betteries

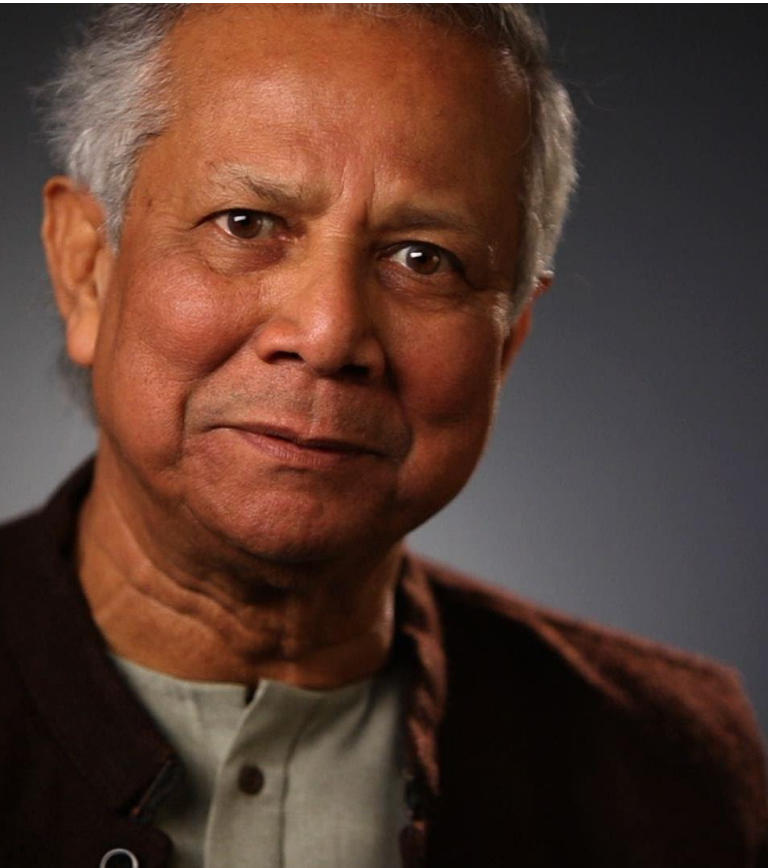
Upcycle batteries.

Avert climate change.

BATTERY TRAINING – SOLUTIONS PLUS
BERLIN | 16.05.2022

Multi-purpose batteries…

… will unlock the opportunities linked to e-mobility and maximize its impact



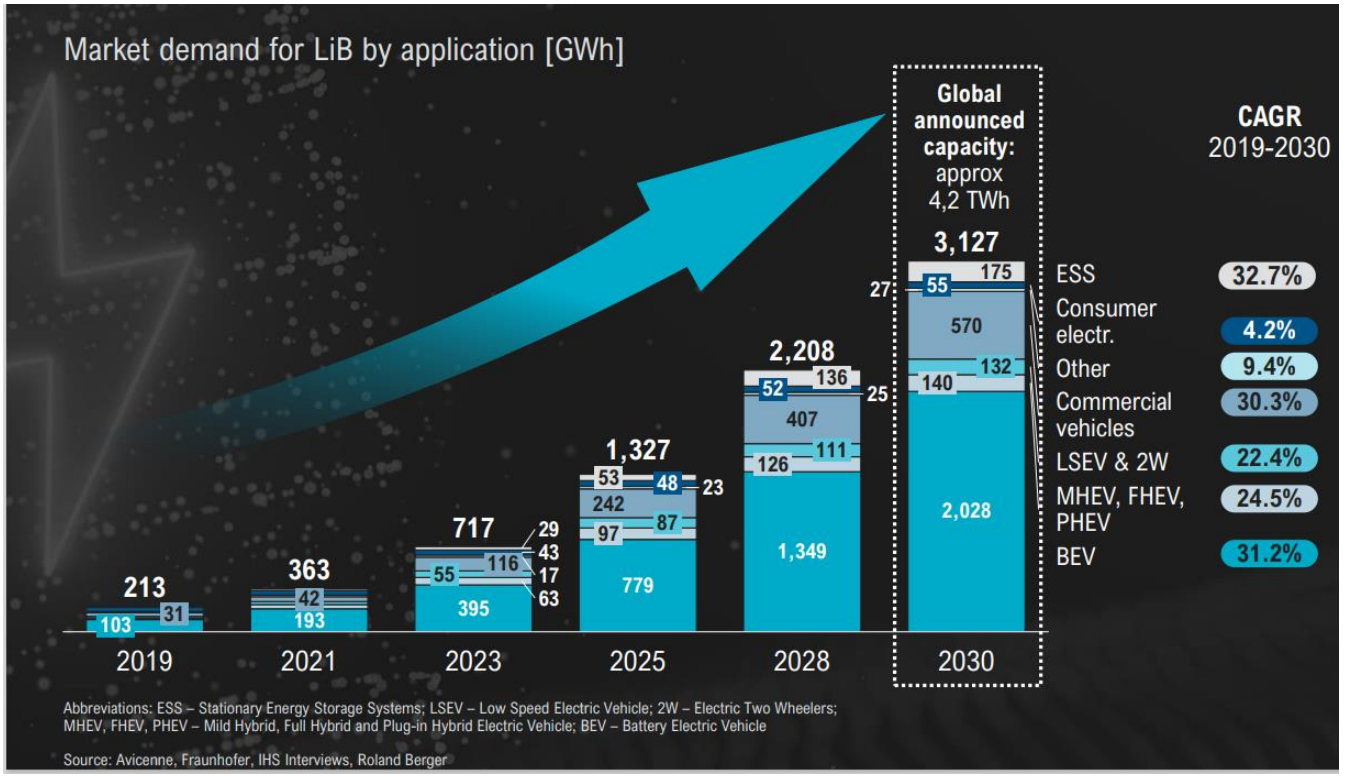
It all started with a question …

"Rainer, why is there no small electric vehicle I can plug into the house in the evening to give the people power?"

Prof. Muhammad Yunus, November 2010

The Li-Ion battery storage demand is skyrocketing

By 2030, 307GWh is needed for LSEV, 2-wheeler, and ESS*

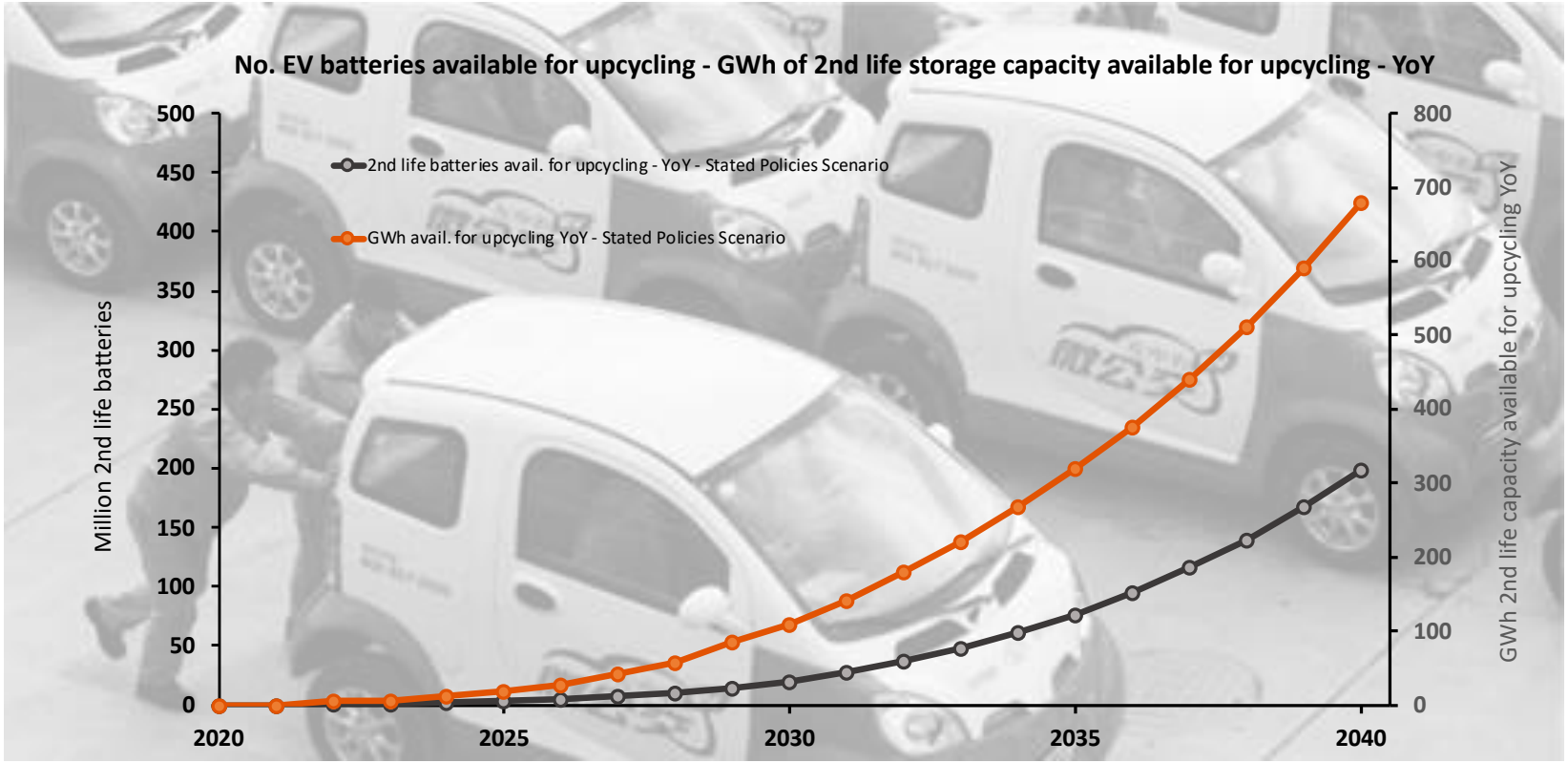


Passengers and commercial EVs will retain more than 85% of the battery market

The Lithium-Ion (EV) battery market and supply chain, Roland Berger Gmbh, April 2022

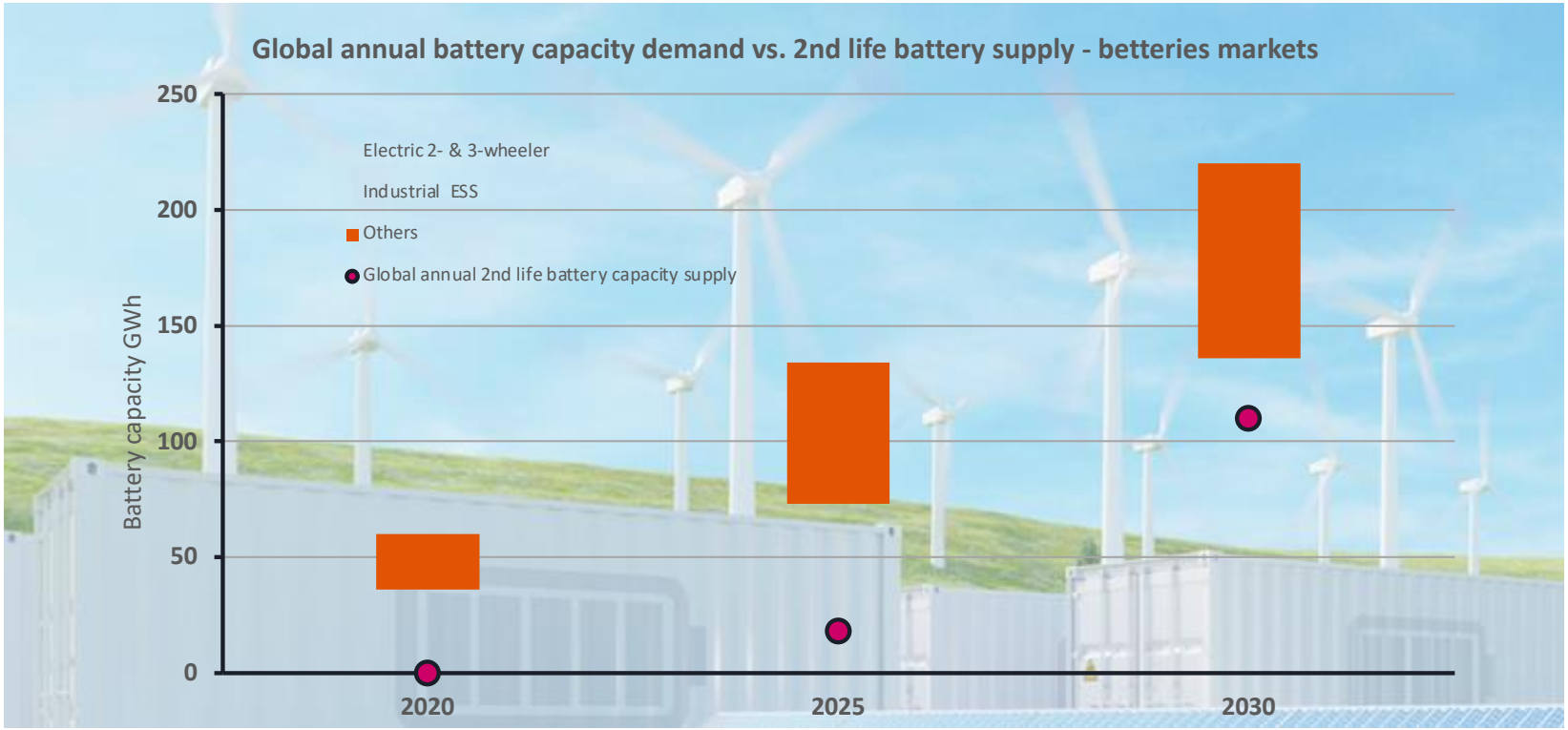
A tsunami of used EV batteries is coming

In 2030 more than 20 million used battery packs will be released from the automotive industry



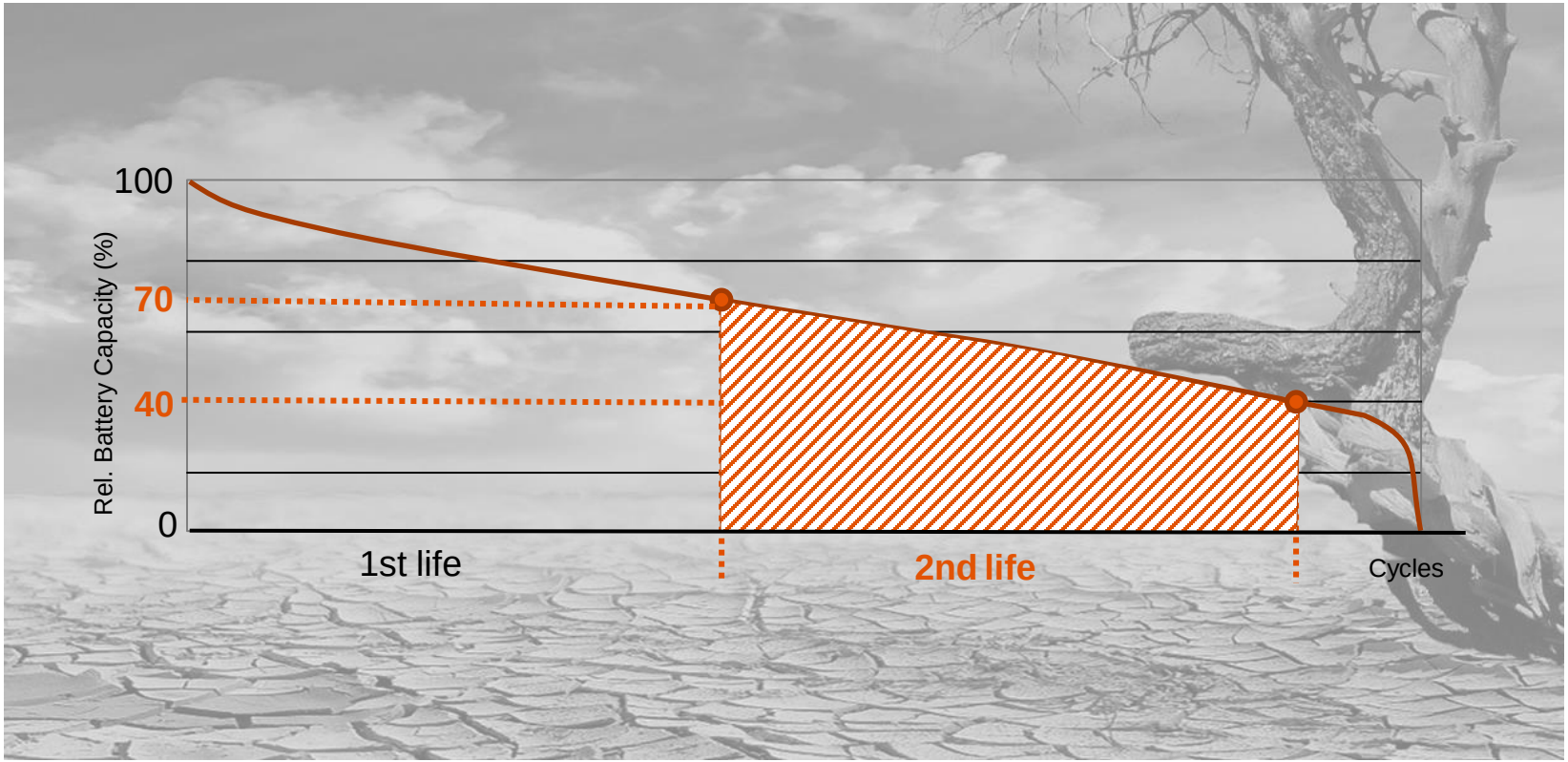
Re-using discarded EV batteries …

… can cover the demand from smaller market sectors



Why waste all this productive battery capacity…

…when they still contain at least 70% of their initial capacity?



Closing the loop in e-mobility

What if we could link the sustainability in the EV sector with boosting e-mobility?

…innovate towards a circular economy in the automotive sector?

…provide affordable access to e-mobility to millions of people?

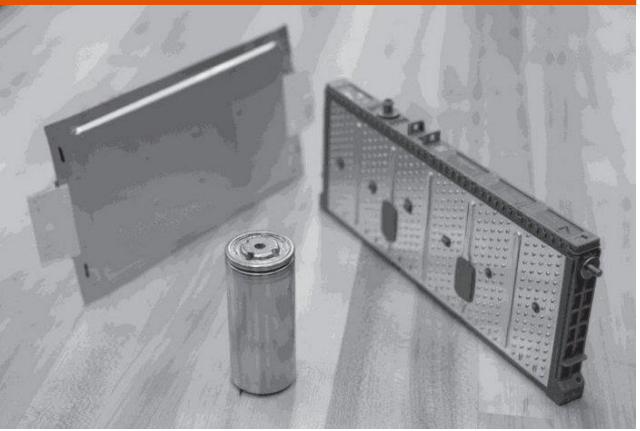
…reduce the C-footprint of an EV battery by 22%?

…avert megatons of CO_2 by replacing combustion engines by electric ones?

Challenges in repurposing EV batteries

Economy of scale principles are crucial to deliver affordable second-life batteries

Lack of standard battery technology



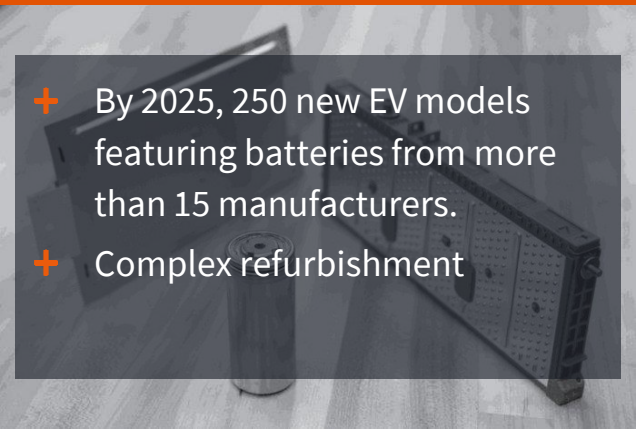
Value gap with new batteries

Regulation

Challenges in repurposing EV batteries

Economy of scale principles are crucial to deliver affordable second-life batteries

Lack of standard battery technology

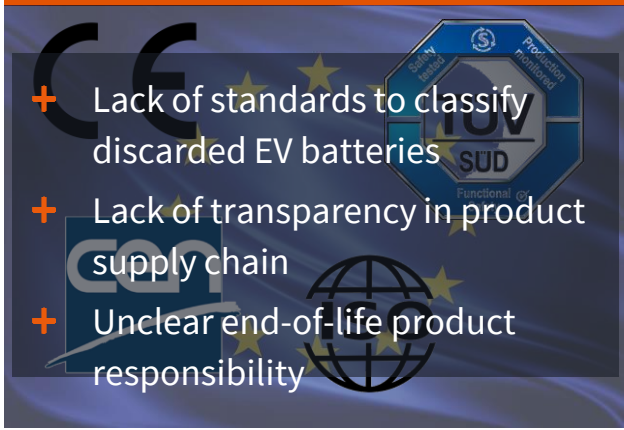


- By 2025, 250 new EV models featuring batteries from more than 15 manufacturers.
- Complex refurbishment

Value gap with new batteries

- Cost gap with new batteries must remain sufficiently large
- Economy of scale benefits
- Industrialization & up-scaling require standardization

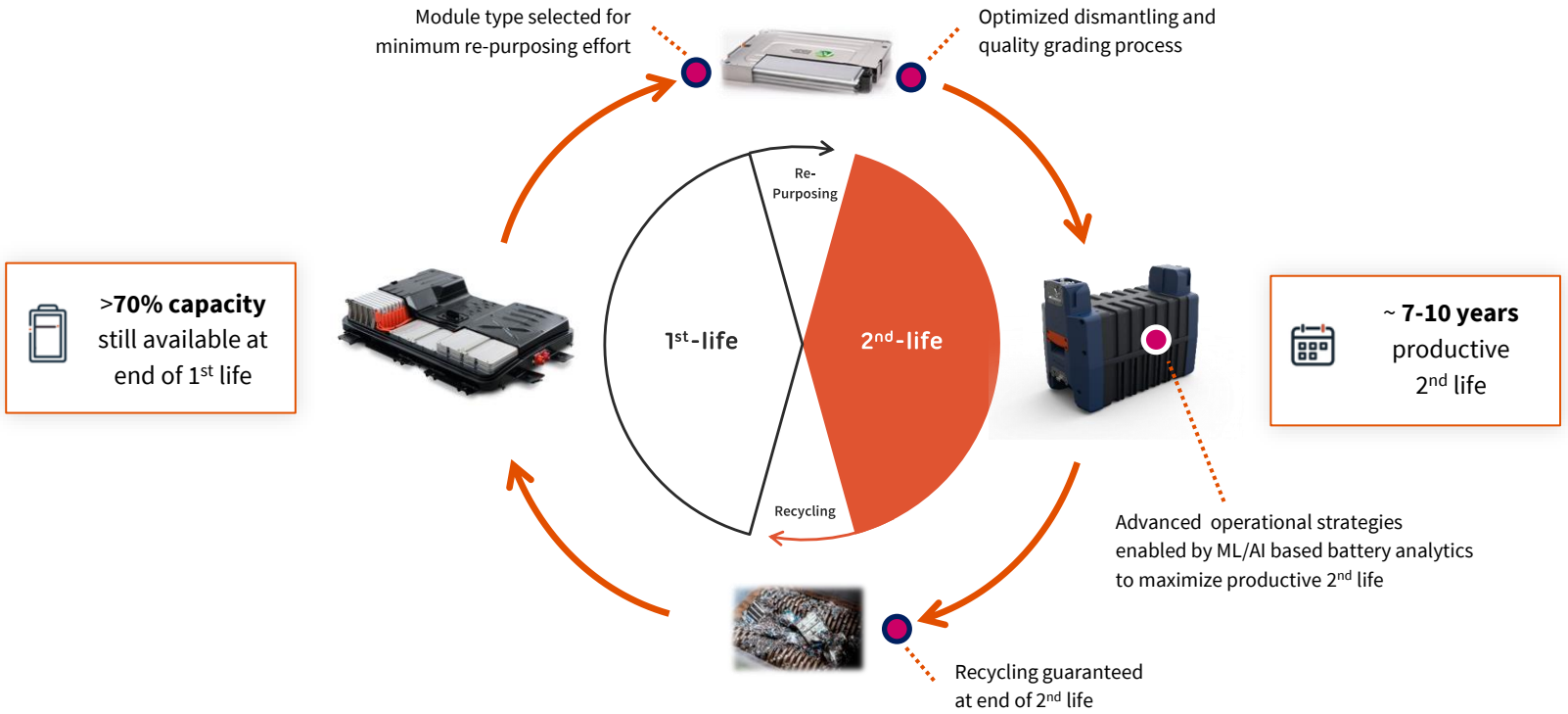
Regulation



- Lack of standards to classify discarded EV batteries
- Lack of transparency in product supply chain
- Unclear end-of-life product responsibility

Upcycling EV battery modules

betteries has optimized each upcycling step to maximize battery productive life and close the material cycle.

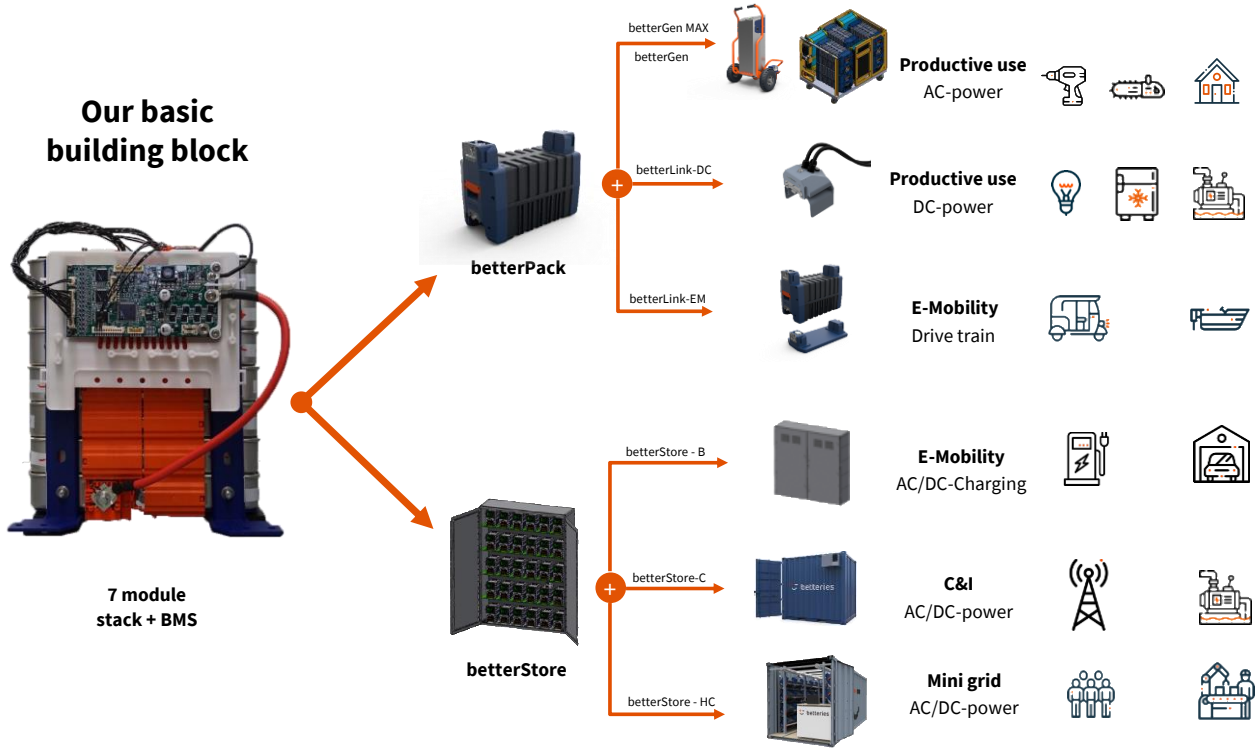


betterPack & betterStore

Providing modular, highly flexible power system solutions to replace carbon intensive technologies

+ Delivering mobile and modular energy storage from **2.3 - 240kWh**

+ Enabling highly flexible **AC & DC** power solutions for on-grid back up, off-grid productive use and e-mobility applications.



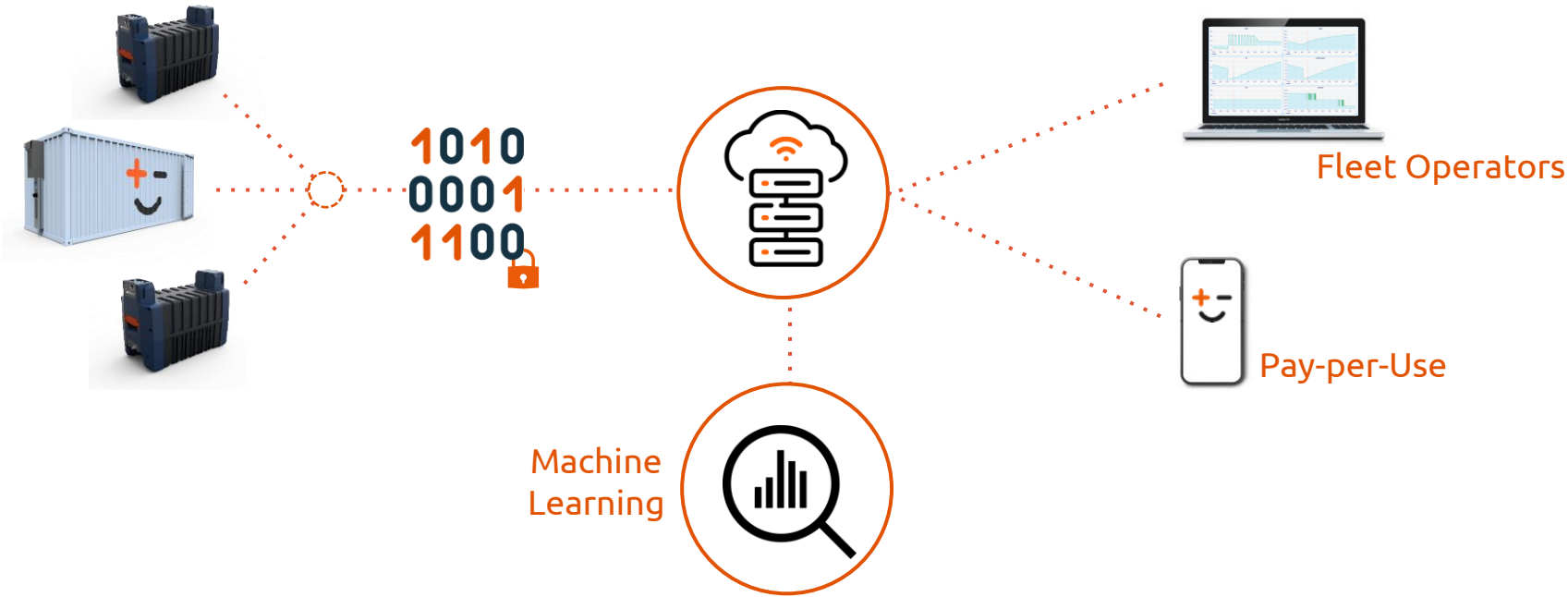
Our IOT backbone & business platform

Enabling optimum asset management and innovative business models

Monitoring and management of IoT devices

Asset tracking

Digital business platform



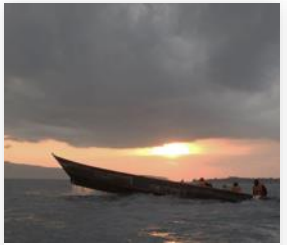
Designed for demanding markets

Swappable and multi-purpose batteries to enable the access to clean and affordable energy

- The right sweet spot-on battery capacity & power for productive use
- Enables distributed energy storage
- Rugged, waterproof, mobile
- Infrastructure lite and flexible on demand
- Remote monitoring and control
- System integration support

Back-up Power

Productive Use



Electric Propulsion

Off-Grid Distribution

Humanitarian Aid

E-Transport

Intentions & Outcomes

Replace combustion engines and fossil fuel generators with 2nd life batteries

8,8 tons

CO_2 savings over system life per generator

22%

Reduction C-footprint of EV

14,3 tons

CO_2 savings over system life per rickshaw

betteries proprietary, strictly confidential

Current Stage – May 2022

- Prototypes successfully tested by customers for multiple applications
- 6+ million operational data points for Battery Analytics
- Development of larger energy storage solutions started
- Pilot projects for industrial applications planned for 2022

Construction Industry

Film sets

Solar farms

Solar container

Electric propulsion

E-mobility

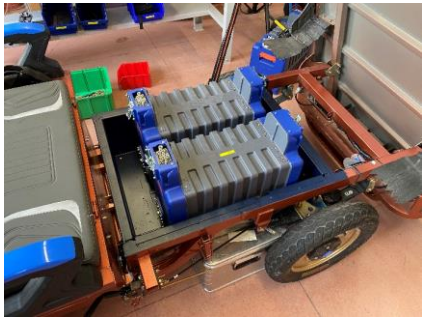
Certification, serial production and sales are imminent

Integrated Solutions for e-mobility

Electric 3-wheeler for emerging markets

- Electric 3-wheeler for a project Zambia in cooperation with *SOS - Kinderdörfer*
- Full adaptation and integration incl. driven train of an electric 3-wheelers

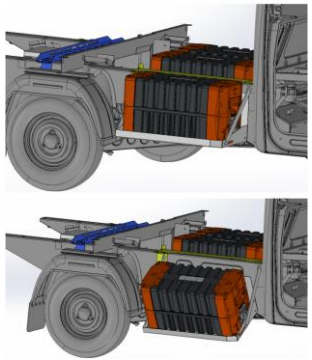
SOS KINDERDÖRFER WELTWEIT

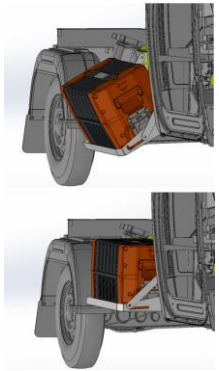


Integrated Solutions for e-mobility

Retrofitting a 3-wheeler (APE) for EU markets

- Piaggio APE in continuous production since 1948
- Mostly used as van for load carrying and as a promotional tool
- 4 betterPacks to power the engine and provide power on-board





Value proposition

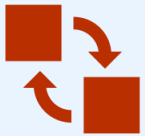
Most economic and green solution for smaller e-vehicles

MULTI-PURPOSE

- PUEs – 1 product multiple uses
- **Maximized asset utilization**
- New anchor loads in mini-grids

MODULAR

- Adapted to individual needs
- **2.3 kWh to 14kWh**
- Reduced production costs



SWAPPABLE

- Small & light weight batteries
- **No range anxiety**
- **No waiting times for charging**

CONNECTED

- Digital payment
- Pay-per-use (adapted tariffs)
- **AI-driven operations**

CO_2 AVOIDED

- **14 tons CO_2 avoided per vehicle**
- 32% emission reduction EV
- Preserving valuable materials

MAX. IMPACTS

- Access to clean transport
- **Reduce air pollution**
- New business & jobs creation

Value proposition

Swappable and multi-purpose batteries are key to reduce and maximize investment

Contact

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