low consumption

Photo: Solcellespesialisten

Funded by the European Union

Lempäälä-talo

TREASoURcE

- Battery energy storage system
  - Energy storage capacity: **80 kWh**
  - Power capacity: **40 kW**
- Solar panels on the roof
- Primary use of batteries
  - Store surplus energy for solar panels to optimize self-consumption
  - Peak shaving
  - Grid support/frequency services

Photo: Lempäälä Municipality

Funded by the European Union

Lempäälä-talo

- Battery system installed in a separate fire cell
- Direct access from outside
- Aerosol based extinguishing system, the recommended method in Finland
- Varied building use gives varied energy consumption
- Different electricity pricing

Photo: Lempäälä Municipality

Funded by the European Union

Summary

TREASoURcE

- The battery market is still changing rapidly, both in terms of technology, design, regulation, market
- Demand for batteries is increasing
- Battery pack designs not standardized across manufacturers; complicates repurposing and recycling
- Repurposing of batteries is time consuming and complicated, standardization and Battery Passport should help
- Battery system installation "best practices" are not well established, especially for battery rooms

Funded by the European Union

Thank you!

Funded by
the European Union

TREASoURcE

Repurposing of EV batteries: Stakeholder engagement activities overview

Jan Bakke, Østfold

Jari Saukko, Ekokumppanit

Tiina Laiho, CLIC Innovation

Funded by the European Union

Stakeholder engagement

- **Engage stakeholders with aim to facilitate CE collaboration, innovation and solutions**
  - Businesses, decision makers, consumers, local communities, procurers and event organizers
- **Method: 5 parallel stakeholder engagement demonstrations**
  - Workshops, hackathons, fixing workshops, seminars, procurement recipes, cultural and sports events

Funded by the European Union

Objectives:

- Learn from stakeholders and understand their perspectives, perceptions and positions in the CE transition
- Strengthen the decisionmakers capability of enabling CE.
- Build knowledge and **stakeholder capacity** to ensure they understand the benefits of CE and **can participate in implementing CE** on different stakeholder levels.

Funded by the European Union

Stakeholder engagement – B2C and public authorities

Funded by
the European Union

Kiertofest

Tampere-House 25.4.2023

- 1600 visitors
- Ekokumppanit had a stand for TREASoURcE project.
- Circular economy of EV batteries and biogas value chain was shared.
- Visitors could participate to quiz that had questions related to EV battery reuse and biogas.
- Key findings:
  - Consumers were curious and interested
  - Trusted information, where?

TREASoURcE

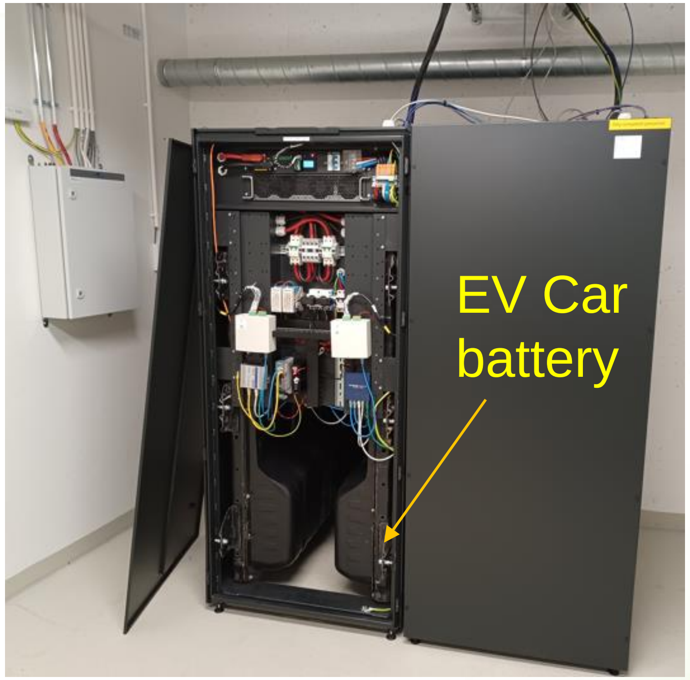
Funded by the European Union

Second life battery, indoor

1. Before the project, business model selection: capacity of the energy
   - To join Reserves and balancing power markets (min 100kW)
   - Or only building level local energy storage
   - Paypack time and return of investment (ROI)
   - Money-Resources-Targets

2. Space requirements:
   - requirements for the air quality
   - Local Fire and Safety regulation

3. Automation and networks:
   - Building management system (BMS)
   - Network connection
   - Service, maintenance and spare parts



Aerosol extinhuishing system

Room temperature and humidity control

BMS connection

Funded by the European Union

Stakeholder engagement ecosystem – clusters and findings

Funded by
the European Union

Definition for cluster

TREASoURcE

What is a cluster?

Clusters should be considered as regional ecosystems of related industries and competences featuring a broad array of inter-industry interdependencies[1].

They are defined as groups of firms, related economic actors, and institutions that are **located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills**. Clusters are referred to both as a concept and a real economic phenomenon, such as the Silicon Valley, the effects of which, such as employment concentration, can be measured.

Funded by the European Union

1. Source: https://clustercollaboration.eu/cluster-definitions

Cluster organizations/ecosystems for batteries

TREASoURcE

What is a cluster?

Clusters should be considered as regional ecosystems of related industries and competences featuring a broad array of inter-industry interdependencies[1].

They are defined as groups of firms, related economic actors, and institutions that are **located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills**. Clusters are referred to both as a concept and a real economic phenomenon, such as the Silicon Valley, the effects of which, such as employment concentration, can be measured.

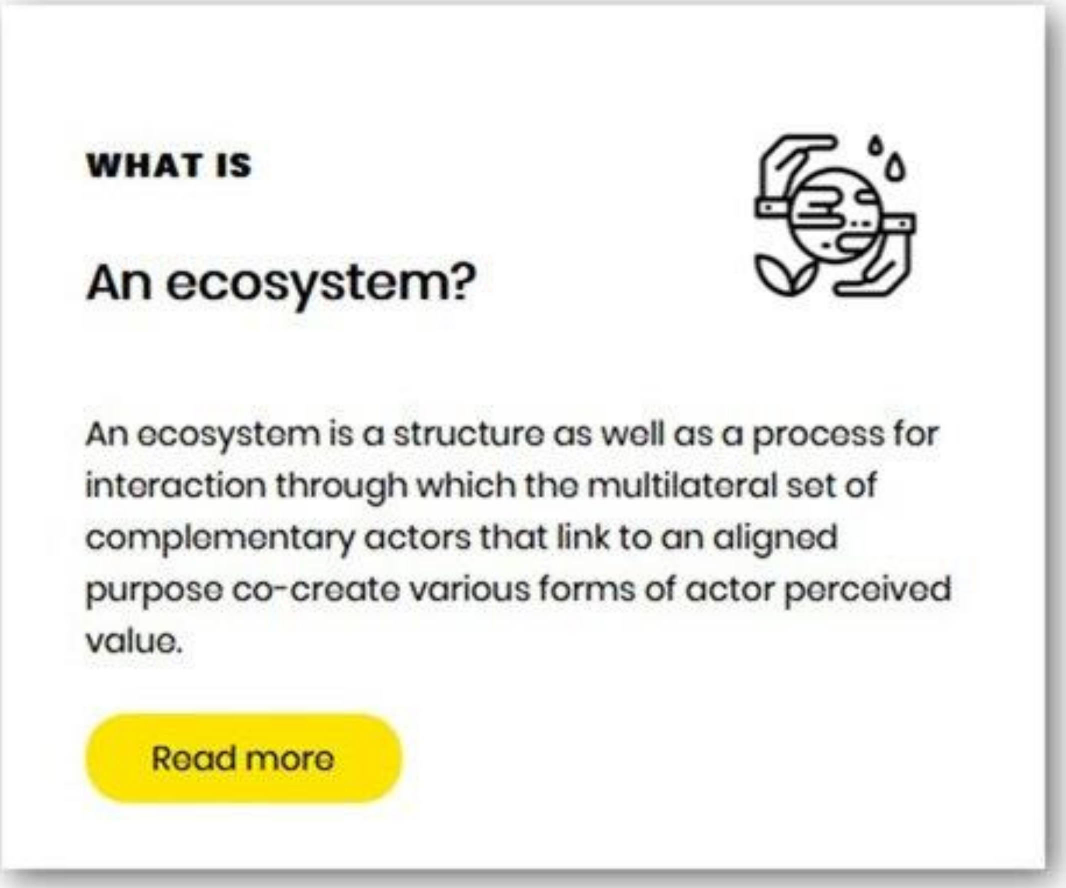
Cluster organizations in Norway	5
Cluster organizations in Finland	9
Cluster organizations in Estonia	8
Cluster organizations in Poland	6

Funded by the European Union

What is an ecosystem?

- **Knowledge ecosystem** → New research knowledge
- **Innovation ecosystem** → New solutions for systemic challenges
- **Business ecosystem** → New business solutions for systemic challenges
- **Business Networks** → Efficient development and implementation process

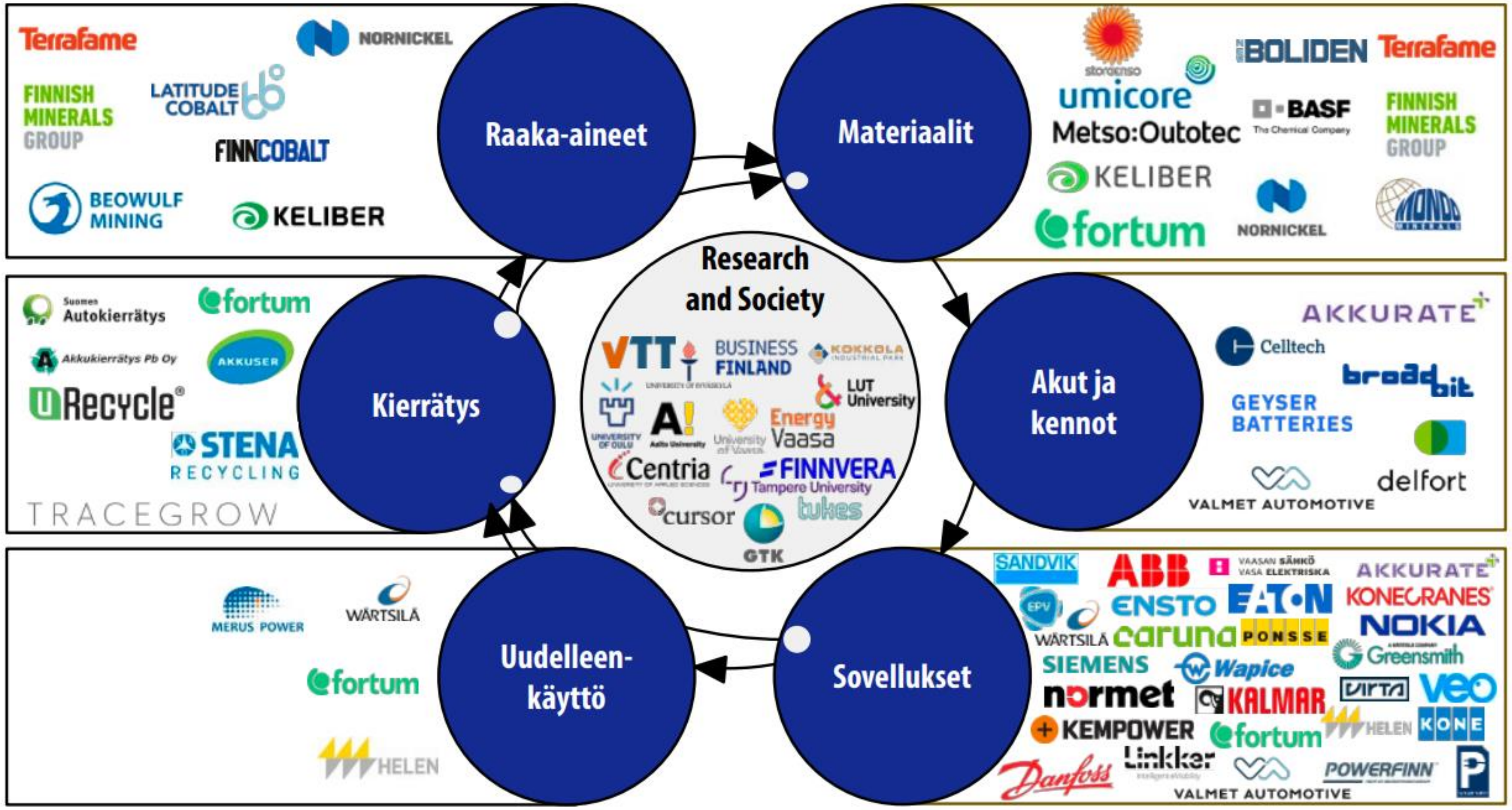
*Ref. VTT



https://www.youtube.com/watch?v=ke5PXlu-n-w

Funded by the European Union

Example:
National battery ecosystem Finland (2018)



Funded by the European Union

EV Battery ecosystem

EV batteries

- Producer responsibility organization coordinates scrap vehicle collection network and recycling operators on behalf of EV producers
- Recycling operators receive and handle batteries from end-of-life vehicles
- Brand services taking care of battery recycling during vehicle usage phase

Industrial batteries (1st and 2nd life)

- Producer responsibility organization coordinates recycling on behalf of industrial battery manufacturers
- Recycling operator sorts and sends to further processing

2nd life battery users

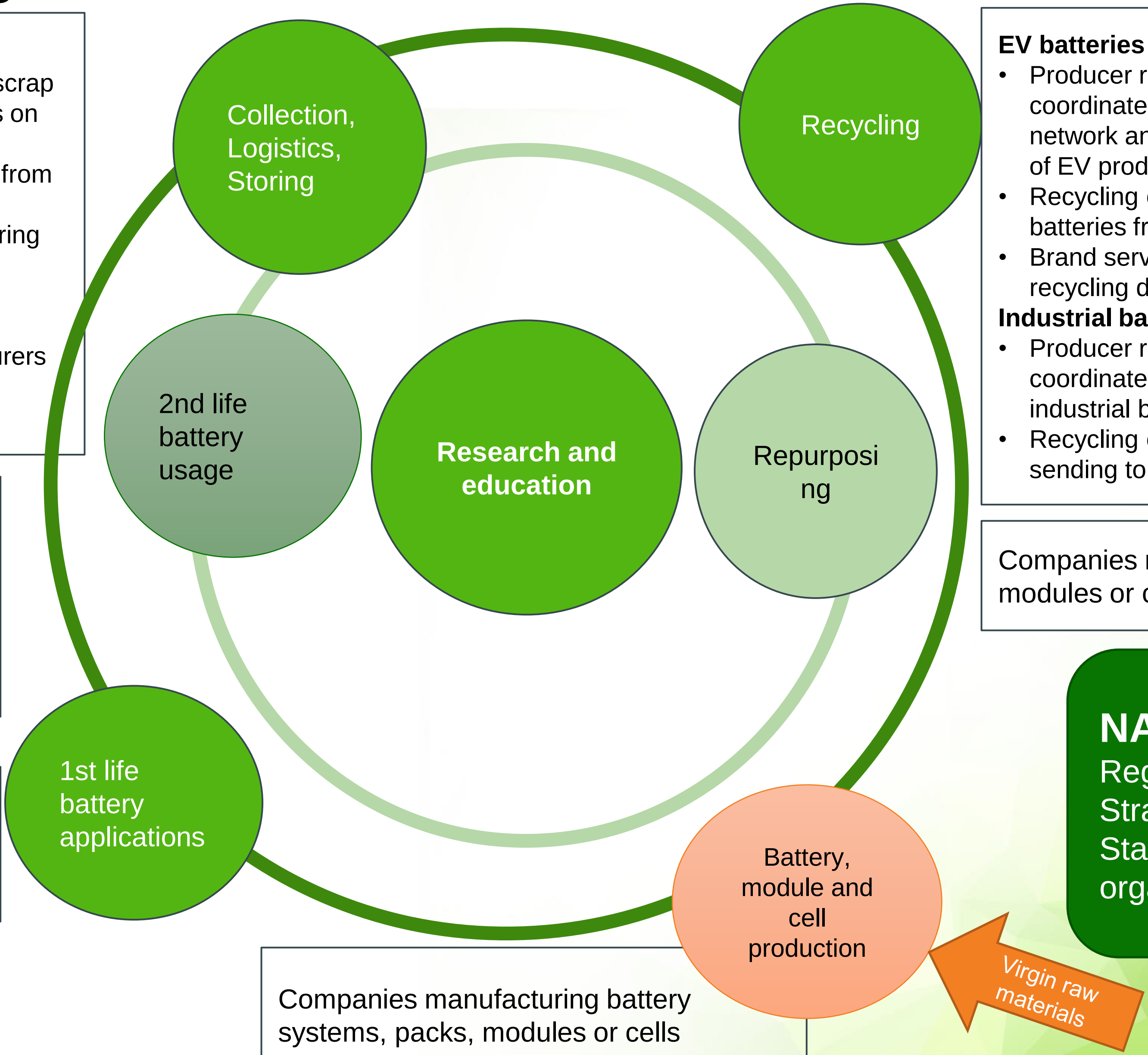
Municipalities, publicly owned buildings, business owning their own facilities, farmers, energy communities, citizens

Grid companies, electricity companies

Applications using 1st life batteries

Electrical vehicle companies, renting and shared car services

Electrified heavy machinery companies



EV batteries

- Producer responsibility organization coordinates scrap vehicle collection network and recycling operators on behalf of EV producers
- Recycling operators receive and handle batteries from end-of-life vehicles
- Brand services taking care of battery recycling during vehicle usage phase

Industrial batteries (1st and 2nd life)

- Producer responsibility organization coordinates recycling on behalf of industrial battery manufacturers
- Recycling operator does sorting and sending to further processing

Companies repurposing battery systems, modules or cells

Companies manufacturing battery systems, packs, modules or cells

NATIONAL LEVEL

Regulations, Legislation, Strategies, Ministries, Standardisation organisations, Guidelines

Funded by the European Union

EV Battery ecosystem - National

TREASoURcE

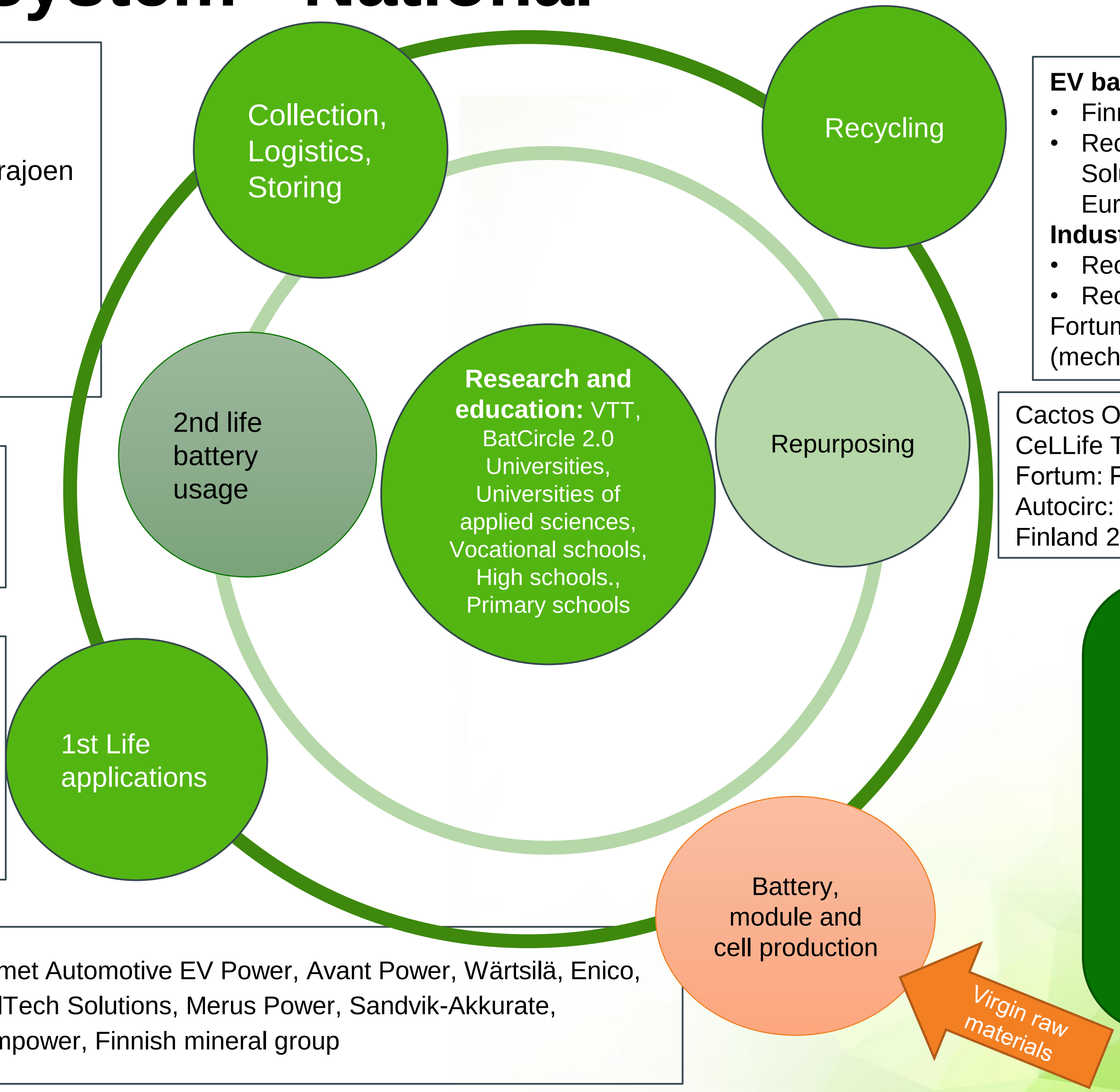
EV batteries
- Finnish Car Recycling Ltd's scrap vehicle collection network and recycling operators
- Collection network: Stena recycling Oy, Eurajoen Romu Oy, Kuusakoski Oy
- Car brand services

Industrial batteries (1st and 2nd life)
- Recser Oy
- Recycling operator (mechanical recycling): Akkuser

2nd life users

EV manufacturers
Valmet Automotive, Linkker, Tampereen ratikka

Heavy machinery manufacturers
Kalmar, Cargotech, Konecranes, Sandvik Mining and Rock Solutions, Avant Techno, Normet



Valmet Automotive EV Power, Avant Power, Wärtsilä, Enico, CellTech Solutions, Merus Power, Sandvik-Akkurate, Kempower, Finnish mineral group

EV batteries
- Finnish Car Recycling Ltd
- Recycling operators: Fortum Waste Solutions Oy, Stena recycling Oy, Eurajoen Romu Oy, Kuusakoski Oy

Industrial batteries (1st and 2nd life)
- Recser Oy
- Recycling operator: Akkuser, Nivala

Fortum Battery Recycling: Ikaalinen (mechanical), Harjavalta (hydrometallurgy)

Cactos Oy: Repurposing EV battery modules
CeLLife Technologies Oy: Reusing cells
Fortum: Piloting 2nd life batteries' applications
Autocirc: Starting second life business in Finland 2024

REGULATION, STANDARDS
- Ministry of of Economic Affairs and Employment
- Ministry of the Environment
- Finnish safety and chemical agency (TUKES)
- Pirkanmaa ELY
- Traficom: Transportation of dangerous goods
- SESKO ry
- Motiva

Funded by the European Union

EV Battery ecosystem – Operations in Pirkanmaa

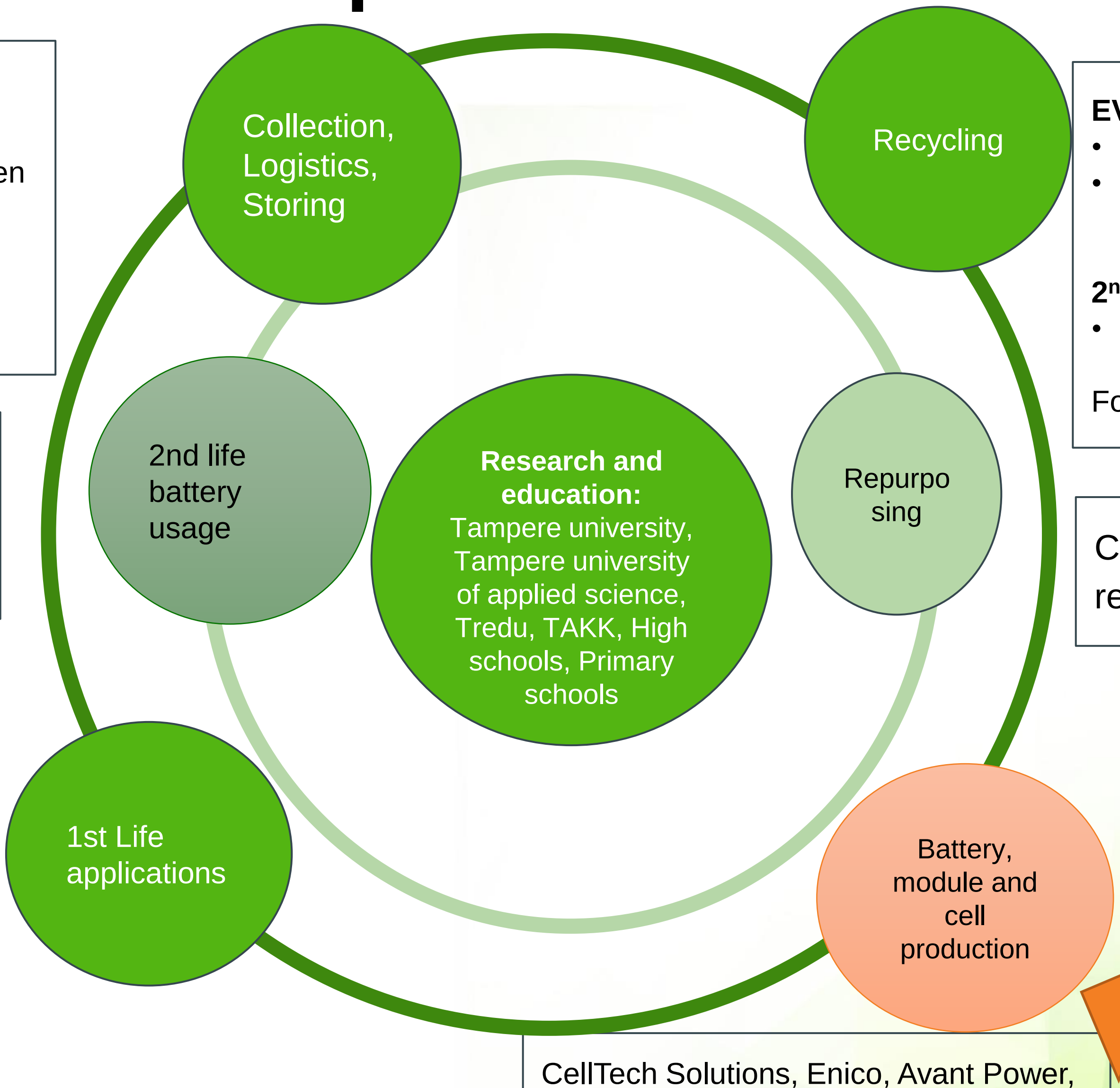
TREASoURcE

EV batteries
- Finnish Car Recycling Ltd (national)
- Collection network: Stena recycling Oy, Eurajoen Romu Oy, Kuusakoski Oy
- Car brand services

2nd life and 1st life industrial batteries
- Recser Oy (national)

2nd life battery users

EV manufacturers
Linkker, Tampereen ratikka
Heavy machinery manufacturers
Sustainable Industry X (SIX) network
Kalmar, Cargotech, Sandvik, Avant Technologies



EV batteries
- Finnish Car Recycling Ltd (national)
- Recycling operators: Fortum Waste Solutions, Stena recycling Oy, Eurajoki Group Oy, Kuusakoski Oy

2nd life and 1st life industrial batteries
- Recser Oy (national)

Fortum: Ikaalinen mechanical recycling

CellLife Technologies Oy: repurposing battery cells

New EU Battery directive will require usage of recycled raw materials (cobalt, lead, lithium, nickel)

CellTech Solutions, Enico, Avant Power, Merus Power

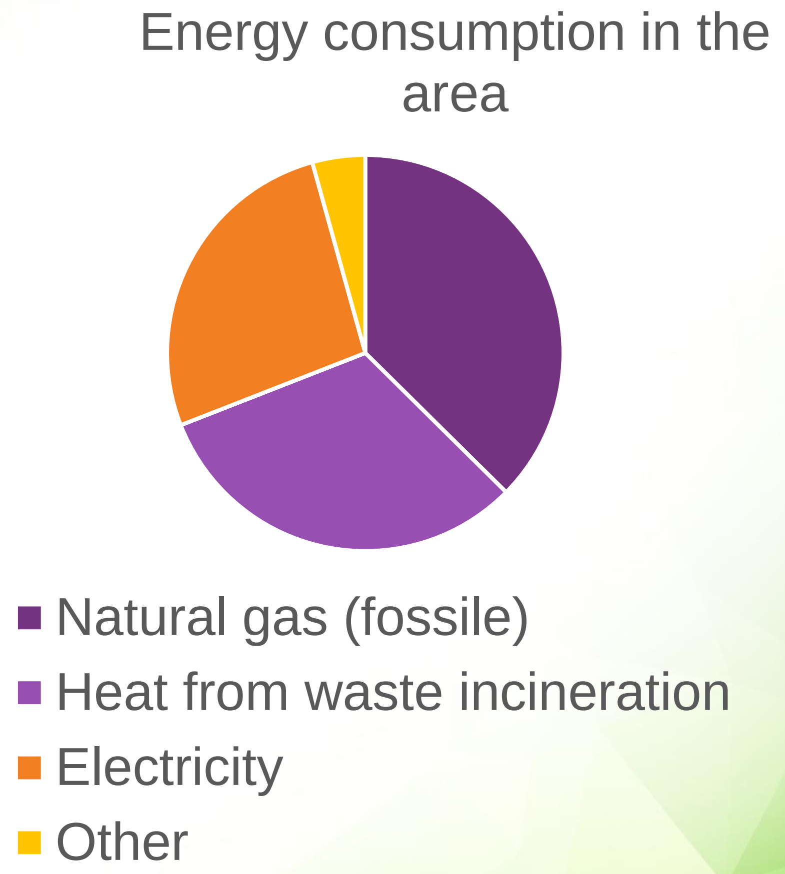
Funded by the European Union

Matchmaking event and industry engagement workshop - Fredrikstad

Funded by
the European Union

Background

- Needs for **more renewable energy capacity** among **industrial companies** in ØRA industrial area
- Limitations of capacity of current electricity grid for local transmission of energy
- Possibilities in exploiting solutions for **energy flexibility**
- Building on existing initiatives for extension of collaboration on the utilization of waste and energy resources



Promoting solar energy solutions and 2nd life batteries for industrial businesses

TREASoURcE

- Co-operation between TREASOURCE, project on innovation through industrial symbiosis & project on emission cuts
- Matchmaking of industrial businesses and solar energy + 2nd life battery energy storage suppliers
- Bring stakeholders together to explore barriers to implement solar energy and 2nd life battery energy storage solutions & steps to overcome them

Bærekraftig innovasjon gjennom industriell symbiose

NORSUS

NCCE

TREASoURcE

Funded by the European Union

SINTEF

FREDRIKSTAD KOMMUNE

ØSTFOLD FYLKESKOMMUNE

med flere

Funded by the European Union

Solutions needed in the area

TREASoURcE

- Functional interplay between different energy solutions
- Increased grid capacity
- **More utilization of other renewable energy sources and surplus energy**
- Energy efficiency
- New production of electricity
- **Exploit flexibility in energy consumption**

Funded by the European Union

Scope of the seminar

- ❖Solar energy-solutions for roof-tops & facades and 2nd life battery energy storage solutions for individual customers
- ❖ Joint concepts for industrial businesses and companies
- ❖ The position of grid operators, role of flexibility solutions like 2nd life battery energy storage systems

Funded by the European Union

Excerpts from seminar

TREASoURcE

- Report on roof-areas & facades suitable for solar energy panels and potential for energy production

Factor	Numbers
Yearly estimated production potential	29,4 Gwh
Estimated life-cycle of panels	30 years
Estimated climate footprint of production	21,9 grams co2 kwh

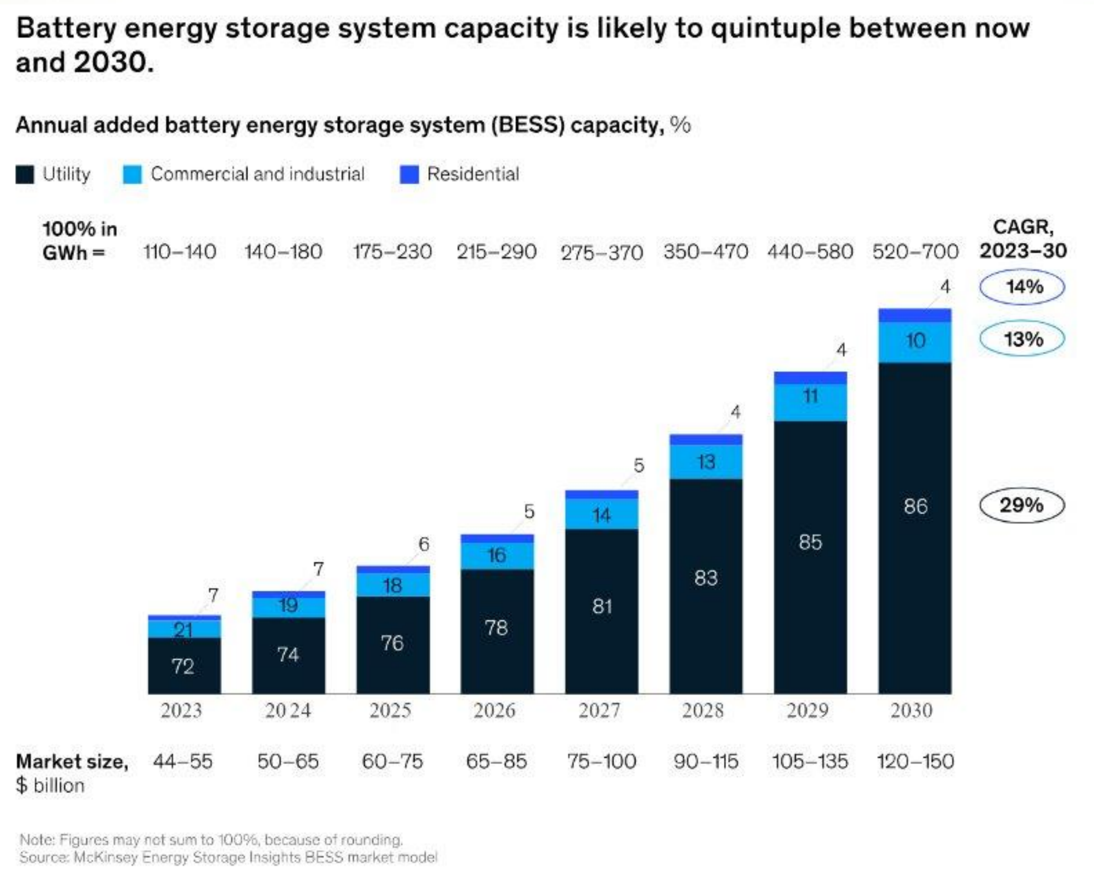
- Flexibility solutions like 2nd life battery energy storage & local sharing of energy can reduce the need for investments in the grid

Funded by the European Union

Highlights

- 15 supplier presentations, including two 2nd life battery energy storage solutions
  - ➢ concept
  - ➢ business model
  - ➢ cost/benefit

Workshops on drivers and barriers for **joint solar energy solutions** and barriers for implementing 2nd life battery energy storage systems



Funded by the European Union

2nd life battery energy storage workshop

- Results of the TREASoURcE project, recommendations put forward from TREASoURcE

➢ Questions engaged with stakeholders:

- ✓ main barriers to implementing major 2nd life battery systems
- ✓ actions necessary to mitigate/lower barriers
- ✓ In which other areas do you see the need for new standards and regulations?
- ✓ Feedback from workshop provide basis for new policy recommendations

Funded by the European Union

Thank you!

Funded by
the European Union

Circular batteries: policy recommendation overview

Tran Ngo, VTT

Funded by
the European Union

WP1

CE framework analysis and actions to enhance CE

Objectives

- Provide an assessment of how the key value chains can be optimized in the territorial clusters, from both national and regional perspectives.
- Identify opportunities & barriers for circular strategies in the Key Value Chains (KVCs).
- Map national & regional material flows & relevant value chains to provide a baseline for the demos & replication in WPs 3-6.

Main activities

- T1.1 Analysis of current CE strategies, roadmaps & action plans.
- T1.2 Material flow mapping & value chain & optimization of the key value chains.
- **T1.3 Mapping of regulatory frameworks to identify potential bottlenecks for CE in the KVCs.**
- T1.4 Review the state-of-the-art of technologies & best practices for circular strategies in the KVCs.

TREASoURcE

Funded by the European Union

T1.3 Mapping of regulatory frameworks

TREASoURcE

Desk research to map EU policies & identify its key drivers and barriers

Workshop & stakeholder engagement for practical validation

Policy recommendation formation

Funded by the European Union

Regulatory context

- The new adopted EU Battery Regulation (2023/1542), replacing Batteries Directive (2006/66/EC), is the primary EU regulation concerning the whole life-cycle of batteries
- Objectives:
  - Strengthen battery sustainability
  - Increase resilience and close material loops
  - Reduce environmental and social impacts
- Actions:
  - Separate battery classification category for EVBs.
  - Requirement for recycled content in new batteries with mandatory minimum levels.
  - Safety requirements for stationary battery energy storage system (BESS).
  - Increased recycling efficiencies, and specific material recovery targets for cobalt, copper, lead, nickel, and lithium.
  - Requirements for repurposing industrial batteries and EVBs for a second life.
  - Requirements for labelling and information.
  - BMS, electronic battery passport and a QR code.

Funded by
the European Union

Topic 1: Legislation drives recycling over higher-level circular strategies like repurposing

No requirements or targets regarding repurposing EVBs for other applications.

Instead, the focus is on recycling by mandating a minimum proportion of materials in new batteries to be sourced from recycled materials.

- Implement quantitative targets for repurposing of end-of-life EV batteries
- Provide incentives or subsidies for manufacturers to invest in repurposing technologies and infrastructure
- Introduce regulations or standards to promote the design of EV batteries with repurposing or higher circularity strategy in mind, such as modular designs that facilitate easy disassembly and component reuse.
- Foster collaboration between industry stakeholders, policymakers, and research institutions to share best practices, knowledge, and resources for optimizing the circularity level of battery systems.

Funded by the European Union

Topic 2: Safety in installation and operation of Battery Energy Storage System (BESS)

No standards or regulations describing:

- How to perform a proper safety assessment for the installed battery system

- How to design the battery room with regards to size, construction materials, ventilation, access regulation, fire extinguishing, placement in the building

- How to handle incidents for building operators, maintenance staff, and fire-fighting crew

- Establish an EU-level research program on knowledge generation of battery room requirements and battery thermal events
- A regulatory framework with a focus on national or international standards regulating the minimum requirements for a battery room should be developed. This should also include standards for risk assessment for the installation of large BESS.
- Minimum requirements for training of building maintenance staff and BESS operators should be implemented.

Funded by the European Union

Topic 3: Eco-design of EV batteries

TREASoURcE

Non-standardization of EVB modules and pack designs

- More standardized solutions for battery systems in electric vehicles should be enforced. This includes both battery cell format and battery module geometry as well as cooling systems, sensors, and electronic components.
- The use of glues, epoxies, or welding which makes the battery difficult to remove or disassemble, should be limited.
- A temporary solution should be implemented, enabling access to historical user data and battery state of health for 2nd life battery stakeholders. When the Battery Passport becomes effective, this will ensure future access to required information.

Funded by the European Union

Topic 4: Incentives for installing 2nd life BESS

TREASoURcE

Disassembly process is done manually, which makes it time-consuming and costly

- Incentives from EU or national governments for buying and installing 2nd life BESS
- Incentives could be implemented in different ways. One example is to cover a specific percentage of the cost related to the purchase and installation of a 2nd life BESS.

Funded by the European Union

Topic 5: Laws and regulations regarding trading used batteries

TREASoURcE

Lack of laws regulating the trading of new and used batteries is a huge safety concern and can lead to severe incidents that can cause economic losses and loss of life.

- There is a need for laws that can regulate sales of batteries, at both cell, module and system level.
- Certification should be required to handle battery systems and their installation.
- Private persons and non-certified companies should be prohibited from manipulating, building and re-building batteries for either private or commercial use.

Funded by
the European Union

Next steps

- Project deliverable D1.3 will be submitted on 31.5.2024, published in June
- Policy brief/White paper coming up from D1.3

Funded by
the European Union

TREASoURcE

Thank you!

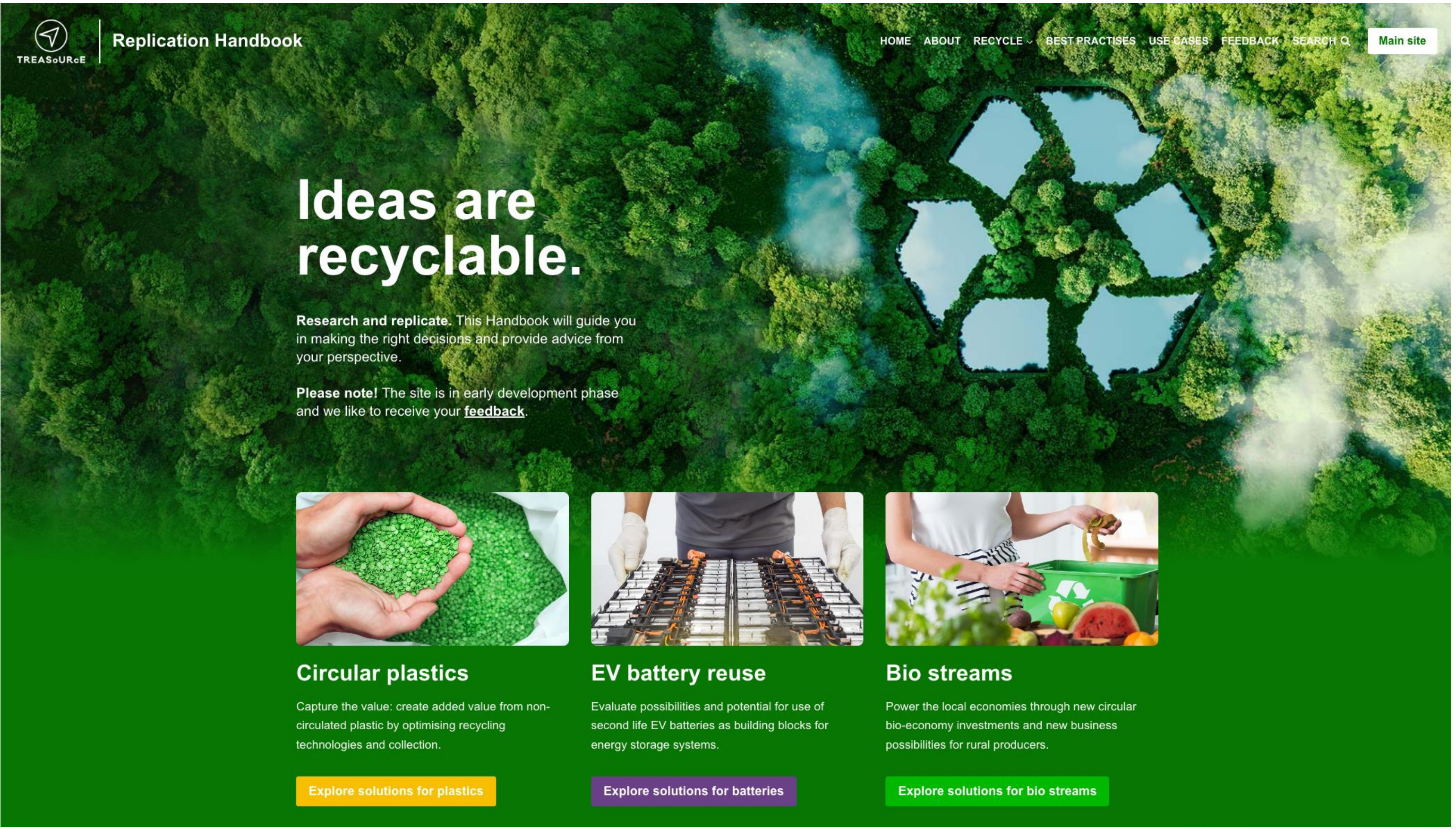
Funded by
the European Union

Supporting the replication of the systemic CE solutions for batteries: TREASoURcE Replication Handbook

Kaisa Sibelius, Forum Virium Helsinki

Funded by
the European Union

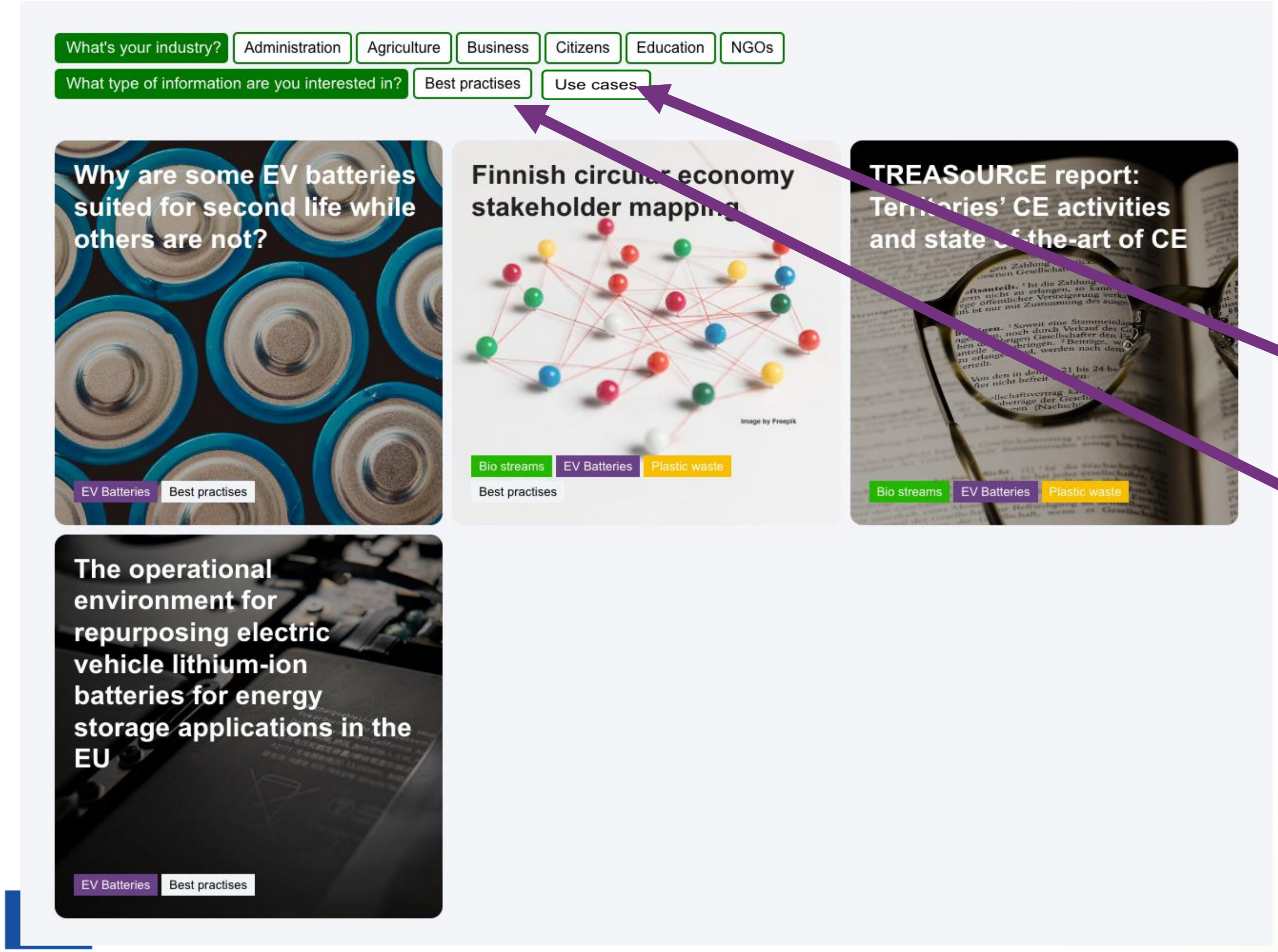
The Replication Handbook



- A goal of the project is to create and share replicable practices and relevant learnings based on the activities and findings of the project.
- The Handbook will be a comprehensive guide that ties in TREASoURcE's key results.
- The content is devided in the three key value chains: Plastic, Batteries, and Bio

Funded by the European Union

EV battery reuse



- The Handbook is a living document and will be developed until the end of the project.
- Use cases
  -> "How we did it"
- Best parctises
  -> "How to do it"

Structure

- The content is devided into the three key value chains:

- Into the different viewpoints:

Solutions for…

Administration
If you represent city, municipality, public procurer or other public entity.
Explore solutions for administration

Business
Here you can find info how to improve the sustainability of your company or businesses.
Explore solutions for business

Agriculture
Check this section if you are a farmer, primary or other rural producer.
Explore solutions for agriculture

Citizens
Read more about solutions for consumers and households.
Explore solutions for citizens

NGOs
This part is dedicated for associations and other non-governmental organisation.
Explore solutions for NGOs

Education
Here is collected materials for educational purposes for different levels.
Explore solutions for education

Funded by the European Union

TREASoURcE

Please visit the site and provide your feedback

handbook.treasource.eu

Funded by
the European Union

Thank you!

TREASoURcE

Funded by
the European Union

Q&A

Please use the chat or
raise your hand virtually to ask questions

TREASoURcE

Funded by
the European Union

TREASoURcE

Thank you

Materials available soon on our website treasource.eu

Coffee break

The webinar will resume at 14:00 CEST with the Biobased side streams session

For more updates

Follow us on social media

Twitter | TREASoURcE_eu
LinkedIn | TREASoURcE
Facebook | Treasource Project

Subscribe to newsletter

Funded by the European Union