



TOSHIBA

Case Study

Circular economy enabled by Batteries that are built to last

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Wirtschaftstag
日独経済シンポジウム **Japan**

Basic Commitment of the Toshiba Group

Committed to People, Committed to the Future.

Toshiba Group's Goal

A society where people and nature coexist in harmony

A world in which humanity and nature are interrelated and live in harmonious balance.

Safe and Secure Society

A world where everyone can live each day without worry, and look forward to tomorrow.

Toshiba Group's Contribution

Carbon Neutrality

Circular Economy

Infrastructure Resilience



Regeneration



Circulation

Solving social issues by leveraging digital technologies, including generative AI, from the perspective of Regeneration of nature and Circulation in the economy.

Toshiba Group's Approach to Value Creation



Digitalization

Energy

Digital Infrastructure

Devices & Technology

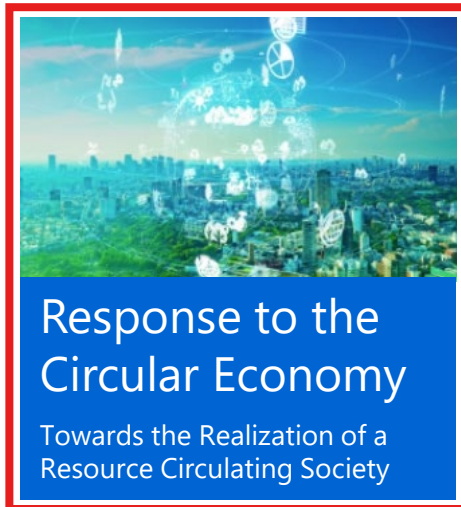
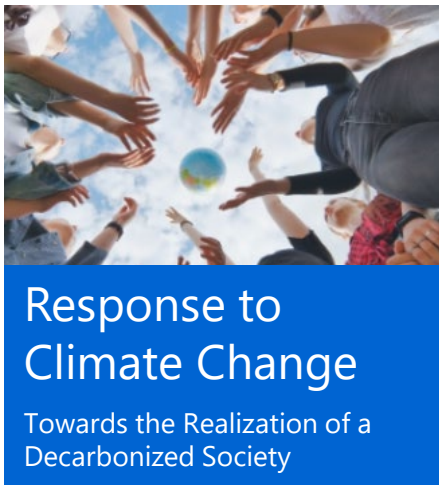
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Toshiba's Sustainability Management

ESG Performance

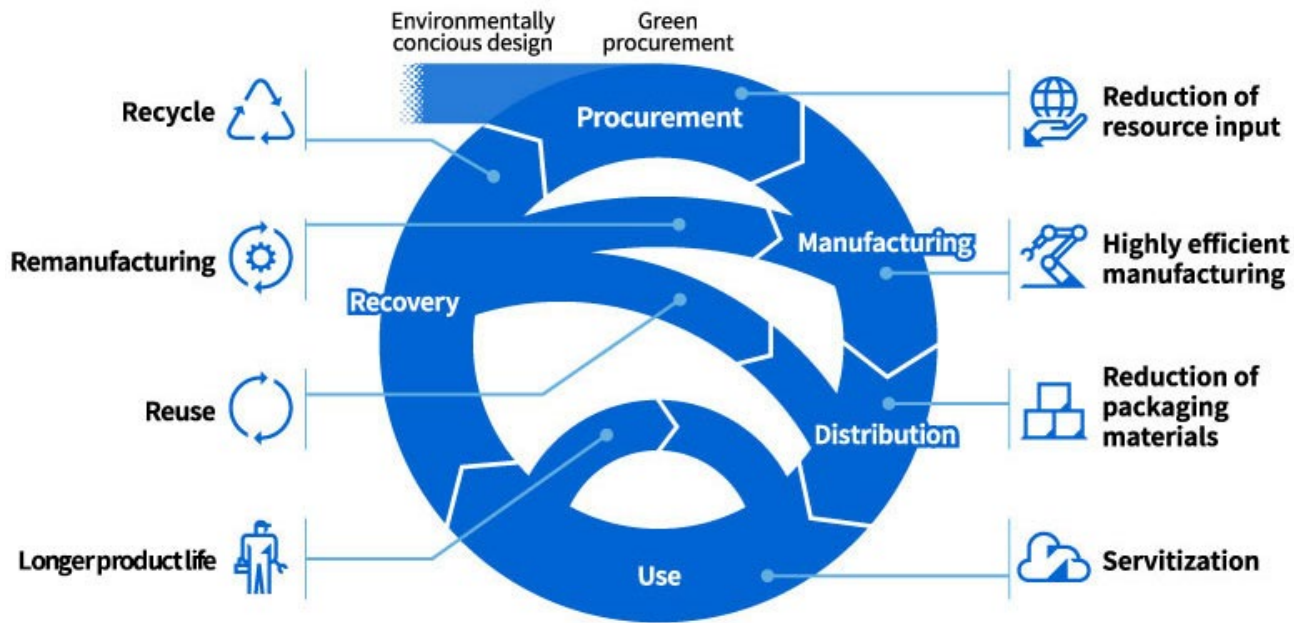


Material issues in Environment

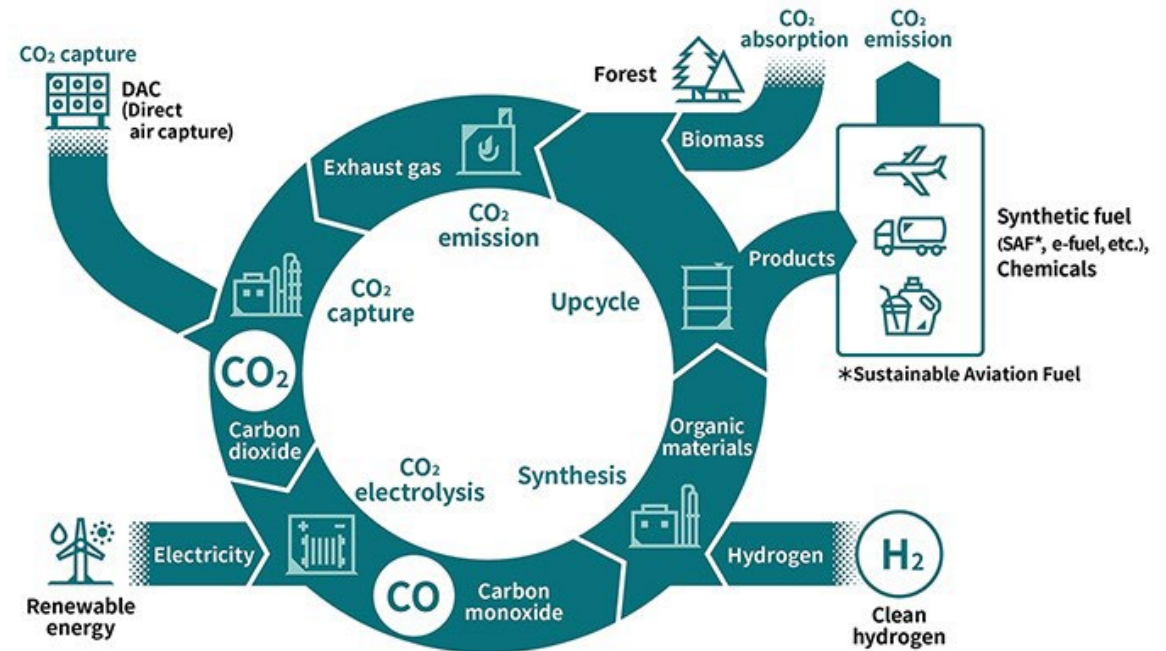


Toshiba's Response to the Circular Economy

Circulation of Resources



Circulation of Carbon



Circular Economy - CO₂ Capture Development Milestones

2009 – Proof of Concept (PoC)

- Successful demonstration of CO₂ capture
- 10 tonnes of CO₂ captured per day

2016 – World's First Commercial CO₂ Capture & Utilisation System

- Municipal waste incineration plant, Saga, Japan
- Captured CO₂ supplied to businesses
- Used for crop cultivation and algae production



2020 – Large-Scale Carbon Capture Deployment

- Mikawa Power Plant, Japan
- Biomass power generation using palm kernel shells
- 500 tonnes of CO₂ captured per day



Battery Requirements for Heavy Duty applications

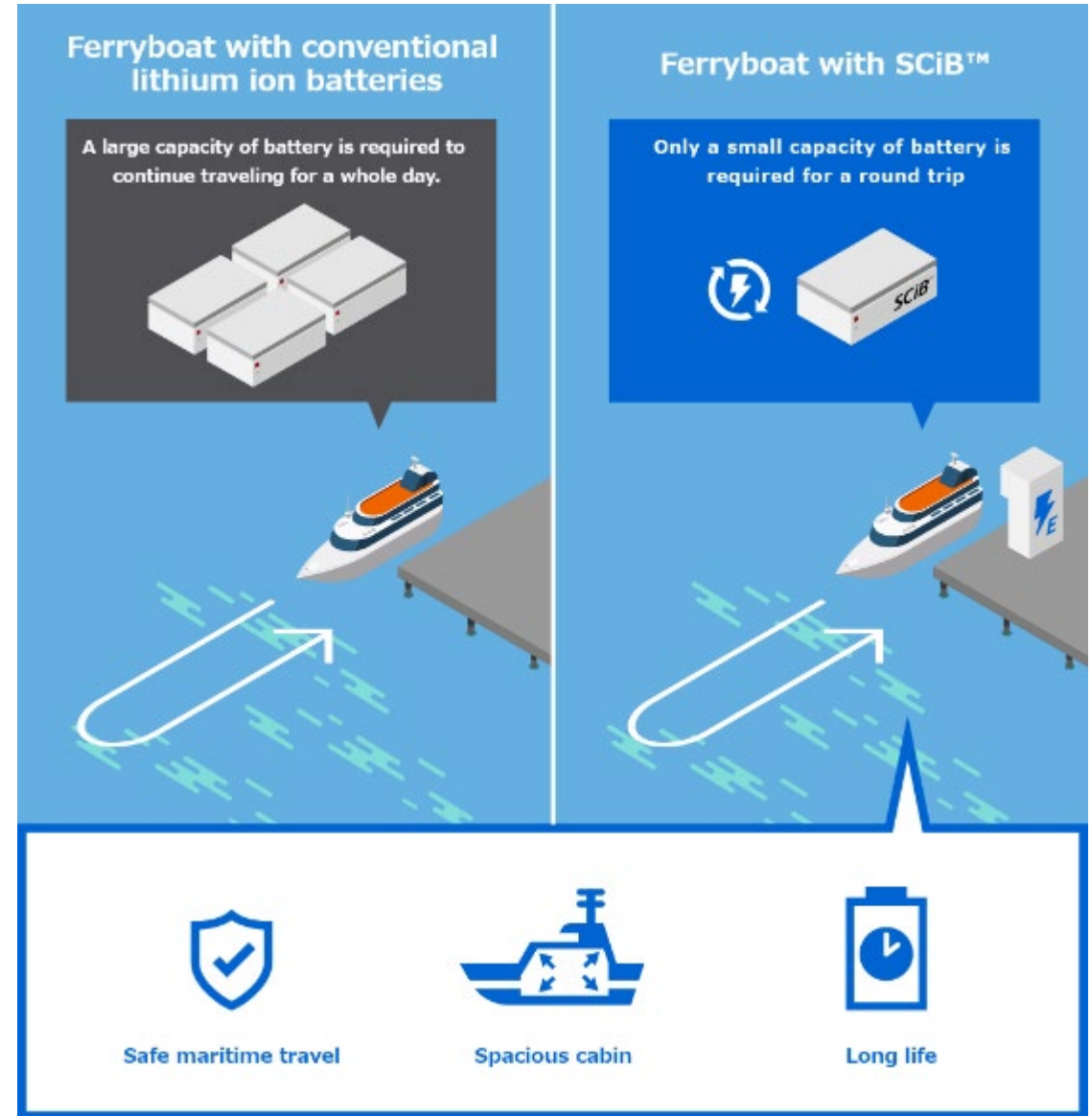


E-car Range = energy capacity

- Few cycles & slow charge

E-ferry Optimize battery to meet the application profile

- Fast charge & long lifetime



TOSHIBA - a Pioneer in Lithium-Titanium-Oxide (LTO) technology



**SCiB™ LTO Batteries:
Build to Last.**

Electric Ferries in Copenhagen



Electric ferry in operation in Copenhagen, Denmark

Ferry Bryggen wins KNVTS
Ship of the Year Award 2021



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DAMEN

- 23m electric ferry
- Designed and built by Damen Shipyards
- 2 electric motors with 2x40kW

 **Echandia**

- Battery system
- From Echandia Marine
- 183 kWh Battery
- DNV-GL certification
- 600 kW automatic charging system at the end of the line

H₂ Fuel Cell Buses in Düsseldorf



Regional Trains equipped with SCiB™ in the VRR region



Route map showing an overview of non-electrified and electrified routes



Images: Verkehrsverbund Rhein-Ruhr (VRR)

<https://www.vrr.de/der-vrr/spnv-aufgabentraegererschaft/niederrhein-muensterland-netz/>

TOSHIBA

**Committed to People,
Committed to the Future.**

人と、地球の、明日のために。

