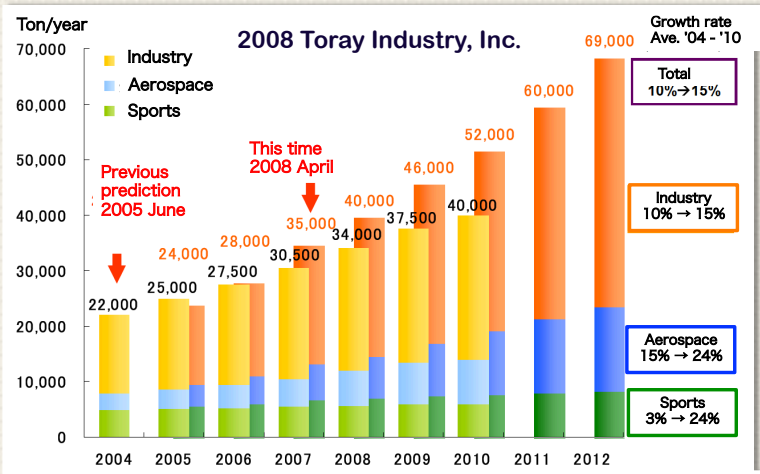


CARBON FIBER RECYCLING TECHNOLOGIES

1. Background

Demand of carbon fiber is increasing rapidly for the purpose of improving fuel cost of aircrafts and cars because of the lightweight with high strength and high modulus. As the main use, however, carbon fiber reinforced plastic (CFRP) are difficult to recycle by itself and the waste products and the residue in production process are mostly landfill discarded.



Issues to be resolved
Thermosetting CFRP are difficult to recycle, resulting in mostly landfill waste.

Simple
carbon fiber recycling process

2. Needs for carbon fiber recycling

As carbon fiber production requires a lot of energy, saving energy by recycling is a key issue. It can contribute to environmental conservation.

	Virgin fiber	Conventional recycled fiber	New development recycled fiber
Energy required to produce	Not good 290MJ/kg (2000C)	Good 48MJ/kg for mild CF	Excellent 14.6MJ/kg (500C)
Size of fiber	All applications	Short	Short and long
Fiber quality	Excellent	Not good	Good

3. Project for carbon fiber recycling

We have started recycling technology and established a production system to extract only the carbon fiber from CFRP used. Also, it is possible to cut short and to make non-woven fabric or plate by using short-cut fiber. To develop the technology and to save the energy, this project has also supported by NEDO since 2010.

CFRP waste



Recycle carbon fiber



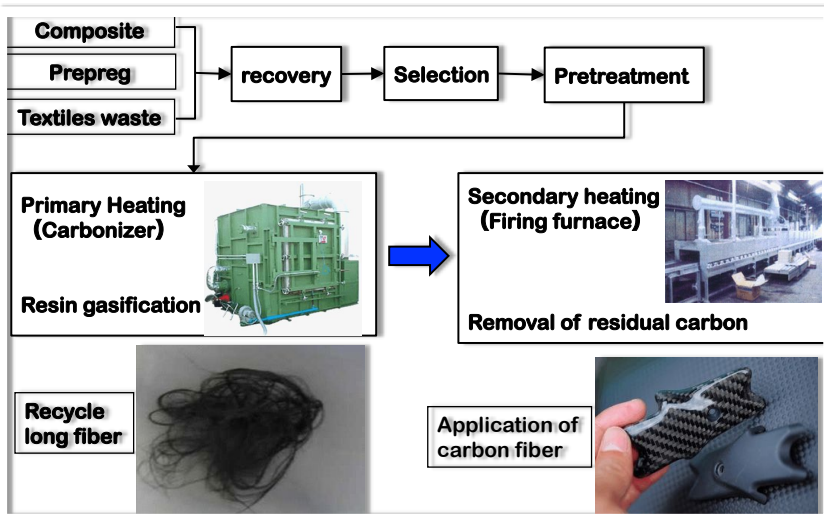
Non-woven fabric



4. Details of the project

The project target is on low energy and cost carbon fiber recycling technology, which surpasses conventional technology being already underway.

Gifu University: Optimization of operating conditions and process design
Carbon Fiber Recycle Industry Ltd.: Demonstration test and commercialization



Quality tests
Gifu University



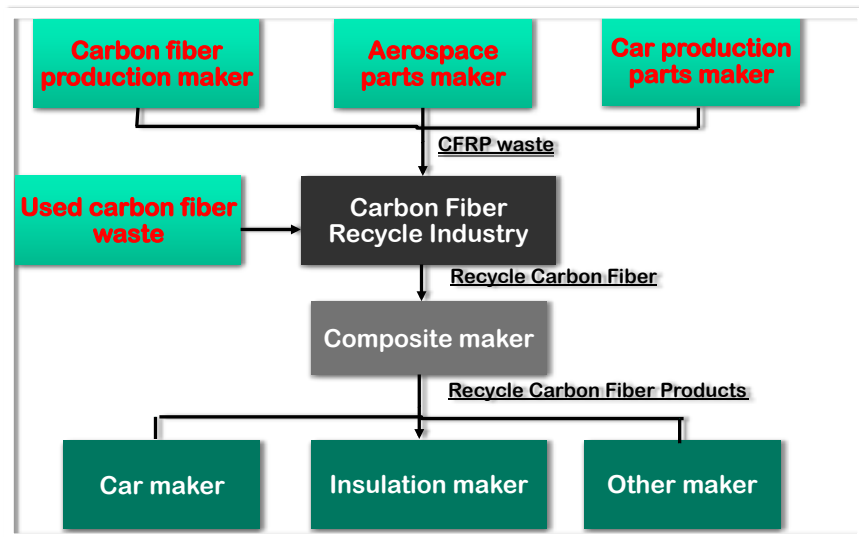
New applications
Carbon Fiber Recycle Industry Ltd.



Instead of
virgin carbon fiber
A lot of maker and user

5. New applications by recycling carbon fiber

Non-woven fabric and plate using carbon fiber with properties such as heat resistance, wear resistance, dimensional stability, light resistance, chemical resistance and electrical conductivity can be expected for various purposes. The mixed product with resin can be also used for reinforcing performance and higher conductivity. The recycling technology will stimulate demand for new applications instead of the high prices for virgin carbon fibers so far.



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