PRESS RELEASE

November 30, 2021
Renoveru, Inc.
Kanazawa Institute of Technology
Kokushikan University

FOR IMMEDIATE RELEASE

Reducing CO2 Emissions by 76% and Waste Generated by 96% Through Renovations*1

Joint Industry-Academia Research Toward a Decarbonized Society

Reduction per unit equivalent to the amount absorbed by 7,500 cedar trees a year

Renoveru, Inc. (Headquarters: Minato-ku, Tokyo; Founder & CEO: Tomohiro Yamashita; hereinafter "Renoveru") is Japan's top*2 company that offers a one-stop service for finding resale apartments, renovation, and creating renovation platforms using technology. Renoveru has confirmed that renovated properties can reduce CO_2 emissions by up to 76% and waste generated by up to 96% when compared to demolishing an existing building and building a new property of the same scale. The findings come from joint research with the labs of Kouichi Sato , Kanazawa Institute of Technology and Kanako Asabuki of Kokushikan University, which used two housing complexes renovated by Renoveru—Kita-Narashinodai Project and Togoshi-Koen Project—to evaluate the effect of renovation in reducing CO_2 emissions and waste generation.

CO_2 emissions during the demolition of existing buildings, design supervision, material production, and construction stages of the Kita-Narashinodai Project were approximately 3,300 tons, which is similar to the amount absorbed by approximately 37,000 cedar trees in one year*3, and equivalent to a cedar forest of approximately 375 hectares or approximately 5.1 Meiji Jingu Shrines*4. Furthermore, on a per-unit basis, there was a reduction of approximately 66 tons of CO_2 emissions. This is equivalent to the amount absorbed by approximately 7,500 cedar trees in a year*3.

This research demonstrated that renovation can be one of the solutions for a decarbonized society. Going forward, Renoveru will continue to quantify the amount of CO_2 reduction and waste reduction through projects, verify and announce the impact of renovation on the environment, and use renovation to contribute to the realization of a recycling-oriented society and a decarbonized society.

1. CO_2 emission study results: Comparison between scrap-and-build and renovation*5

①When evaluating the demolition, design supervision, materials production, and construction phases of an existing building

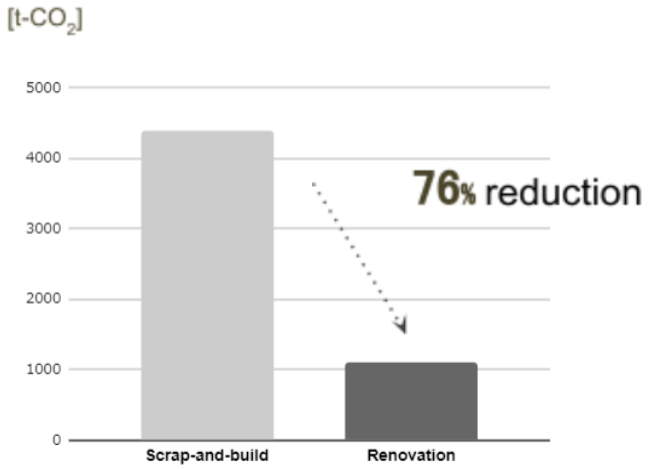
Kita-Narashinodai Project

The amount of CO_2 emissions per building was reduced by 76% compared to scrap-and-build, with the reduction calculated to be approximately 3,300 tons. This works out as a reduction of approximately 66 tons on a per-unit basis.

Togoshi-Koen Project

The amount of CO_2 emissions per building was reduced by 63% compared to scrap-and-build, with the reduction calculated to be approximately 336 tons. This works out as a reduction of approximately 42 tons on a per-unit basis.

CO2 reduction effect of the Kita-Narashinodai Project (per building, design to construction stage) from renovation



Source: "Effect of renovation on reducing carbon dioxide emissions and waste generation" (Renoveru, research laboratories of Kouichi Sato, Kanazawa Institute of Technology and Kanako Asabuki, Kokushikan University) - compiled by Renoveru based on the above.

Inquiries regarding this press release
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② When evaluating 20 years of running (operation, refurbishment stage) after renovation or new build in addition to ① above

Kita-Narashinodai Project

The amount of CO_2 emissions per building per 20 years was reduced by 34% compared to scrap-and-build, with the reduction calculated to be approximately 3,050 tons. This works out as a reduction of approximately 61 tons on a per-unit basis.

Togoshi-Koen Project

The amount of CO_2 emissions per building per 20 years was reduced by 25% compared to scrap-and-build, with the reduction calculated to be approximately 272 tons. This works out as a reduction of approximately 34 tons on a per-unit basis.

2. Results of study on waste generation: when evaluating the comparison of scrap-and-build with renovations (demolition of existing buildings and construction stages)

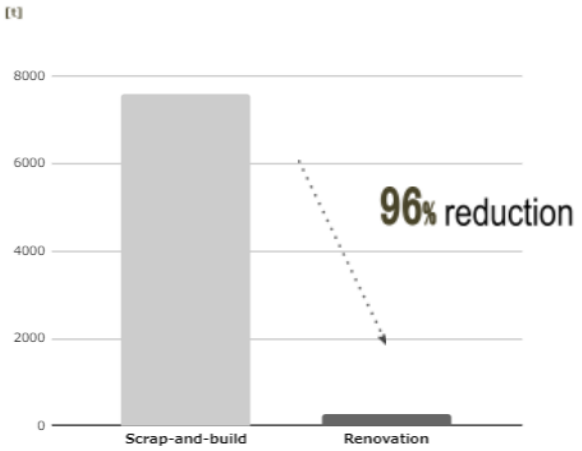
Kita-Narashinodai Project

The amount of waste generated per building was reduced by 96% compared to scrap-and-build, with the reduction calculated to be approximately 7,289 tons. This works out as a reduction of approximately 146 tons on a per-unit basis.

Togoshi-Koen Project

The amount of waste generated per building was reduced by 94% compared to scrap-and-build, with the reduction calculated to be approximately 751 tons. This works out as a reduction of approximately 94 tons on a per-unit basis.

Waste generation reduction effect of the Kita-Narashinodai Project (per building, existing building demolition to construction stage) from renovation



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Effect of renovation on reducing carbon dioxide emissions and waste generation

			Kita-Narashinodai Project			Togoshi Koen Project		
			Reduction (a)=(b)-(c)	Scrap-and-build (b)	Renovation (c)	Reduction (d)=(e)-(F)	Scrap-and-build (e)	Renovation (f)
1－① Demolition of exist buildings Design supervision, materials production, and construction stage	CO_2 emissions (t)	1building	3,300	4,400	1,100	336	528	192
		1unit	66	88	22	42	66	24
1－② In addition to (1) above, renovation or operation and refurbishment stage for 20 years after new build	CO_2 emissions (t)	1building	3,050	9,100	6,050	272	1,096	824
		1unit	61	182	121	34	137	103
2 Existing building demolition and construction stage	Waste generated (t)	1building	7,289	7,576	287	751	801	50
		1unit	145.8	151.5	5.7	94.0	100.2	6.2

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Properties covered

Two properties of different ages and sizes were evaluated.

Kita-Narashinodai Project

Renovation of a 19-year-old apartment complex (Funabashi, Chiba; 6 above-ground stories; 4,042 m^2 of total floor space; reinforced concrete; 50 units; 65.93 m^2 of average exclusive use area), including both private and common spaces.

Togoshi-Koen Project

Renovation of a 49-year-old rental apartment complex (Shinagawa Ward, Tokyo; 4 above-ground stories; 487.34 m^2 of total floor space; reinforced concrete; 8 units; 45.13 m^2 of average exclusive use area), including both private and common spaces.

Background of the initiative

Since the declaration of carbon neutrality in 2020, CO_2 emission reduction targets for 2030 have been set, and significant reductions are required in various fields. ESG is also becoming more important in corporate activities, influencing the evaluation of corporate value. The Sustainable Development Goals, as a common global target for industry, government, and the public, are beginning to influence people's consumption decisions.

Renovating buildings can contribute to the reduction of CO_2 emissions by greatly reducing the amount of materials and the amount of fuel used during construction compared to new builds. Furthermore, waste generated by demolishing buildings can also be significantly reduced. However, due to the highly individualized nature of building renovation and the lack of previously examined case studies, its effects had not been quantified or visualized.

This led Renoveru to team up with the research labs of Kouichi Sato of Kanazawa Institute of Technology and Kanako Asabuki of Kokushikan University to conduct joint industry-academia research to calculate and visualize the CO_2 and waste reduction effect.

Since its establishment, Renoveru has been striving to realize a recycling-oriented society by improving the longevity of existing buildings and revitalizing their distribution through renovations that revive the function and value of existing housing. The company also seeks to realize a shift to a sustainable and environmentally friendly recycling-oriented society that makes use of existing stock by further promoting the provision of renovation as a sustainable option through proposals such as improving thermal performance in renovations.

Comment from Professor Kouichi Sato, Kanazawa Institute of Technology

“I hope that building up this kind of case study will lead to the establishment of the following two norms.

First, a method of collecting data on buildings to obtain information on CO_2 emissions. Second, a method of selecting what to compare something with when examining how it reduces CO_2 emissions.”

Comment from Assistant Professor Kanako Asabuki, Kokushikan University

“Something I found interesting in this research is how the CO_2 reduction effect differed depending on individual characteristics of the renovation. Moving forward, I would like to continue research on how renovation can contribute to decarbonization and resource recycling.”

*1 Comparison of the amount of CO_2 emissions during the demolition, design supervision, material manufacturing, and construction stages of existing buildings and the amount of waste generation during the demolition and construction stages of existing buildings “Kita-Narashinodai Project” Source: “Effect of renovation on reducing carbon dioxide emissions and waste generation” (Renoveru, research laboratories of Kouichi Sato, Kanazawa Institute of Technology and Kanako Asabuki, Kokushikan University)

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*2 Number of one-stop renovations (Ranked the top one-stop service company in the Japan Journal of Remodeling: Apartment Reform Profit Ranking 2021)

*3 One hectare (1,000 trees) of a man-made forest of appropriately maintained cedar trees with a 36 to 40 year lifespan is estimated to absorb approximately 8.8 tons of carbon dioxide a year (Forestry Agency calculation)

*4 Meiji Jingu Shrine is approximately 73 hectares in size.

*5 The evaluation was conducted by calculating the type and quantity of materials from the plans of existing buildings, completed renovation plans, and estimate for each building. CO_2 emissions during the design, material production, construction, operation (excluding energy), and disposal stages are calculated using the “LCA Tool for General Buildings Ver. 5.00” published by the Architectural Institute of Japan. (Since apartment complexes are comprised of an extremely wide variety of materials, input was omitted for materials with low quantity of use and low CO_2 emissions, and exterior and planting were excluded from the evaluation.) CO_2 emissions associated with energy consumed in operating renovated buildings were calculated by inputting energy consumption performance calculated by Housing Complex Floor Input Method Calculation Program Ver 3.0.3 and Energy Consumption Performance Calculation Program Ver 3.0.0 Housing Edition into CASBEE Architecture (New Build) Evaluation Software CASBEE-BD_NC_2021v1.04), which is published by the Japan Sustainable Building Consortium.

*6: The evaluation calculates the types and amount of waste originating from buildings themselves by using the plans of existing buildings and completed renovation plans.

Profile of Professor Kouichi Sato, Kanazawa Institute of Technology

Graduated from the Department of Architecture, Faculty of Engineering, the University of Tokyo in 1990. In 1997, he completed a doctoral course at the Graduate School of Engineering, University of Tokyo. Holds a doctorate in engineering. After taking up roles such as representative secretary of A/E WORKS Association, he now works as a professor at Kanazawa Institute of Technology. Has co-authored works such as *Architectural Revitalization* (Ichigaya Publishing), and *Wood Fireproofing (Planning, Design, Construction) Manual* (X-Knowledge)

Profile of Assistant Professor Kanako Asabuki, Kokushikan University

Graduated from the Department of Architecture, Faculty of Engineering, The University of Tokyo in 2002. In 2007, she completed a doctoral course at the Graduate School of Frontier Sciences[A3] , the University of Tokyo.
Holds a doctorate in environmental studies. After working as a technical official at the Ministry of Land, Infrastructure, Transport and Tourism, she is currently an associate professor at Kokushikan University. Her research focuses on resource recycling in construction and the environmental impact of building renovation and demolition. Has co-authored works such as Architectural Materials New Textbook and Visual Architectural Production Reference (Shokokusha[A4] Publishing).

Renoveru, Inc. Profile

Renoveru has established Japan’s leading platform for the distribution of used apartments, the utilization of existing buildings, and renovation. The company has been working to strengthen its value chain by expanding its partner network to include real estate, design firms, building contractors, interior designers and financial institutions throughout Japan and leveraging its extensive track record of over 3,700 units to develop products that cater to the renovation industry.

Launched Renoveru, a one-stop service for finding and renovating resale apartments, in 2010. Operates showrooms with renovated areas across Japan, and provides one-stop support for the entire process from finding a resale apartment to renovating it, spanning everything from property search to mortgaging, designing renovations, construction, and interiors. In addition, as part of its “urban creation business,” the company engages in the real estate revitalization business for enterprises, including renovation and conversion of single buildings, and design of commercial facilities and offices. Renoveru hopes to design places where people will gather, enhance the charms of the neighborhood, and bring people and the neighborhood together.

The company supports planning, architectural design and construction to create value that will last into the future.

Company name: Renoveru, Inc.

Founder & CEO: Tomohiro Yamashita

Capital and capital surplus: 2,439,860,000 yen

Established: April 2010

Address: Headquarters Tatsumura Aoyama Building, 5-4-35 Minami-Aoyama, Minato-ku, Tokyo

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Business: Technology-driven renovation platform business, renovation of apartments and stand-alone houses, single building renovation, design and construction of stores, offices, and commercial facilities, as well as consulting.

Corporate website URL: https://renoveru.co.jp/

Renoveru URL: https://www.renoveru.jp/

URL for the Urban Development Business Service website: https://renoveru.co.jp/citycreate/

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