

Remanufacturing: the Future of Sustainability

“Remanufacturing is the key to global economic competitiveness. A nation’s ability to create global product demand, employ people, and conserve resources is paramount to long-term stability.”

A google search for the word “Sustainability” brings up over 115 million hits, while a search for “remanufacturing” garners only 0.5% as many hits. The emphasis on the green economy is pervasive, yet remanufacturing, arguably the definition of sustainability, receives relatively little market or media recognition. Remanufacturing products is just plain smart; the ability for companies to remanufacture products is a critical differentiator from a financial, sustainability, and customer service perspective. Although the remanufacturing industry reached \$43 billion in revenue and employs over 180,000 workers in the United States, most people have never heard of this important industry.¹

¹ "How Remanufacturing Is Booming across the US." *Msnbc.com*. NBC News Digital, 1 Dec. 2014. Web. 02 Mar. 2015.

What is Remanufacturing Really?

Remanufacturing is defined as a comprehensive and rigorous industrial process by which a previously sold, worn, or non-functional product or component is returned to a “like-new” or “better-than-new” condition and warranted in performance level and quality.²

In layman’s terms, remanufacturing is the process of breaking down a product, assessing each part, and remaking the product to equal or better quality than a newly produced good.

Remanufacturing has grown substantially in recent years. In fact, from 2009-2011, the industry grew 15% to reach \$43 billion (“How Remanufacturing Is Booming across the US”).



Interestingly, the Aerospace industry accounts for over 30% of remanufacturing, followed by Heavy Duty/Off-Road and Vehicle Parts. Machinery and IT Devices account for nearly 20% of remanufacturing. In total, remanufacturing employs over 180,000 people in the United States alone. This number is sure to skyrocket over the next decade as more companies convert their manufacturing and design processes to support the remanufacture of goods (“How Remanufacturing Is Booming across the US”).

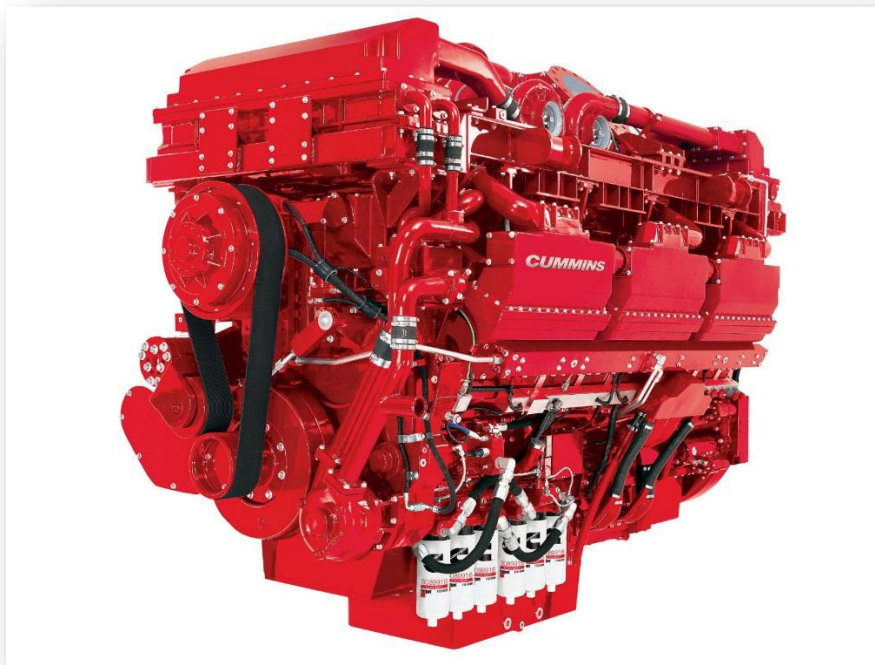
TOP FIVE INDUSTRIES IN THE U.S.
REMANUFACTURING 2011

	PRODUCTION	EMPLOYMENT
Aerospace	\$13 billion	35,201
Heavy Duty/ Off-Road	\$7.7 billion	20,870
Vehicle Parts	\$6.2 billion	30,653
Machinery	\$5.8 billion	26,843
IT Devices	\$2.7 billion	15,442

² "Remanufacturing Industries Council." *Remanufacturing Industries Council*. N.p., n.d. Web. 02 Mar. 2015.

Financial Benefits: Same Product, Multiple Lives

Companies that remanufacture make profit on the exact same product, often many times over. Remanufacturing completely disrupts the end-of life product concept and creates a circular cycle. The automotive industry is the veteran leader of remanufacturing techniques. Cummins, for example, produces engines that can be remanufactured up to three times, which positively impacts long-term profitability. Rather than replace an entire industrial engine, Cummins simply replace failed or worn parts, such as pumps and turbochargers, to restore the unit. In fact, in their most recent Corporate Responsibility report, Cummins reported that over 80% of their engine can be remanufactured, enabling the company to reap profits over and over while simultaneously delivering a quality product. In 2012, Cummins reached \$1 billion in sales of remanufactured products, reclaiming over 50 million pounds of product.³



Not only do the manufacturers save money by remanufacturing, consumers also benefit. Products that are restored to “like new” condition can save consumers up to 40 percent in comparison to brand new products, while also decreasing the environmental footprint of manufacturing.⁴

³ "Remanufacturing." *www.cummins.com*. N.p., n.d. Web. 02 Mar. 2015.

⁴ Shukla, Arun, and Ramesh Subramoniam. "The Lure of 'Like New'." *The Lure of 'Like New'*. N.p., Dec. 2014. Web. 02 Mar. 2015.

One reason businesses may be weary of adopting remanufacturing processes is the fear that these products will cannibalize new sales. A recent report from FTI Journal refutes this claim and states that “recent reports confirm that returns processing not only will not negatively affect sales of new products but potentially could boost volume due to improved design knowledge and innovation gained from manufacturing” (“The Lure of Like-New” 4).

From the Original Equipment Manufacturer’s Perspective

In order for an OEM to justify the investment in developing the internal or external capability to remanufacture, they must develop a model that shows the return on investment. The business case for remanufacturing looks at yield, cost to remanufacture, cost of new, and ASP of remanufactured products. Using these data points an OEM can quickly determine the profitability of remanufacturing and the strategy to move forward. To demonstrate this analysis, in simple form, review the table below for Widget 123 that has a new sales price of \$100. In a traditional sales model, Widget 123 would yield a profit of \$40 for each new sale. If remanufacturing is introduced we see the model change quickly.

Financial Opportunities of Remanufactured versus New for Widget 123

New Sales Price	\$100.00
New Cost	\$60.00
Advanced Exchange Price	\$65.00
Cost to Reman	\$10.00
Yield	90%

Traditional Sales Model	All Sales
New Sale	\$100.00
New Cost	<u>\$60.00</u>
Gross Profit	\$40.00

Reman Sales Model	First Sale	Reman Sales Model	Second Sale	Reman Sales Model	Third Sale
Advanced Exchange Sale	\$65.00	Advanced Exchange Sale	\$65.00	Advanced Exchange Sale	\$65.00
New Cost	\$60.00	Reman Cost	\$10.00	Reman Cost	\$10.00
		Yield Factor	<u>\$6.00</u>	Yield Factor	<u>\$6.00</u>
Gross Profit	<u>\$5.00</u>	Gross Profit	\$49.00	Gross Profit	\$49.00

Total New Product GP	\$40.00
Total Reman Product GP	\$103.00

Sustainability Benefits: *Out with the Old and in with the New*

Remanufacturing marries competitive business with corporate responsibility, and this business model will be increasingly important. In recent decades, the strain on the Earth's raw materials has become alarming. In addition, population growth is expected to soar. By



2050 the world's resources must support a population expected to reach over 9.2 billion ("The Lure of Like-New" 2-3). As the middle class populations in developing countries continue to grow, consumption is expected to increase, creating both risks and opportunities. One risk that has already started to manifest is the issue of increased waste. From 1980 to 1997, solid waste in OECD countries rose 40%, and is expected to grow another 40% by 2020.

As more and more goods are produced to sustain consumer habits, the associated waste degrades the environment and creates an additional cost of disposal. Remanufacturing, in contrast, presents an opportunity to reduce the energy expended to manufacture new products. In an increasingly competitive world, remanufacturing can reduce the uncertainty of the price swings of raw materials while simultaneously reducing toxic waste. Often times, remanufacturing facilities are more conveniently located near the customer base, reducing the energy used on shipping and transportation. Material recovery through remanufacturing is a profitable way to reduce reliance on fossil fuels.

The Challenges of Remanufacturing

It is certainly not easy to adopt remanufacturing, although many companies would benefit immensely from incorporating these processes. Ramesh Subramonium of FTI Consulting asserts that, "Remanufacturing requires a dedicated returns management process and different financial and demand-planning models." In addition, the costs to establish remanufacturing can be incredibly high because equipment, storage, and transportation must

be customized. There are two main challenges that typically stand in the way of incorporating remanufacturing:

1. Lack of Returns Management Processes

Often times, companies are unable to accurately forecast returns. They don't know how much is coming back and in what condition. Even if a company can successfully forecast returns, the information about these returns often does not include defect details that can be used to assess critical parts for repair. Visibility into all returns across sales channels is critical to plan remanufacturing of components. In many companies, the lack of executive sponsorship of a returns management strategy is extremely detrimental.

2. Disconnect between Design and Manufacturing

It is critical to facilitate communication between engineering, design, and manufacturing. For products to be easily broken down and remanufactured, they must be designed as such. By gathering data on the causes for returned goods, companies can improve their design process thereby improving customer satisfaction. Closing the loop between design and manufacturing standardizes material to be remanufactured.

Keys to Success

In order for remanufacturing to take its rightful place in the world of sustainable manufacturing, two things must take place:

1. A definition of remanufacturing should be established.

Confusion remains about what remanufacturing entails and how it relates to sustainable manufacturing. In order to promote remanufacturing, a common definition must be accepted by all.

RIC defines remanufacturing as a comprehensive and rigorous industrial process by which a previously sold, worn, or non-functional product or component is returned to a "like-new" or "better-than-new" condition and warranted in performance level and quality (RIC footnote).

2. Common standards must be developed.

The Remanufacturing Industries Council (RIC) has taken important steps to develop the American National Standard for Remanufacturing under the American National Standards Institute (ANSI). This new standard establishes technical specifications, benchmarks to ensure quality of remanufactured goods.

Remanufacturing Industries Council

The Remanufacturing Industries Council (RIC) is the leading industry body that promotes remanufacturing. The goal of RIC is to support remanufacturing across industries by creating collaboration opportunities and fostering education, advocacy, and research of this field. RIC is spearheading the initiative to bring standardization to the remanufacturing as well as sponsoring roundtable events to bring leaders of remanufacturing together. Major players in the remanufacturing space have joined RIC recently, including Caterpillar Inc., Cummins Inc., John Deere Reman, and GE Healthcare.

Innovation Case Study: Nextant

One of RIC's most interesting members is Nextant Aerospace. Their slogan says it all: Reimagined, Rebuilt, Reborn. Nextant is one of the first companies to successfully remanufacture jets. The Nextant 400XTi, backed by a full factory warranty and a global network of service centers, is completely disrupting their niche market. Selling for half the price of comparable jets, the 400XTi is built using a unique remanufacturing process through which an existing airframe is re-built with the latest technological advances in aerodynamics and avionics.⁵ Nextant is a stellar example of a company that has capitalized on remanufacturing innovation to the benefit of their customers and their profit.



*Source: Nextant Website

Economics versus the Environment: There Really are no Trade Offs

For many years, buying sustainable products meant paying a premium. Whether buying organic food or solar powering your home, the consumer typically has to value these positive externalities to accept higher prices. Remanufacturing, in contrast, creates zero trade-offs. Prolonging the lifespan of goods through remanufacturing is both “green” and

⁵ "Nextant 400XTi | Nextant G90XT | Remanufactured Private Jets - Nextant Aerospace." [Http://www.nextantaerospace.com](http://www.nextantaerospace.com). N.p., n.d. Web. 02 Mar. 2015.

cost effective for the retailer, OEM, and consumer. Our financial model shows that by adopting remanufacturing processes, it is possible to far exceed the profits made by producing a new good, all while maintaining quality. By remanufacturing products, the traditional linear process of making goods completely transforms into a closed loop. Win-win-win.

The Challenge

Understanding where to start – how to integrate remanufacturing into your corporate DNA – can be complicated. If you need help starting or improving the process, Spinnaker can help. Let a Spinnaker consultant help you achieve your desired future state.

About the Authors



Paul Adamson



512.713.5957



padamson@spinnakermgmt.com

Paul Adamson is the Director of Business Development and Marketing for Spinnaker. He has over 20 years of industry experience in Returns Management, Service Operations, and Sustainability. A recognized subject matter expert in Electronics Remanufacturing, Recycling, and Second-Life Applications, Paul has been a regular moderator and panelist at regional and national conferences on reverse logistics, material reuse, and recycling. Throughout his career, Paul has worked in leadership positions for a variety of industries including Consumer Electronics, Distribution, Retail, and Sustainability.

Prior to joining Spinnaker, Paul founded two successful electronic test and repair companies with global operations. Paul's diverse background includes strategy, operations, and business development roles for other high-tech repair and remanufacturing companies. In these roles he has helped develop reverse logistics, remanufacturing, and recycling strategies for clients with operations across the globe. Most recently, Paul worked to establish collection and processing capabilities in Central America for universal waste, electronics, metals, and plastics. Paul received his B.S. in Business Administration from LeTourneau University.



Delana Lensgraf



713.702.2845



mlensgraf@spinnakermgmt.com

Delana Lensgraf is the Research Content Specialist for Spinnaker's Supply Chain practice. An expert in international relations, Delana blends a unique skillset of global supply chain operations and corporate social responsibility. At Spinnaker, Delana is responsible for driving thought leadership across the firm's four lines of business. In this role, Delana collaborates with practice leaders to publish innovative pieces on topics from Remanufacturing to Omni-Channel to Electronic Waste.

Prior to joining Spinnaker, Delana's career in International Development brought her to five continents to work with leading non-profits and consultancies. This time abroad fostered Delana's passion for sustainability in global supply chains. Fluent in Spanish, Delana completed three years as a Teach for America corps member serving in a low-income Latino school in Houston, Texas. Delana holds a Bachelor of Arts in International Studies from the University of North Carolina at Chapel Hill and a Master of Science in Foreign Service from Georgetown University.

Works Cited

"How Remanufacturing Is Booming across the US." *Msnbc.com*. NBC News Digital, 1 Dec. 2014. Web. 02 Mar. 2015.

"Nextant 400XTi | Nextant G90XT | Remanufactured Private Jets - Nextant Aerospace."

Http://www.nextantaerospace.com. N.p., n.d. Web. 02 Mar. 2015.

"Remanufacturing Industries Council." *Remanufacturing Industries Council*. N.p., n.d. Web. 02 Mar. 2015.

"Remanufacturing." *Www.cummins.com*. N.p., n.d. Web. 02 Mar. 2015.

Shukla, Arun, and Ramesh Subramoniam. "The Lure of 'Like New'." *The Lure of 'Like New'*. N.p., Dec. 2014. Web. 02 Mar. 2015.