



January 29, 2025

Tokyo Metro Co., Ltd.

Metro Sharyo Co., Ltd.

Honda Trading Corporation

Nippon Sougou Recycle Co., Ltd.

Nikkeikin Aluminium Core Technology Company, Ltd.

Kawasaki RailCar Manufacturing Co., Ltd.

Suminoe Industries Co., Ltd.

Memorandum of Understanding Concerning Basic Policies for Joint Research on Horizontal Recycling of Aluminum Railway Car Bodies Signed

- Initiation of Consideration into Horizontal Recycling of Aluminum Railway Car Bodies -

Tokyo Metro Co., Ltd. (Head office: Taito-ku, Tokyo; President and CEO: Akiyoshi Yamamura; hereinafter “Tokyo Metro”), Metro Sharyo Co., Ltd. (Head office: Taito-ku, Tokyo; President and CEO: Masao Tomeoka; hereinafter “Metro Sharyo”), Honda Trading Corporation (Head office: Chiyoda-ku, Tokyo; President and CEO: Tatsuya Natsume; hereinafter “Honda Trading”), Nippon Sougou Recycle Co., Ltd. (Head office: Takaoka City, Toyama Prefecture; President and CEO: Yasushi Takakura; hereinafter “Nippon Sougou Recycle”), Nikkeikin Aluminium Core Technology Company, Ltd. (Head office: Minato-ku, Tokyo; President and CEO: Hideo Iotake; hereinafter “Nikkeikin Aluminium Core Technology”), Kawasaki RailCar Manufacturing Co., Ltd. (Head office: Kobe City, Hyogo Prefecture; President and CEO: Hiroshi Murao; hereinafter “Kawasaki RailCar”), and Suminoe Industries Co., Ltd. (Head office: Kyoutanabe City, Kyoto Prefecture; President and CEO: Hirotomi Ono; hereinafter “Suminoe Industries”) have signed a memorandum of understanding regarding the basic policies for joint research to realize horizontal recycling*1 of aluminum railway car bodies owned by Tokyo Metro and have initiated consideration for the implementation of this joint research.

Tokyo Metro has traditionally conducted cascade recycling*2 of aluminum scraps from discarded railway car bodies. In this joint research project, we will conduct technological verification from FY2024 to FY2027 to develop a technical process for horizontally recycling of aluminum scraps used in the railway car bodies owned by Tokyo Metro without downgrading it, and recycling it for parts of the railway car body and interior parts of railway car body.

Through this joint research, we will be recycling aluminum which is a valuable resource, and use them for a longer period, which will help reduce CO₂ supply chain emissions during the production of new rolling stocks*3. These activities will further contribute to the realization of a more decarbonized and recycling-oriented society in the railway industry and lead to the realization of a sustainable society.

*1 Horizontal recycling

Form of recycling which involves recycling the waste into alloys of the same purity and composition, thereby maintaining the purity and alloy composition. Strict selection and adjustment are required to prevent deterioration.

*2 Cascade recycling

Form of recycling which involve downgrading to low-purity materials with a high amount of impurities. Since the properties of the material will deteriorate and change, it will not return to its original elemental state, but it is reused as a material.

*3 The effect of aluminum recycling

Aluminum requires a large amount of energy to produce primary aluminum from bauxite and generates a large amount of CO₂. When recycled, aluminum requires only 3.4% of the energy and produces 2.8% of CO₂ compared to the production of primary aluminum. (Quoted from the “Inventory Analysis Report on Melting Scrap for Wrought Materials” by the Japan Aluminum Association LCA Research Committee, March 2023)

Details on the Conclusion of “Memorandum of Understanding on Basic Policy for Joint Research on Horizontal Recycling of Aluminum Railway Car Bodies”

1. Background

Tokyo Metro currently owns one of the largest railway car fleets in the country, with over 2,700 railway cars, all of which have bodies made from aluminum alloys.

In general, aluminum requires a large amount of energy and generates a large amount of CO₂ during the production of primary aluminum, and when recycled, it is possible to significantly reduce CO₂ emissions by approximately 97% compared to the production of primary aluminum.*1

For this reason, Tokyo Metro, as a company that owns and operates a large number of railway cars, has been promoting the recycling of scrapped railway car bodies in order to take the lead in addressing global climate change and strongly promote the reduction of environmental impact.

However, the removal of impurities required for horizontal recycling is technically difficult, and until now, recycling of scrapped railway car bodies owned by Tokyo Metro has been limited to cascade recycling into casting materials which are relatively easy to manage in terms of composition. Additionally, the use of recycled materials for railway car has also been limited.

The companies that have signed the memorandum have decided to work together and conduct joint research, by realizing horizontal recycling of scrapped railway car bodies in commuter railway cars. Their goal is to further reduce CO₂ supply chain emissions in the railway car business in the future by expanding the use of recycled materials to parts of railway car structures where strength is particularly required.

2. Contents of Joint Research

From FY2024 to FY2027, we will develop processes and conduct technical verifications to achieve horizontal recycling of aluminum scrap from the railway car bodies owned by Tokyo Metro. Our goal is to ensure the material strength is maintained, allowing the aluminum to be reused in the railway car structure and interior parts.

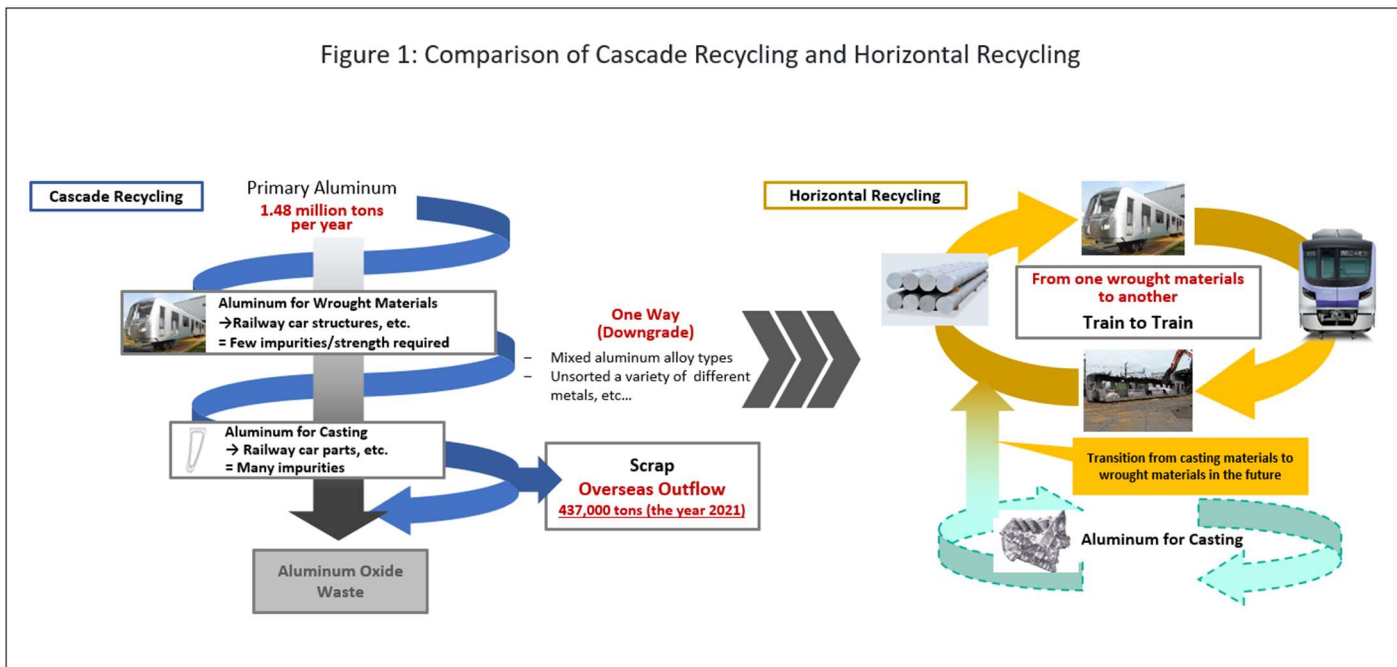
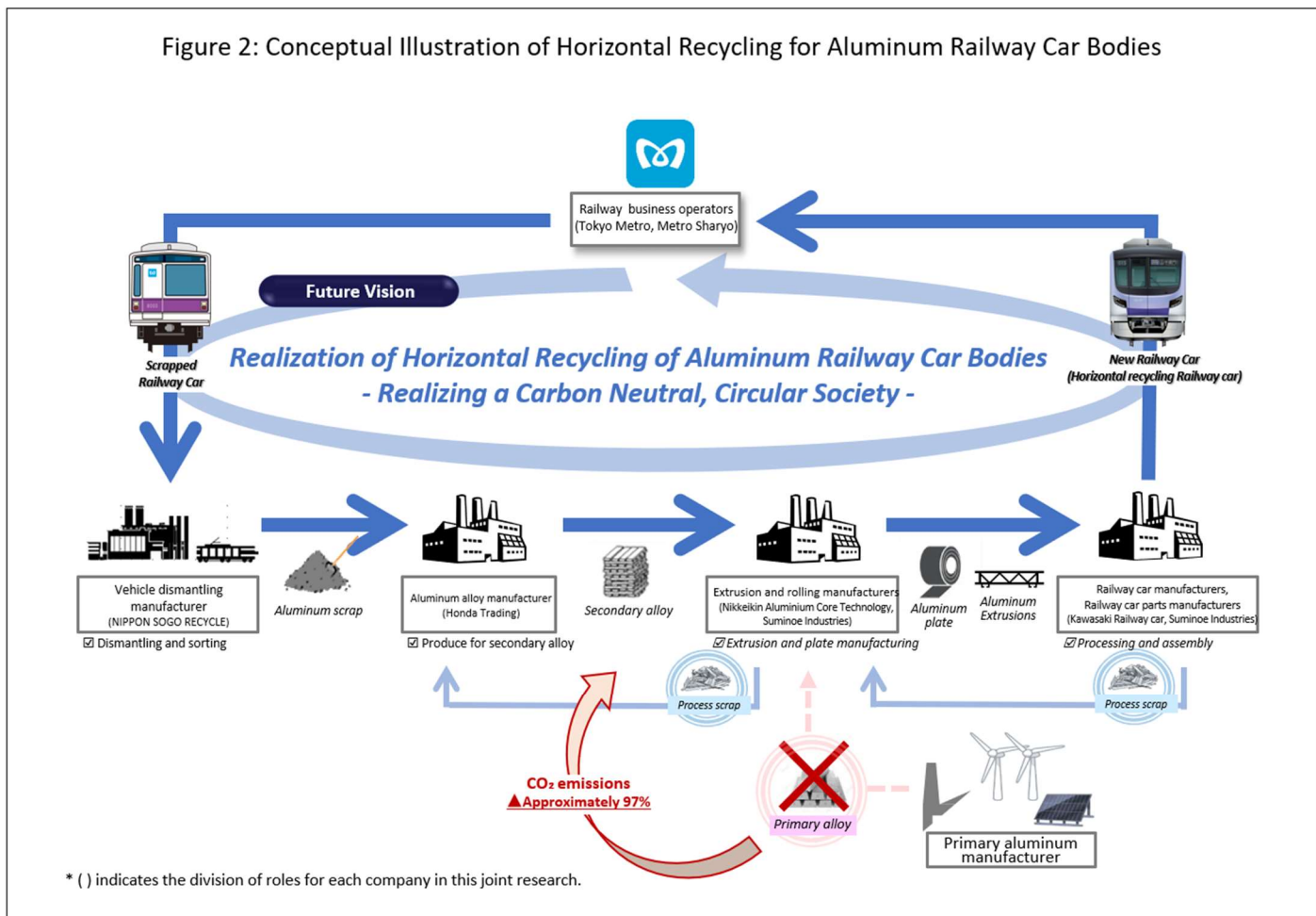


Figure 2: Conceptual Illustration of Horizontal Recycling for Aluminum Railway Car Bodies



*1 The effect of aluminum recycling

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