

NExT-e Solutions Inc.

~for Battery Circular Economy~



Advanced Battery Control Technology for Everyone

【2050 EV disposal】

60 million units/year



How to react ?

100
million units

It is predicted that the number of EVs produced and sold worldwide in a year will exceed 100 million units!

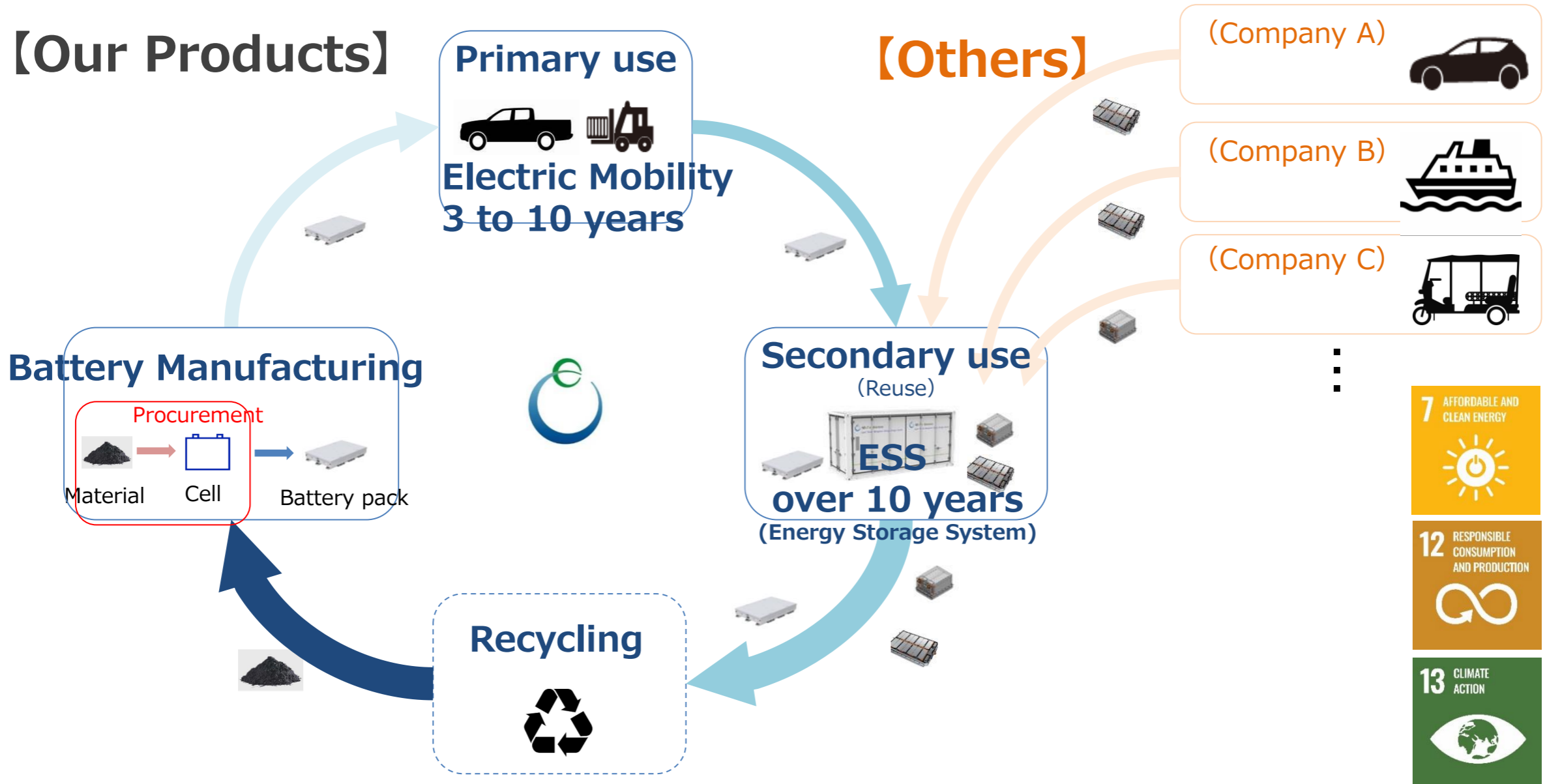
86%

Predictions are that 86% of new cars will be BEVs for carbon neutrality!

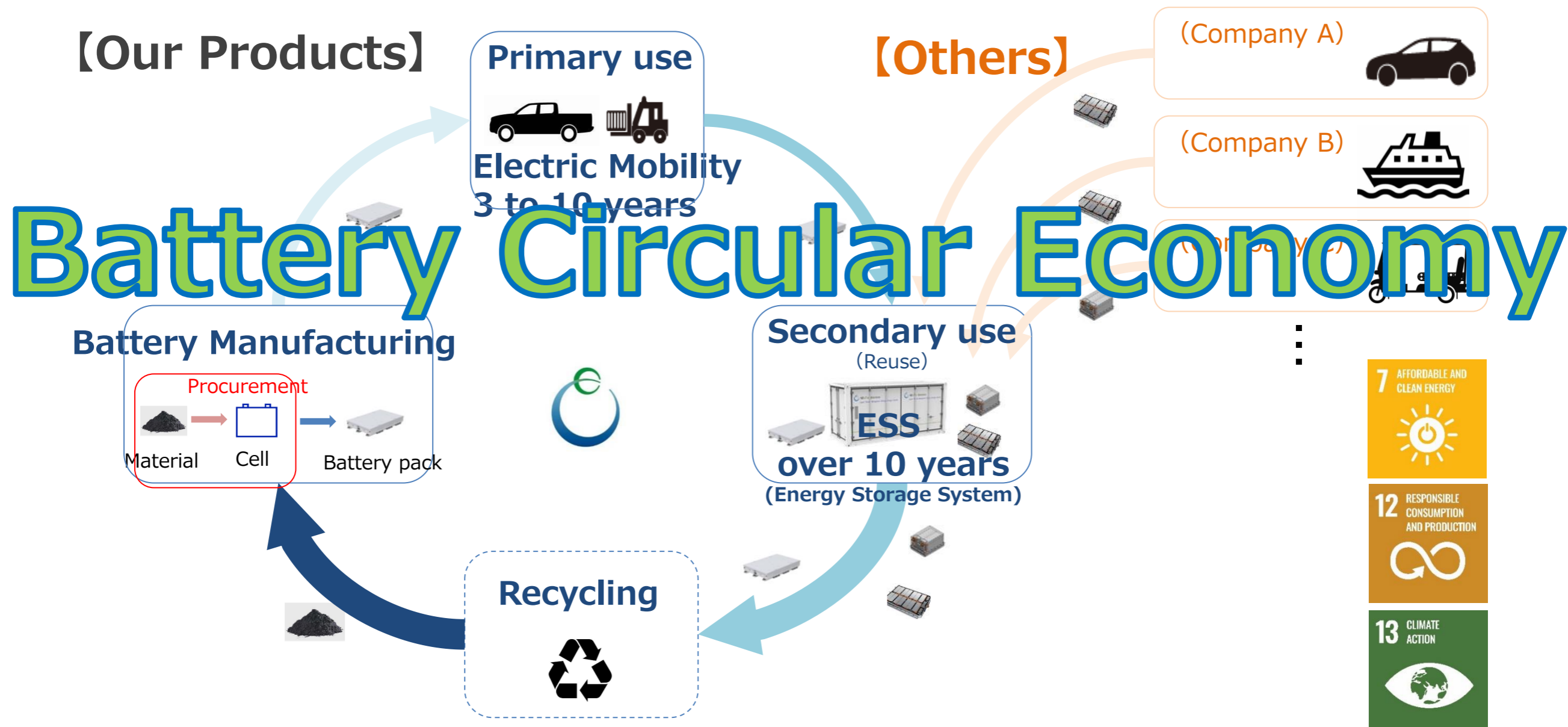
20x

There are projections that the lithium resources needed to meet battery demand will be about 20 times greater than today's

- We will create battery circular economy for the spread of renewable energy



- We will create battery circular economy for the spread of renewable energy



Reuse EV battery for ESS is useful solution
However it's still in the development stage
due to following problems

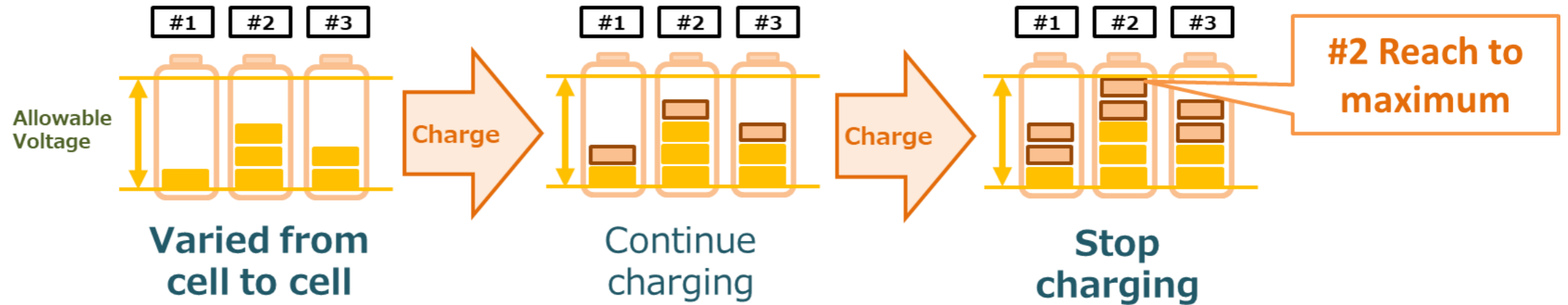
✓ 1. Technology

✓ 2. Cost

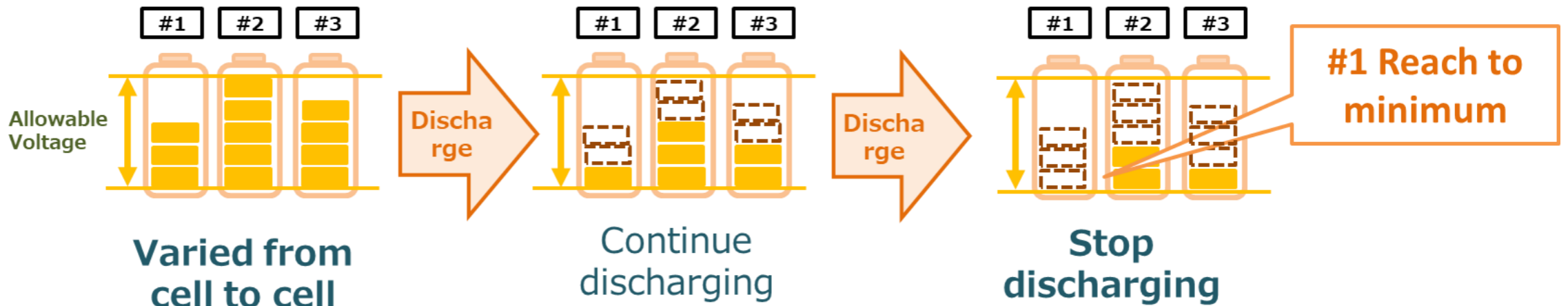
1-① Problem on Technology

- Since the charge/discharge performance of batteries is constrained by most degraded (the weakest) battery, they cannot be fully recharged or used up to the end of their useful life.
- Not only is battery performance not maximized, but the life of the battery is also shortened
- Balancing between batteries and group control technology is necessary to use up battery performance.

Charge

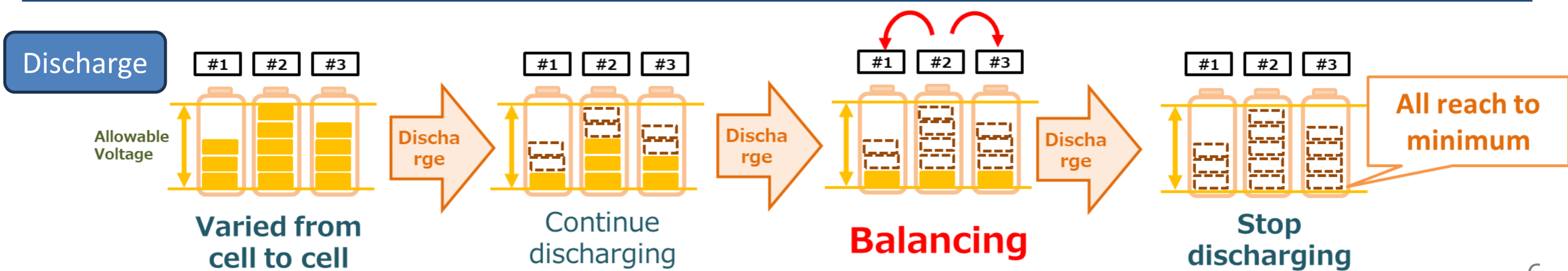
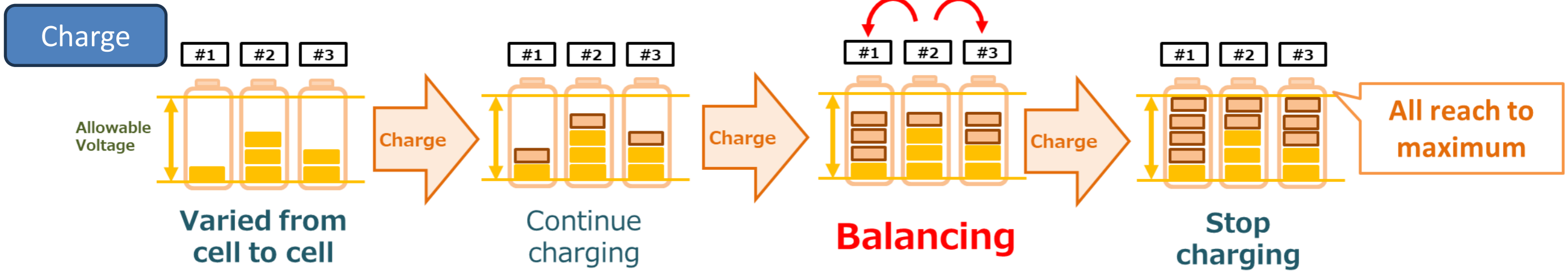


Discharge




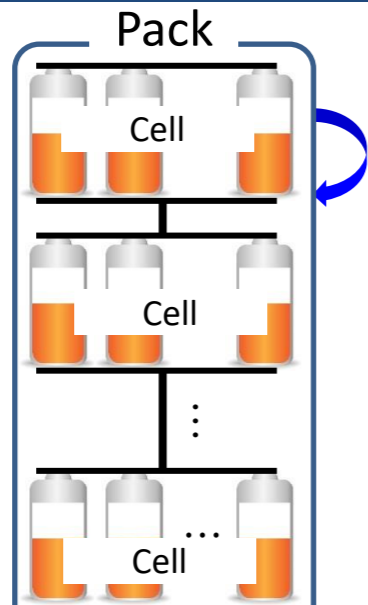
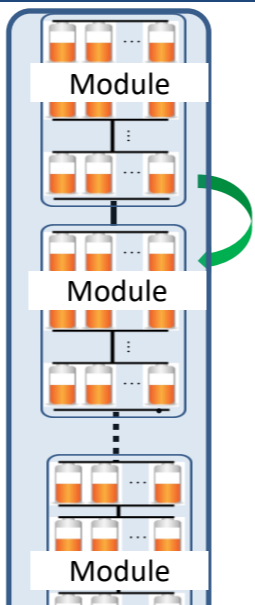
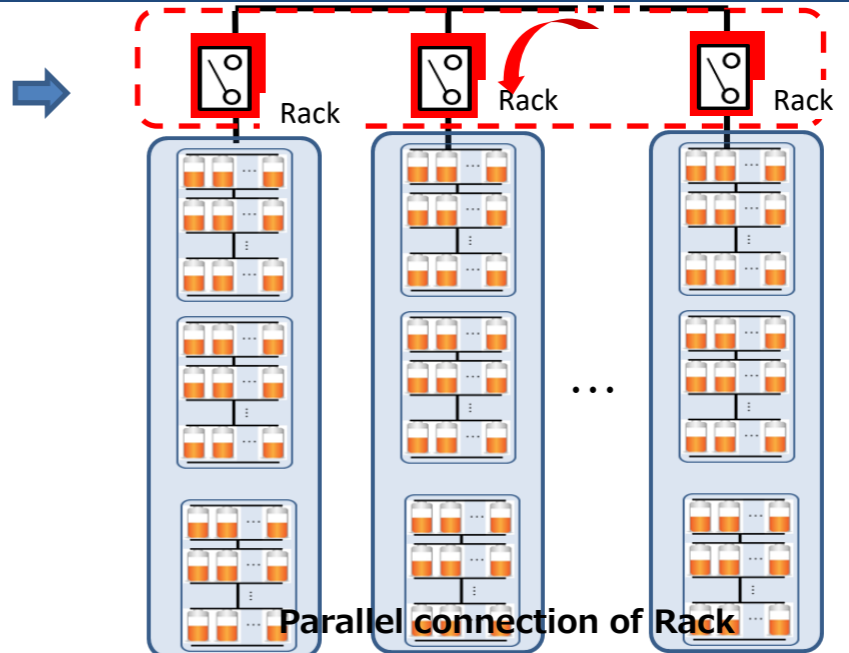








1-② Technology Solution #1

- Our Active balance technology solves this problem by transferring excess energy from non-degraded battery to degraded battery, then, it can be fully used up with using their capacity
- Also it enables stable operation with different manufacturers, different battery types (LFP and NMC), and different voltages.

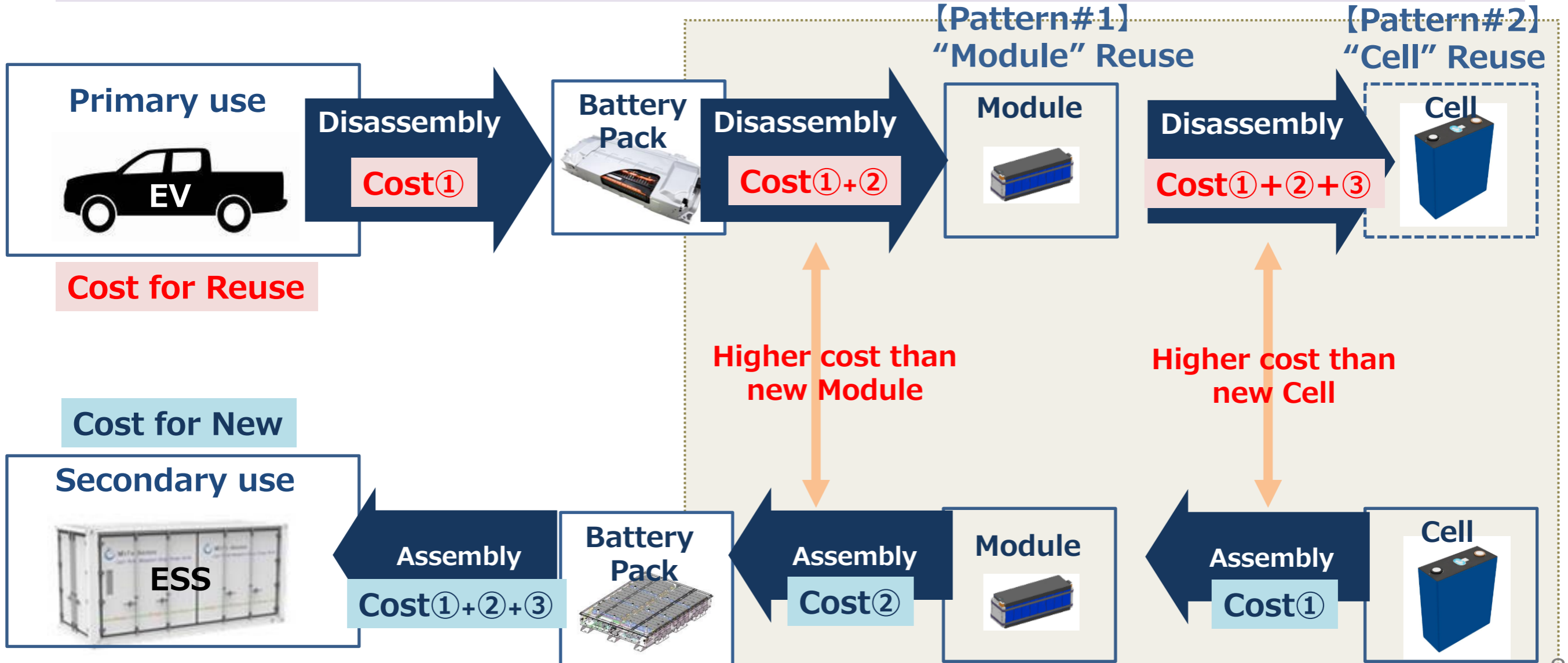


1-② Technology Solution #2

	In-Pack Balance	Inter-Pack Balance	Inter-Rack Balance
Needs	Voltage 	Higher Voltage 	Capacity Increasing & Easy maintenance 
Solution	Tech for Series connection		Tech for Parallel connection
	 <p>Series connection by Module</p>	 <p>Series connection of Pack</p>	 <p>Parallel connection of Rack</p>
Improvement	Prevent capacity loss due to "single module" capacity imbalance	Prevent capacity loss due to "pack" capacity imbalance	Charge/discharge end rack disconnection/connection Realization of active insertion/extraction for each Rack
Out Technology	Active Cell Balance  	Active Module Balance  	Intelligent Hot Plug Switch  

2-① Problem on Cost

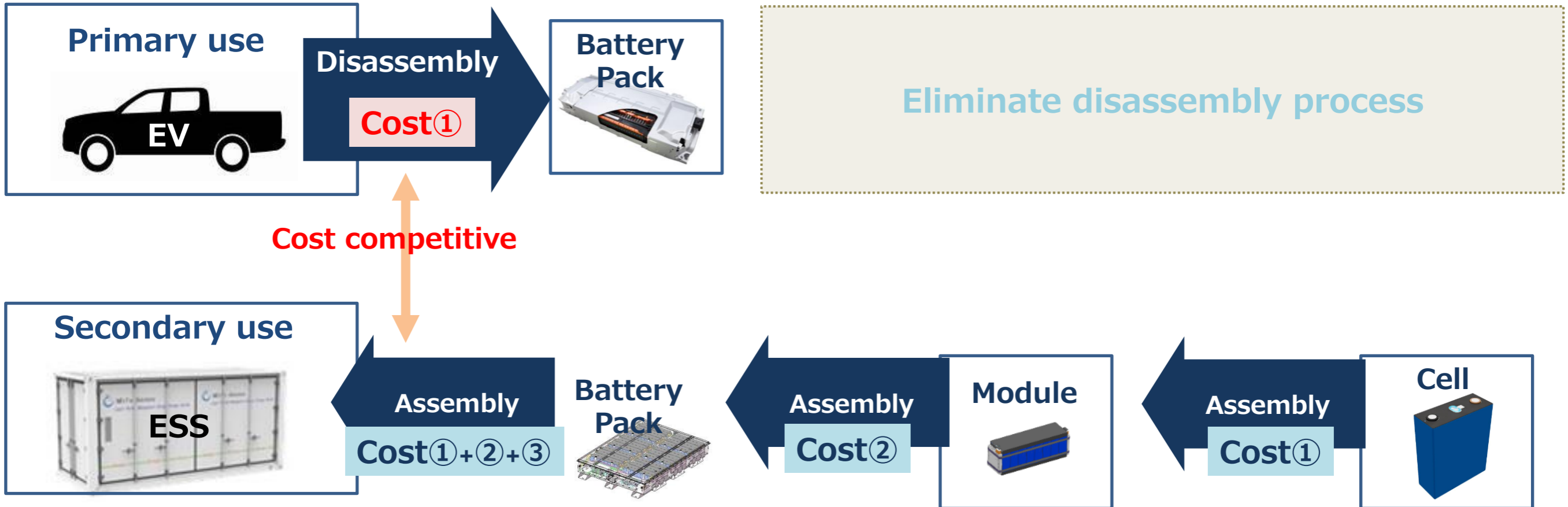
The more battery packs are disassembled for reuse, the higher the cost, making them more expensive than new batteries -> Battery Circular Society never come true



2-② Cost Solution #1

• In order to reduce replace cost, we will use battery pack, not to disassemble Battery pack or Battery module

Reuse with "Battery Pack"

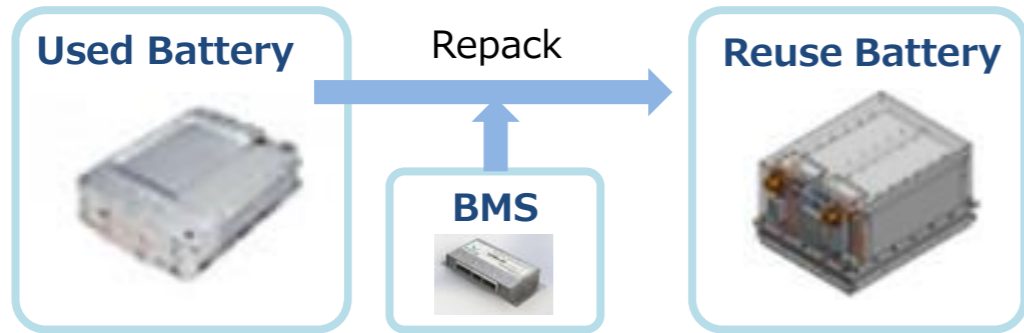


2-② Cost Solution #2

Continued demonstration testing on how to convert to ESS at lower cost than new using our balancing technology, reducing costs through Case 1 to Case 3 initiatives.

Case1: Full Repack

- Converting used battery into reuse battery with new BMS for ESS and Steel housing .



【Test example】

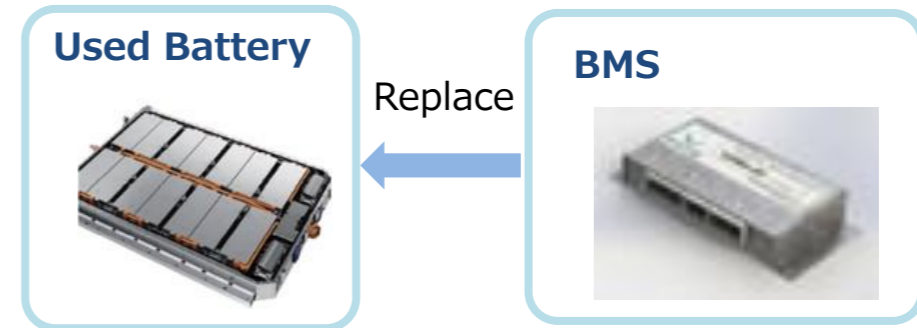


△ : Not economically viable

Level-up

Case2: Partial Repack

- Replacing only the BMS for ESS, while steel housing as it is



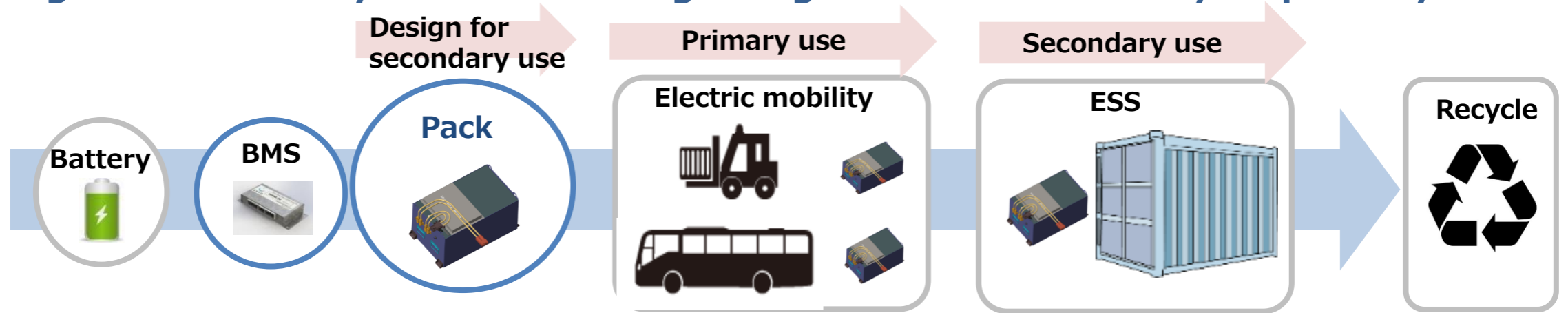
【Test example】



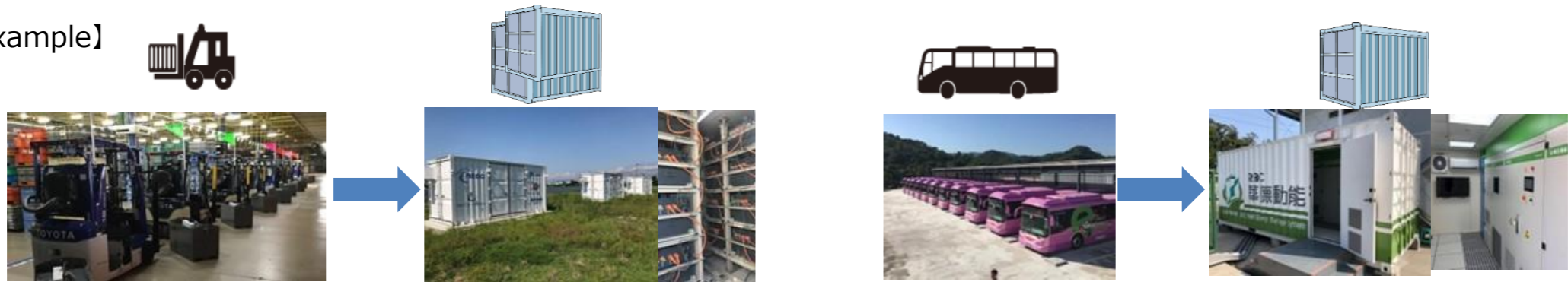
○ : Partially viable

Case3 : Use as is

- Both BMS and steel housing are used as it is
- Design for secondary use at the design stage of Electric mobility as primary use



【Test example】



◎ : Viable (Most economical)

Case1: Full Repack

 **AEESC** 
東京電力パワーグリッド

 **BYD**
東京電力パワーグリッド



 **BYD**
東京電力パワーグリッド

 **KYUSHU**
東京電力パワーグリッド



Case2: Partial Repack

 **CATL**



 **CATL**

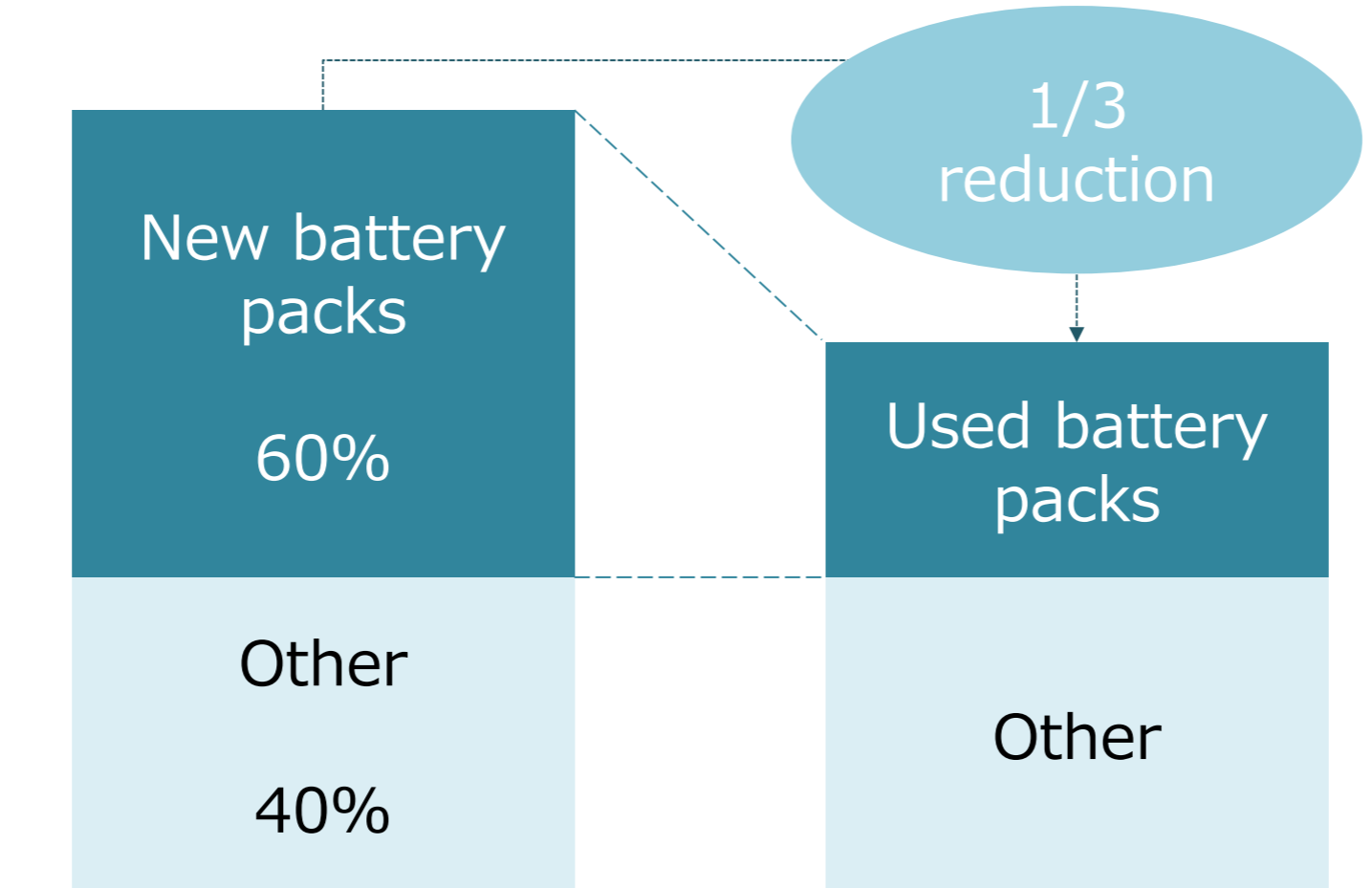


 **東京電力パワーグリッド**

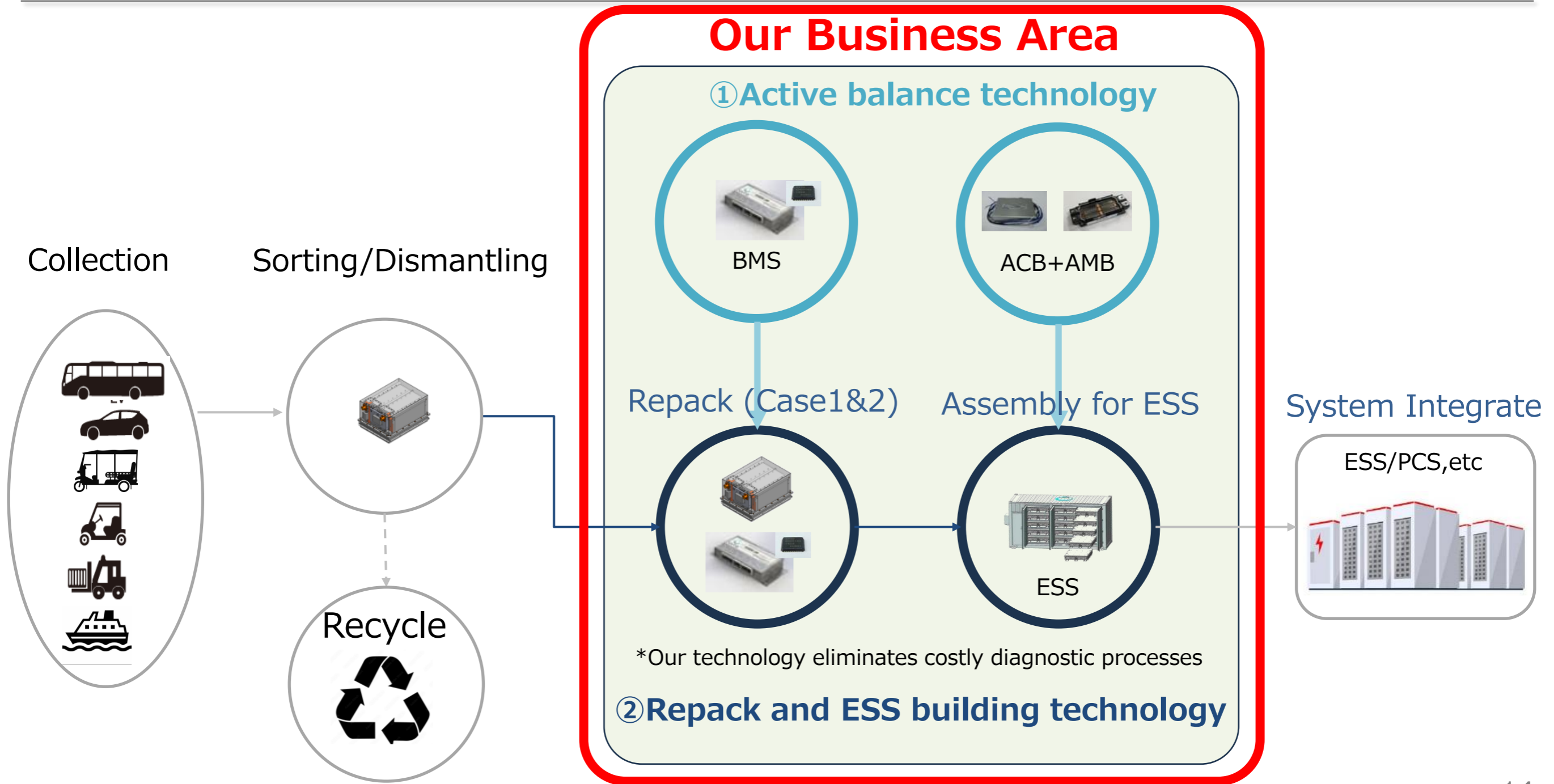


Resource saving & Cost Competitiveness

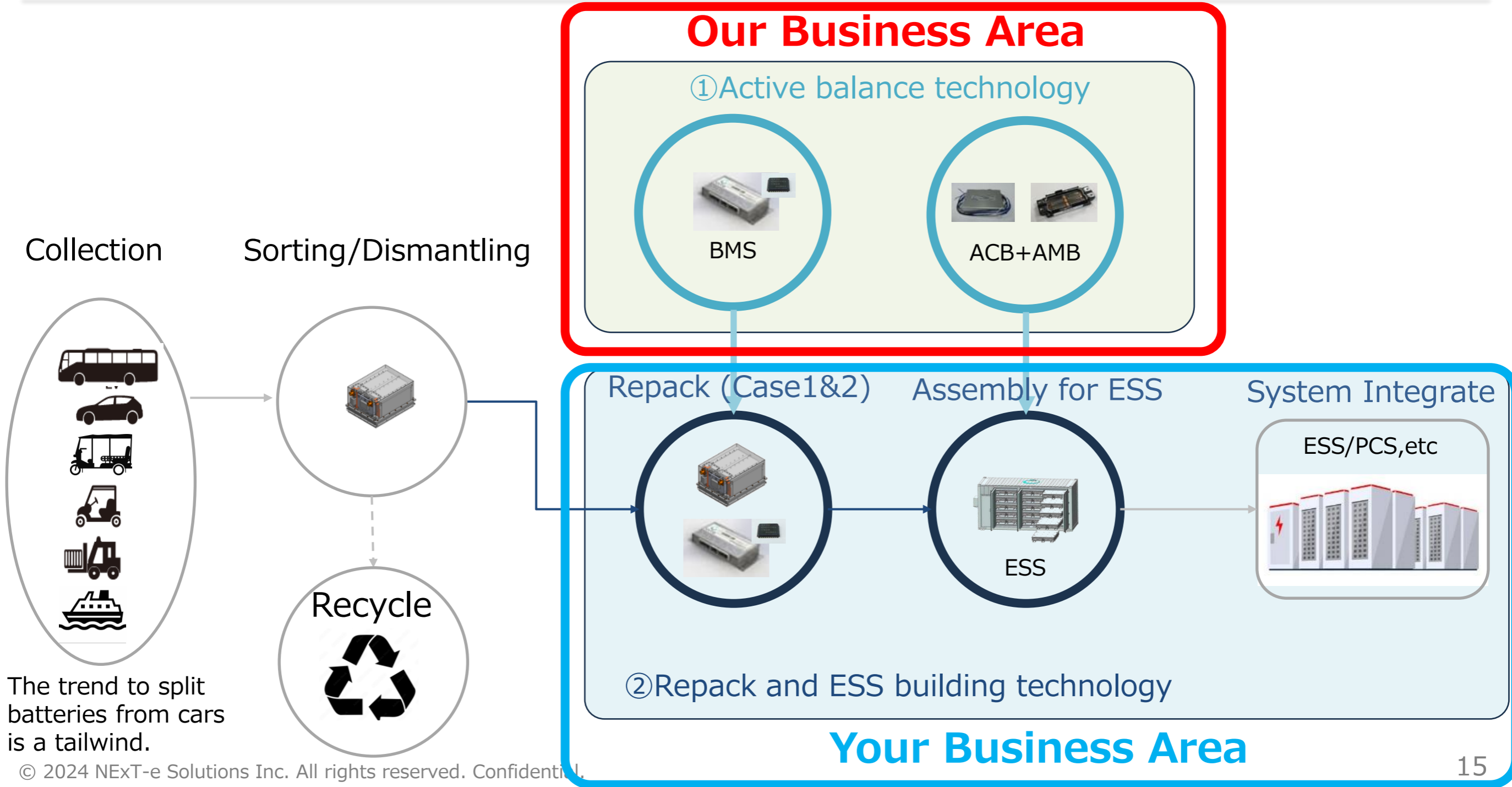
Cost of large-scale battery storage system



3-① Supply Chain



3-② Proposal for Collaboration





New Battery pack for Mobility

■ Japan : For World largest forklift manufacturer

Start shipping since '22~

Delivery units : 660 (15.5MWh)

■ China : For dealers to replace
Lead-acid battery

Start lease sales since '18~

Cumulative leases units : 1063

New Battery pack for ESS

■ Japan : For Japan largest energy company

Start shipping since '22~

Delivery volume : 15MWh

For other costumers 14MWh

Total : 29MWh



5. Management



Makoto Inoue, CEO

- Leading business development and business partnership



Fumiaki Nakao, CTO, Ph.D.

- Specialist in power supply technology
- Inventor of our core technologies



Fengping Lu

- Head of product development (Electric Power)
- In charge of alliances with Chinese battery manufacturers and subcontractors



Shin Yoshida

- Head of product development (Machinery)
- Leading Japanese quality production



Akio Miki

- Head of production management and quality management
- Leading Japanese quality production (Toyota Production System)

