

# Technological Strategy of Panasonic Energy - for Sustainability and Well-Being

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Panasonic Energy Co., Ltd.

Executive Vice President and CTO

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Notes:

1. This is an English translation from the original presentation in Japanese.
2. In this presentation, "Fiscal 2023" or "FY23" refers to the year ending March 31, 2023.



# 1. Position in the Panasonic Group

## Panasonic Holdings Corporation

Panasonic Corporation

Panasonic Automotive Systems Co., Ltd.

Panasonic Entertainment & Communication Co., Ltd.

Panasonic Housing Solutions Co., Ltd.

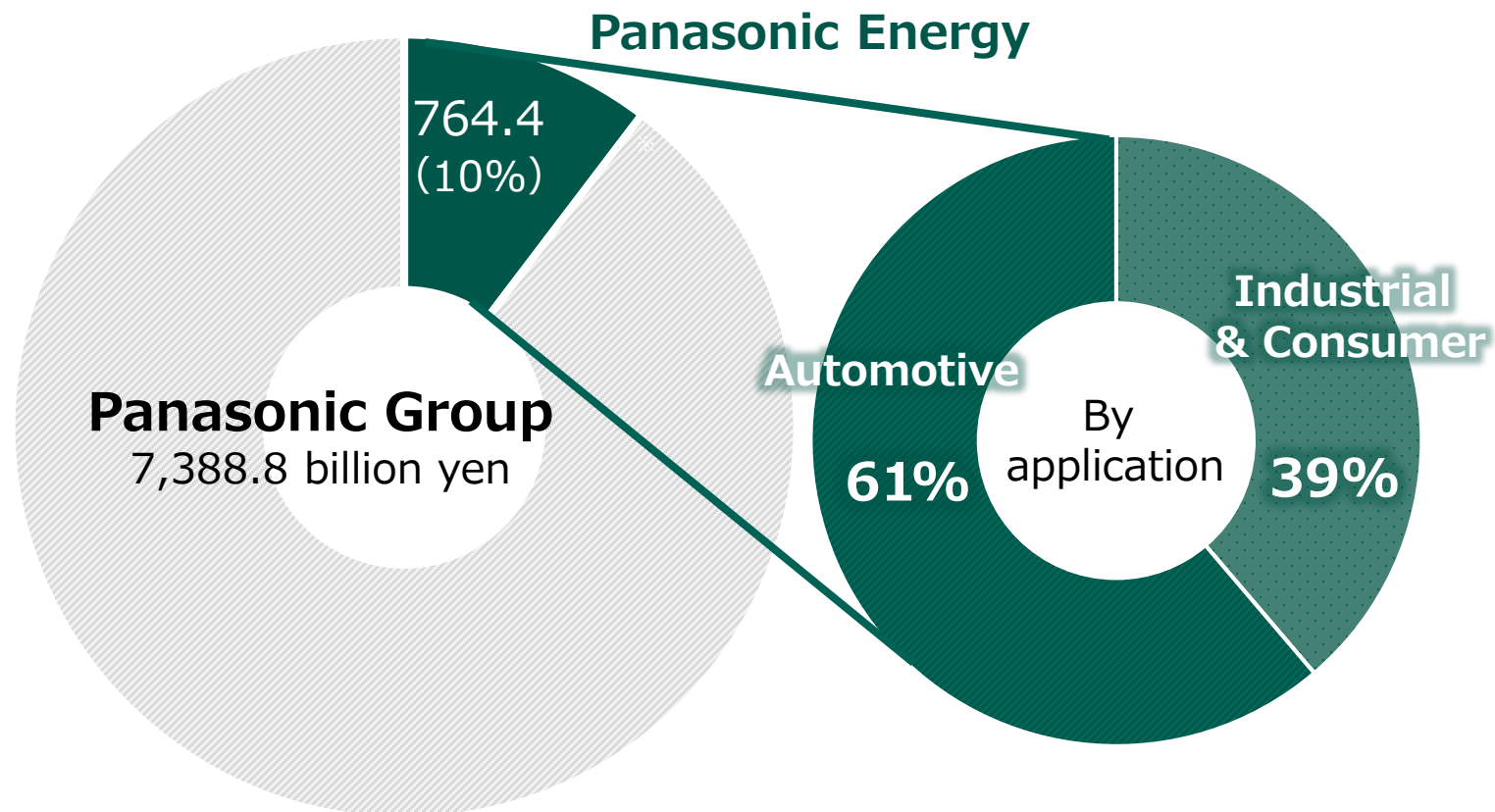
Panasonic Connect Co., Ltd.

Panasonic Industry Co., Ltd.

**Panasonic Energy Co., Ltd.**

Panasonic Operational Excellence Co., Ltd.

Sales Composition in the Panasonic Group  
(FY2022)



**Started as Panasonic Energy Co., Ltd. from April 1, 2022**

\*The composition ratio is the net sales ratio after offset.

## 2. Mission/Vision/Will of Panasonic Energy



### Our Mission

*Achieving a society in which the pursuit of happiness and a sustainable environment are harmonized free of conflict.*

### Our Vision

*Energy that changes the future.*

### Our Will

*Doing what humankind requires.*



In development of lithium-ion batteries

- ① Higher energy density
- ② Less rare metals
- ③ Response to the environment

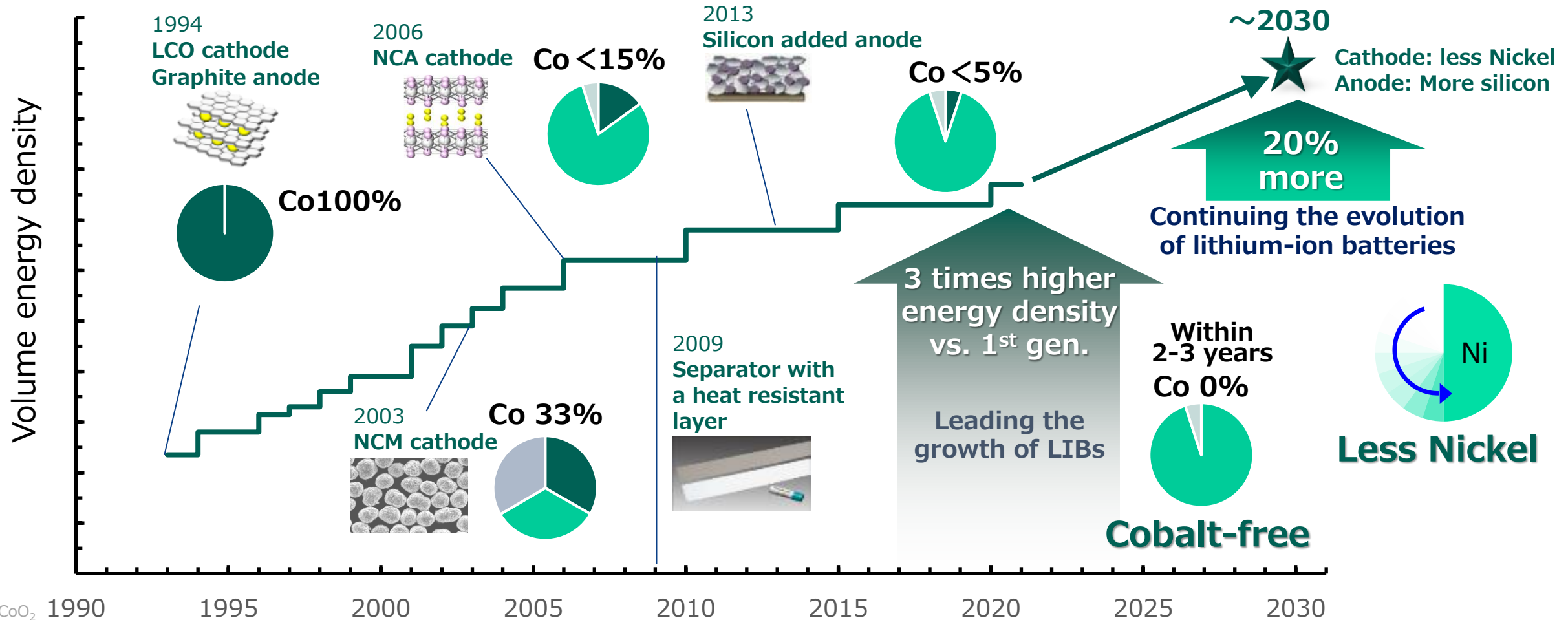
# 4. Technological development and future evolution of LIBs Panasonic ENERGY

## ① Higher energy density:

Driving energy density evolution as a pioneer in introducing cutting-edge technologies. We aim to further evolve energy density by 20% or more.

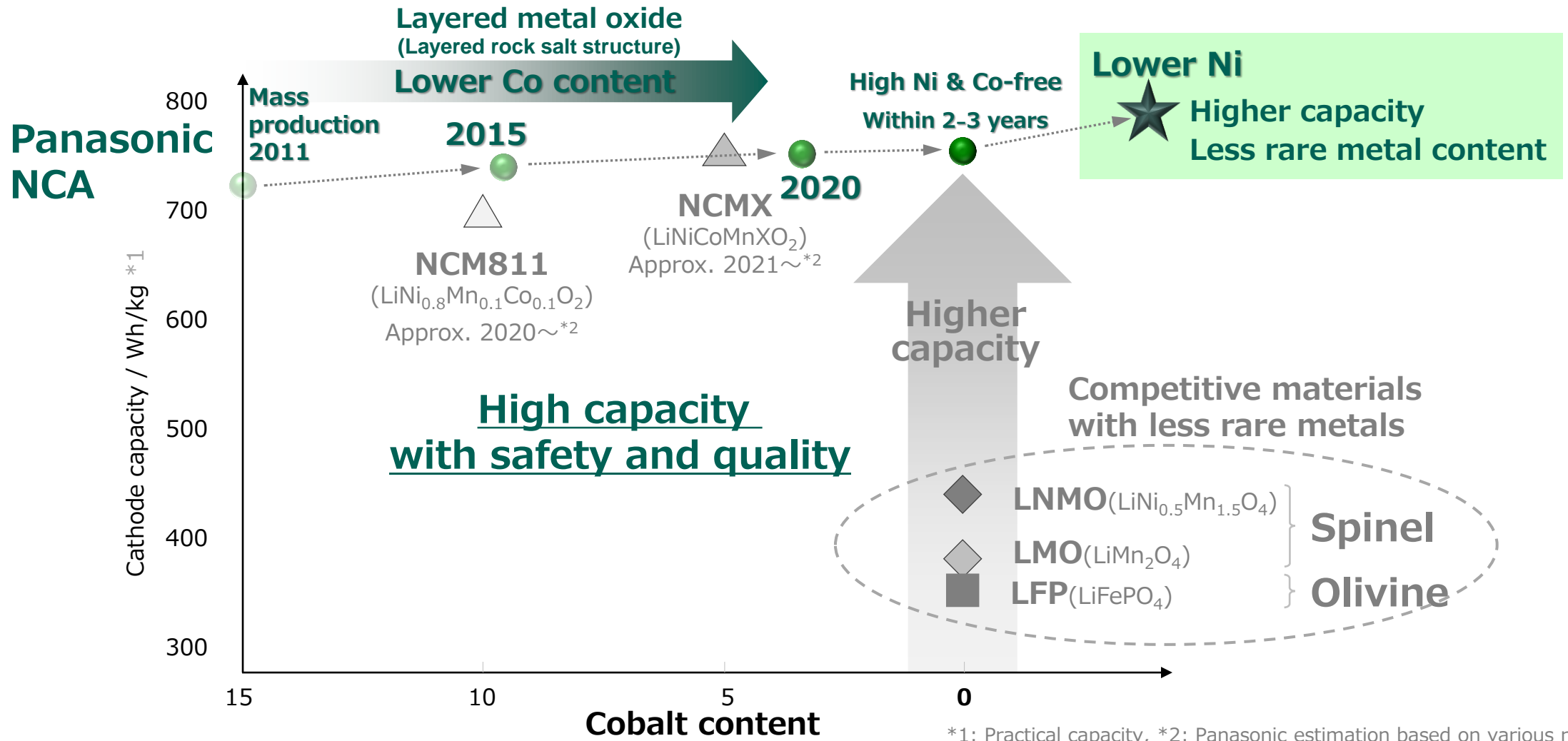
## ② Less rare metals:

Leading the evolution of **higher-capacity and less-cobalt high-Ni cathodes.** Going forward, aiming to develop cobalt-free and less-nickel cathodes.



# 5. Competitive edge of our cathode materials

The high Ni and low Co of NCA can realize a higher capacity than other chemicals.  
 The maximum use of material informatics (MI) accelerates development.



\*1: Practical capacity, \*2: Panasonic estimation based on various reports

# 6. Our competitive edge in manufacturing

Introduction of DX evolves the existing infrastructure for cylindrical cells, allowing thorough pursuit of cost advantages.

## Our strength

- High-speed, high-quality process
- Product safety management
- Established traceability system

Production rate of cylindrical cells >7 million cells/day (>80 cells/sec.)\*1



\*1: Panasonic estimation based on global production numbers



**Black box equipment: In-house manufacturing**

**DX introduction: Traceability & central monitoring**

Global management: from factory to market

**No. 1 share in North America: Cumulative cell production of more than 10 billion cells**

Cell size	Cumulative cells shipped	EV unit conversion
2170	<b>5.5 billion cells*2</b>	<b>1.7 million units*3</b>
1865	<b>4.6 billion cells*2</b>	

\*2: As of Dec 2021

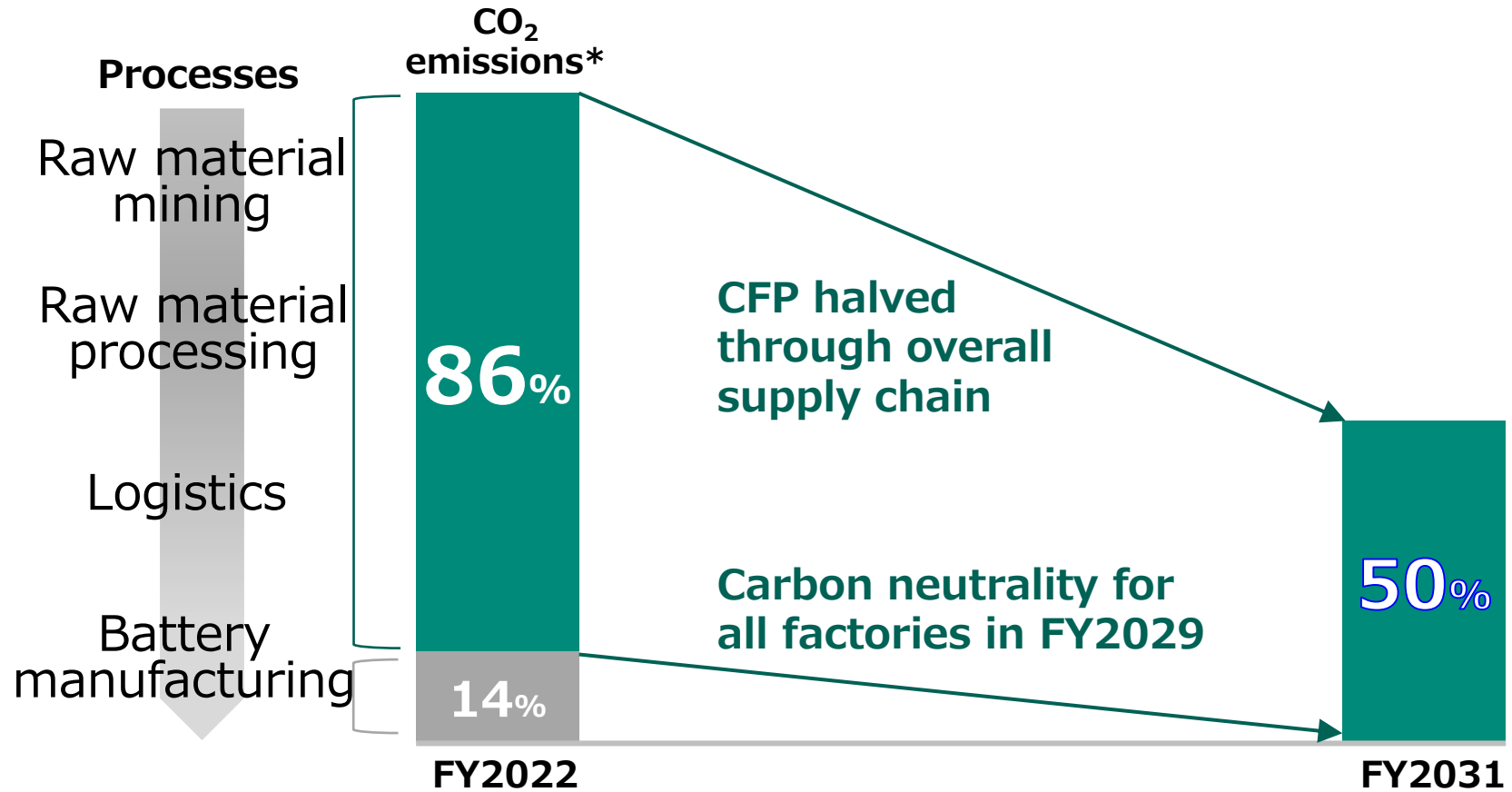
\*3: Panasonic estimation

**Zero recall of automotive lithium-ion batteries (from 2012)\*4**

\*4: Battery-attributed

# 7. Initiatives for carbon footprint (CFP) reduction

## ③ Response to the environment: Reduce CFP by half in FY2031 (vs. FY2022)



\*Panasonic estimation from Li-ion batteries for EVs produced at the North American factory



# 8. Establishment of low CFP supply chain

## ● Usage of recycled battery materials

- Signs a procurement agreement with Redwood regarding recycled materials (cathode material and copper foil)

(Press release in Nov. 2022)

## ● Promotion of local procurement

- Signs an MOU regarding graphite supply Offtake Agreement with Canada's NMG - Produces with renewable energy (hydraulic power process)

(Press release in Oct. 2022)



### REDWOOD MATERIALS



Cathode materials



Copper foil for batteries



### NOUVEAU MONDE GRAPHITE



Graphite

# 9. Commercialization of 4680 cells

## Expected impacts:

- Reduction of cell assembly personnel (by 30-50%)
- Reduction of pack assembly cost (number of welds  $\times$  1/5)



**4680**

(Starting up at Wakayama site in Japan)

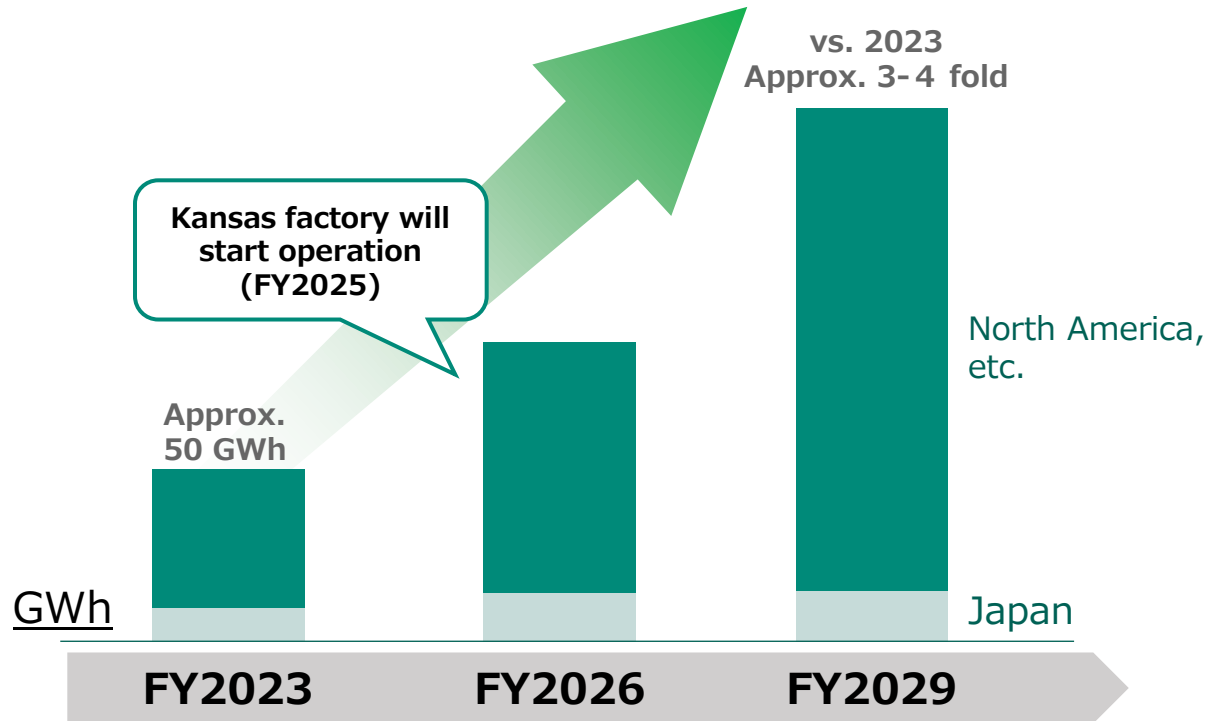


**2170  $\times$  Approx. 5 cells**

# 10. Contribution to CO<sub>2</sub> reduction through products

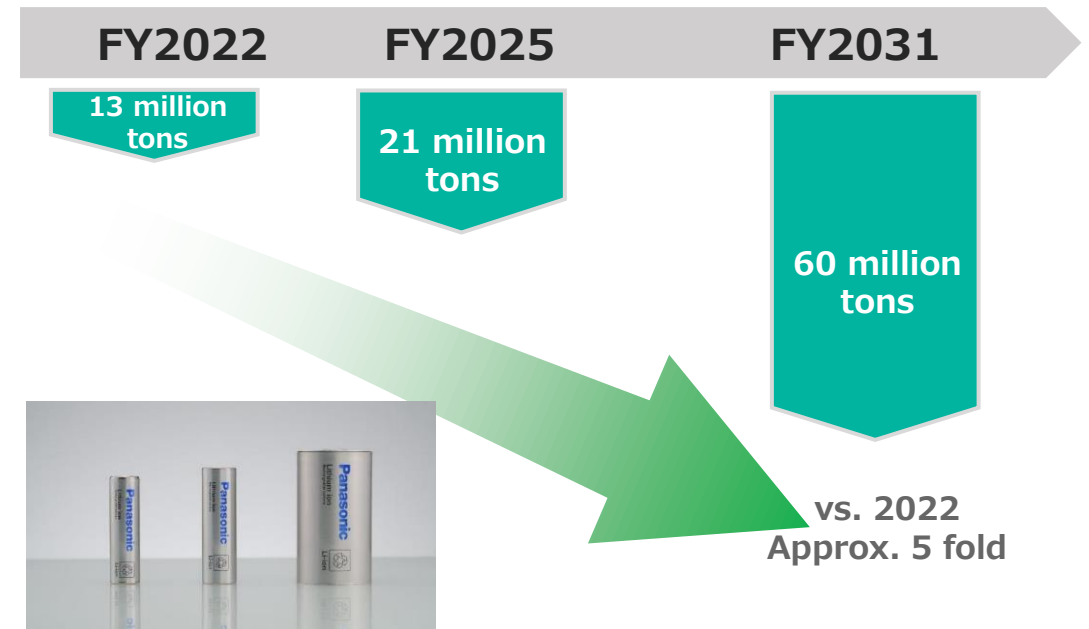
- Production capacity of automotive batteries:
  - aim to expand global production capacity toward FY2029 approx. 3 to 4 fold (vs. FY2023)
- Contribution to CO<sub>2</sub> reduction:
  - aim to expand our contribution approx. 5 fold in FY2031 (vs. FY2022; 60 million tons)

## ■ Production capacity of automotive batteries



## ■ Reduction of CO<sub>2</sub> emissions by using BEVs equipped with our batteries

-Replacing ICE with BEV helps reduce CO<sub>2</sub> emissions for society



**Panasonic ENERGY**

*Energy that changes the future.*

## Disclaimer Regarding Forward-Looking Statements

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