Fortum Battery Recycling

Overview for sustainability & safety of battery recycling

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Who I am

Kimmo Lehtonen
Safety professional with 35 years experience of safety throughout the lifecycle of electrical products

Who we are

Fortum Battery Recycling Oy
One of the most experienced and advanced recycling companies to offer services for whole battery recycling chain

What we do

We recycle lithium batteries to reusable chemicals and raw materials to be further offered for new battery manufacturing.

Where we operate

We have operations in EU territory, mainly in Finland and in Germany.
Co- operation and customers throughout the Europe.

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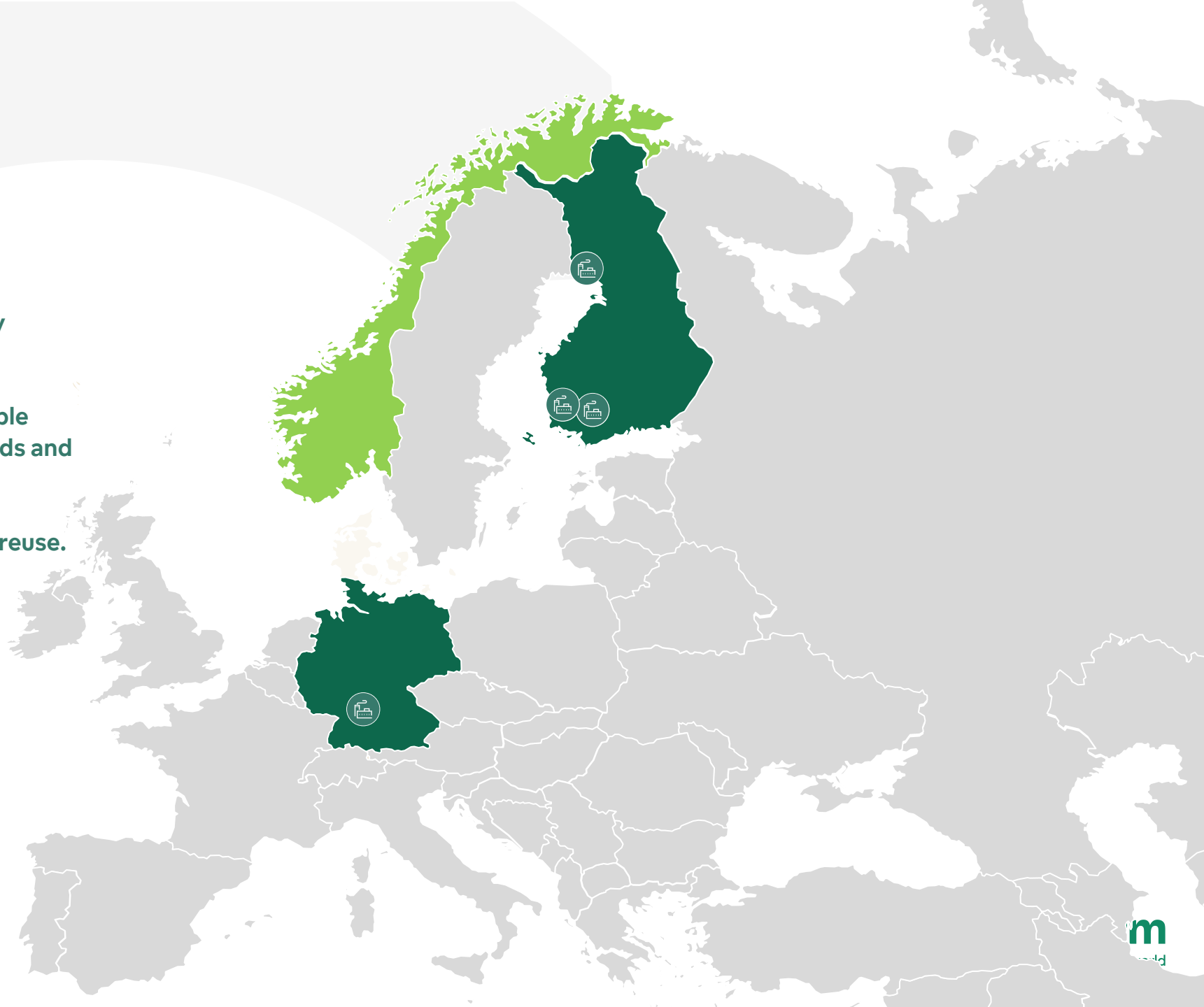
Battery Recycling

We are part of Fortum Group

Main operations in Finland and in Germany
(co-operation in several countries)

Business to provide cutting edge sustainable battery recycling services for vehicle brands and battery manufacturers

Providing recycled valuable chemicals for reuse.



UN sustainability goals – basis for today´s topic

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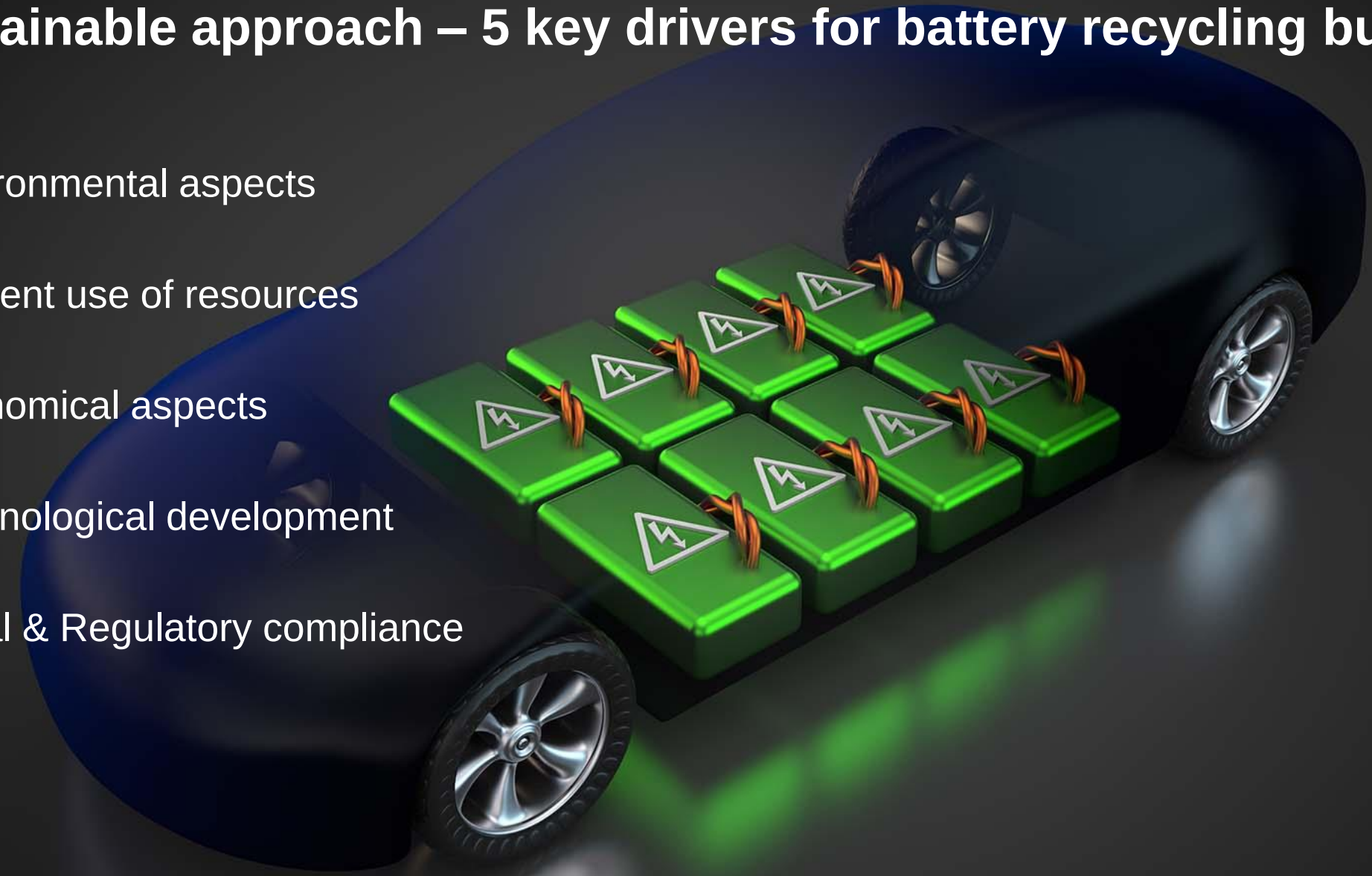
A sustainable approach – 5 key drivers for battery recycling business

1. Environmental aspects
2. Efficient use of resources
3. Economical aspects
4. Technological development
5. Legal & Regulatory compliance



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Environmental aspects

Recycling the batteries reduces the need for
new raw materials and prevents the release of harmful substances into the environment.

The materials contained in batteries, such as
magnesium, nickel, cobalt and lithium,
would be harmful if released into the environment,
but recycling allows them to be reused
without the need for new extraction processes.

The recycling rate can & is expected to rise over 95%

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Resource efficiency

- Understanding of sustainability fundamentals and implementation of them in product lifecycle is crucial.

- That requires more emphasis on design, material selection and production technologies
  → improved recyclability and safety
  → less hazardous waste to environment
  → lower carbon footprint to release
  → more local ownership thru the life cycle
  → more competitiveness
  → higher national / regional social responsibility

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Economical aspects

Battery recycling offers business opportunities as the materials generated in the recycling process are valuable. For example, manganese, lithium, cobalt and other metals are raw materials in high demand and their reuse can be economically viable.

Circular economy is rising to more important role as its own area of industry.
It is supported strongly by high education, research & development and understanding of sustainability.

Recycling and reuse of critical materials also calms down the reaction of the markets in turbulent economical and political world we are living.

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Technological development

Technological innovations are making battery recycling more efficient and cost-effective.
For example, advanced separation and purification techniques allow a greater proportion of battery materials to be recovered and reused.

The composition and quantity of chemicals vary between models and technologies – finding the right “recipe” requires both deep knowledge of chemistry but also sophisticated process able to vary based on the needs.

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Legal & Regulatory requirements in EU & implementation in Finland

EU has implemented directive and related national regulations that oblige battery manufacturers and importers to recycle batteries and reuse certain amount of raw materials recycled in EU territory.
This drives the material flows to circulate more in EU but also gives direct market protection against too un-sustainable raw materials deliveries and unprotected labor used.

In Finland, the government has created national battery strategy (Kansallinen akkustrategia) to implement these regulations and targets in practice.
This is implemented by focusing on 7 development areas:

1. Battery cluster growth and continuous renewal
2. Increasing of investments
3. Increasing of competitiveness
4. Raising the profile of battery expertise globally
5. Sustainability and its profitable implementations
6. Key roles in value chains
7. Development of digital solutions

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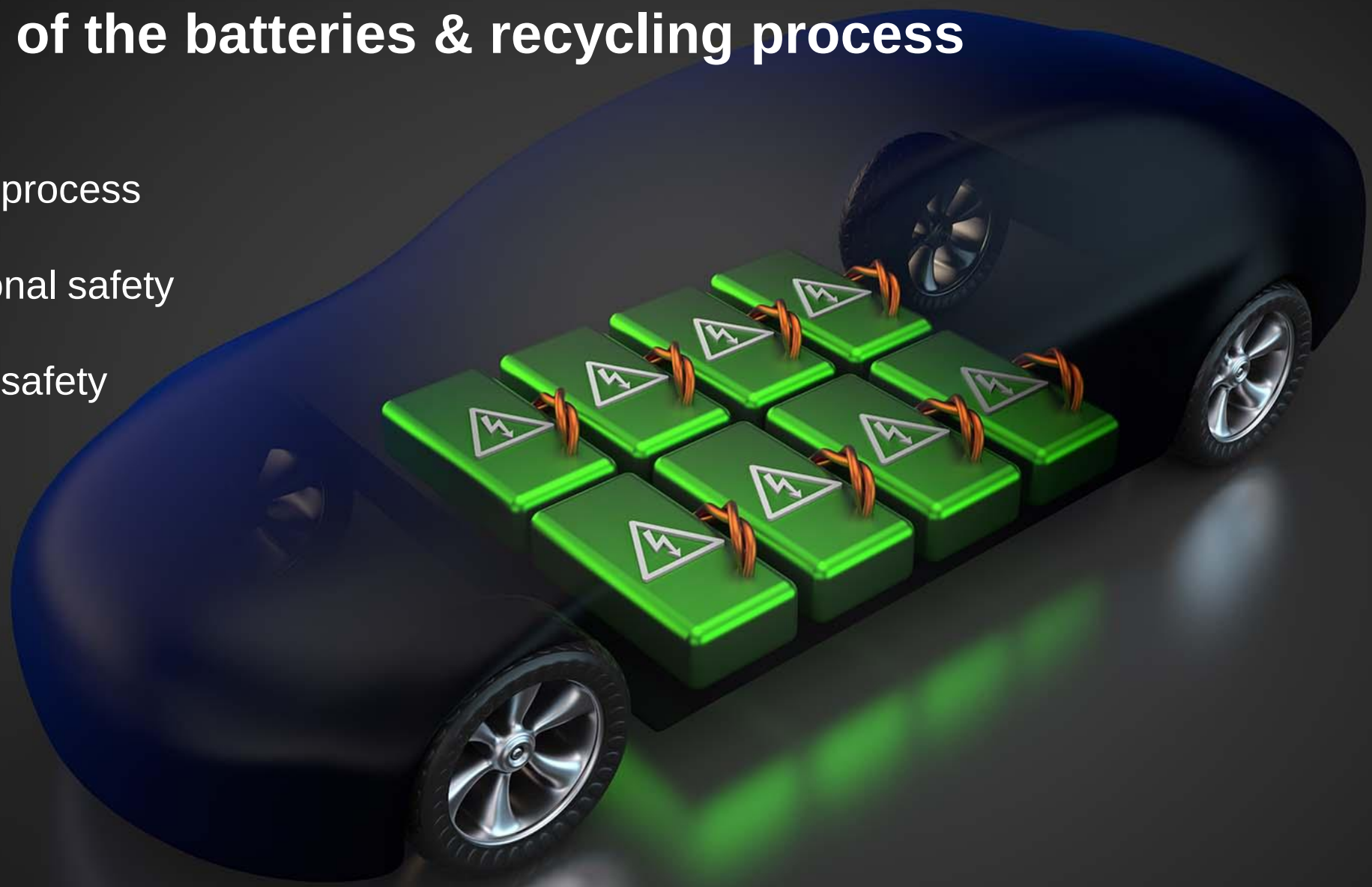
Safety of the batteries & recycling process

recycling process

occupational safety

technical safety



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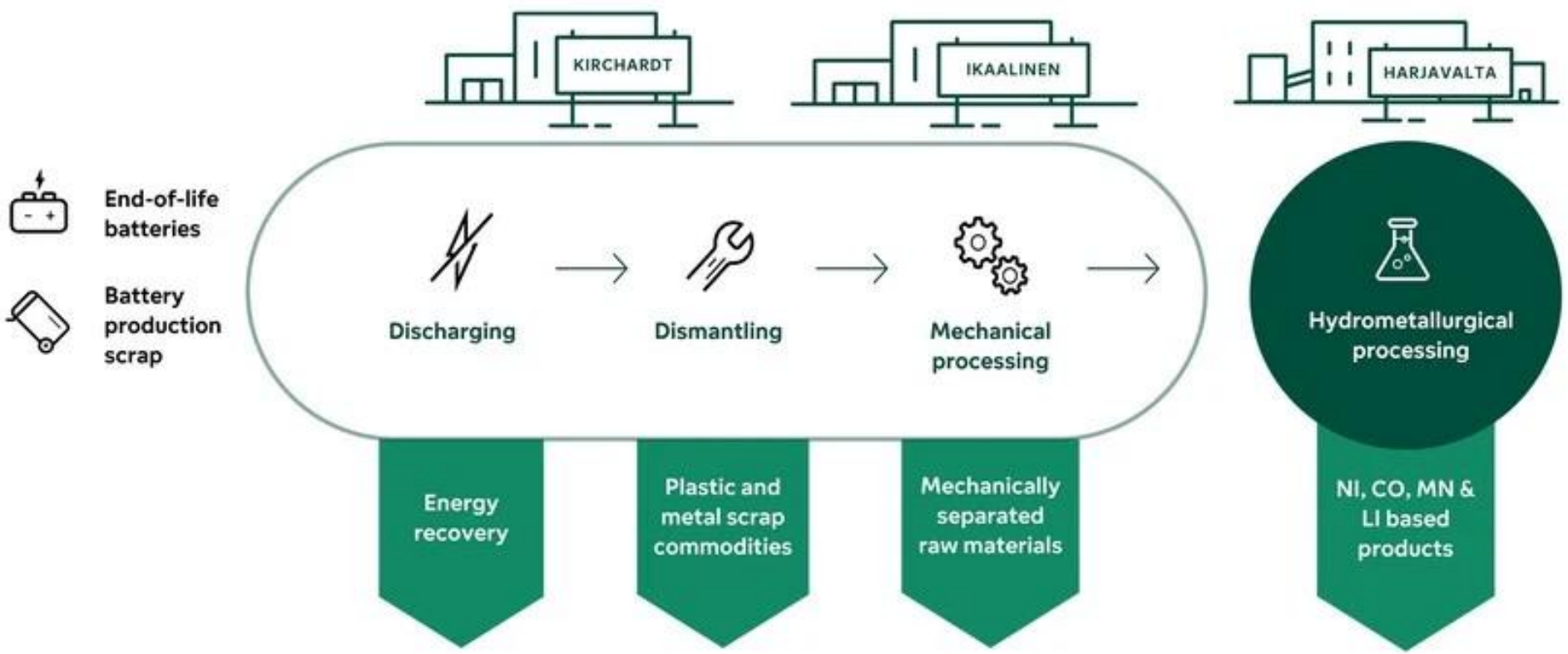
Safety challenges in battery recycling – the process in brief



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Battery recycling process – the human factor & exposures

Batteries are unlimited power sources without protective fuses
→ the dismantling work is often rated as voltage work (120VDC +)

The current batteries are seldomly designed from recycling perspective
→ variable, manual work where the battery is still energized

Batteries are heavy
→ need special attention in strafing and in processing

In the case of battery reaction, certain precautions are needed to implement immediately
→ investing in safety and continuous trainings and thrills

Battery recycling process – the technical & process safety

Dismantling is very much model based work – no mechanical standards yet implemented
→ various, battery model specific tooling need to be created

Discharging has variables. Some batteries may start reacting while discharged
→ reaction process is very difficult to interrupt

Automation and automated precautions are crucial
→ sensors and detectors are way much faster to react than human

Crushing process and related chemicals require stabile and closed machinery due to small particle size
→ ATEX & ventilation & residue control

Transportation and handling of the chemicals require several licenses and qualifications
→ VAK & handling precautions

As a summary of this presentation….
… e-mobility is here to stay, grow and develop.

We – Finns and Finnish companies – are at the forefront of sustainable development.
Let’s catch this momentum and convert it to our national success.

Thank you for your attention