Remanufacturing and Reverse Logistics: Waste to Recovery

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Agenda

Why is Remanufacturing Critical?

Highlights on Efforts in Remanufacturing

Reverse Logistics: How does it fit?

Opportunities for Vietnam
WHY IS REMANUFACTURING CRITICAL?
2010 Global manufacturing output = **USD 10.1 Trillion**

IN APAC, China alone make up USD 2.0 Trillion accounting for approximately **20 percent** of the 2010 global manufacturing output.

Global remanufacturing output value not even **5 percent** of global manufacturing output.

**Sustainability issues in manufacturing… opportunity for Remanufacturing**
What we had done!

- 100 million units personal computer sold in APAC
- 130 million units of smartphones sold in APAC
- Rain forests being cut down 100 acres per minute
Is our inputs to manufacturing sustainable?

2010 world consumption of non renewable natural resources

- Coal = ~ 7 billion Tonnes
- Steel = ~ 1.3 billion Tonnes
- Crude oil = ~ 30 billion Barrels

2010 world reserve for non renewable natural resources

- Coal = ~ 930 billion Tonnes
- Crude oil = ~ 1350 billion Barrels

High Consumption + Limited Resources = Not Sustainable
Facts to ponder…

• Every year we fill enough garbage trucks to form a line that would stretch from the earth, halfway to the moon.
• Only two human-made structures on Earth are large enough to be seen from outer space: the Great Wall of China and the Fresh Kills landfill, located on the western shore of Staten Island!
• Raw materials saved by remanufacturing would fill 155,000 railroad cars forming a train 1,100 miles long.
• Energy savings by remanufacturing equals the electricity generated by 8 nuclear power plants or 16 Million barrels of crude oil
We don’t have the liberty of infinite resources to sustain future growth at this pace...

THEN, HOW?
Viable Solution: REMANUFACTURING

- Conserve natural resources
- Eliminate Landfill
- Save the forest and environment
- Second line of products for manufacturers
Global market demands and governmental pressures are pushing business to become more sustainable. Legislation regarding environmentally-friendly products is becoming more important than ever. Consumers and distributors are seeking repair and service options for good financial sense and high-quality products.

Remanufacturing: Path for Sustainability

Annual energy savings resulting from remanufacturing activities worldwide:
120 trillion Btu’s, which equals the electricity generated by 8 nuclear power plants, or 16 million barrels of crude oil.

Remanufacturing saves over 80% of the energy that would have been used to produce a new part.

Remanufactured components are 40 – 60% the cost of a new component and can save 70% on materials during production.
Benefits of Remanufacturing

The Benefits of Remanufacturing

Business Angle
- Cost savings
- Increased profits
- Enhanced reputation and market value
- Purchasing flexibility

Environmental Angle
- Raw material conservation
- Landfill space conservation
- Air pollution reduction
- Energy conservation
HIGHLIGHTS ON EFFORTS IN REMANUFACTURING
What companies do in Remanufacturing?

I. TATA – Recon Engine

II. Aisin AW – Remanufactured A/T

III. Fuji Xerox – Remanufacturing components
What TATA Motors has done?

Reconditioned engines is a unique exchange scheme offered by Tata Motors Pvt Ltd, in which, OE standard, high quality long blocks are provided in exchange of used long blocks.

Reconditioned engines offers the following benefits:

- Genuine spare components
- Highest quality of aggregates and components
- Higher performance, comparable with new product
- An increased uptime of the vehicle, ensuring higher returns
- Attractive warranty and nationwide service support (backed by 6 months warranty)
- Wide range of reconditioned engines

Beside Engine, TATA also promotes Recon power steering, rack and pinion gear, power steering pump and so on.
What Aisin AW has done?

AISIN AW CO., LTD.

Remanufacturing automatic transmission at lower price for repair and replacement of models already in service

- The company started the remanufacturing business in 1969
- During 1979-1980, company started remanufacturing of AT for Toyota models
- Expand the use of returnable container
- Remanufacturing project for hybrid system
- Promoting initiatives to recover discarded parts

Company contributes to environment conservation through its remanufacturing program. In 2009, The company had remanufactured 13,000 units of AT in Japan.
What Fuji-Xerox has done?

The company installs all remanufactured components in all products without distinction between new and remanufactured products.

- Demand for remanufactured products is not restricted by consumers product selection
- Achieve 99.9 percent resource recycling rate from products in Japan, 99.8 percent from Asia Pacific

Reusing waste toner saves several million dollars in raw-material costs each year.
- Equipment remanufacture and the reuse and recycling of parts prevent millions of pounds of waste from entering landfills each year.

Source: Fuji Xerox 2010 sustainability report
Remanufacturing: Select Industry Examples

Automotive Sector (e.g. spare parts, tires, alternators, starter motors, engines)

- **BMW’s recycling and remanufacturing campaigns** has shown that the cost of a remanufactured engine of BMW account for 50-80% of a new one.
- During this process, **94% of the old engines are repaired**, 5.5% of them dissolved regeneration and only 0.5% is dumped in landfills.

- Since 1947, **Volkswagen has managed to recover 7.48 million units of original engines remanufactured**.
  - This figure is equivalent of **saving 337,366 tons of steel** (enough to build 49 Eiffel Towers and 161 golden gate bridges).
  - **CO2 were reduced by 572,220 tons**, sulfur dioxide emissions reduced by 569 tons, and nitrous oxides emissions reduction of 662 tons

Healthcare (e.g. Medical Devices)

- Ascent leads in the **remanufacturing of medical devices** in the US, its hospital partners have realized hundreds of millions of dollars in **cost savings through the use of medical device remanufacturing programs**.
- On a per-hospital basis, some **hospitals saved more than $600,000 per year**. Ascent’s programs also helped customers reduce their environmental footprint by **diverting an estimated 5.3 million pounds of total waste from landfills**.
Remanufacturing: Select Industry Examples

Imaging Industry  (e.g. Copiers and Ink Cartridges)

- 265 million HP print cartridges have been recycled since the Renew program began in 1991, representing a weight of 343 million pounds.
- HP has also been recycling and refurbishing computer hardware since 1987, and collects approximately 2.5 million hardware products each year that is refurbished, resold or donated.

Electronics  (e.g. Computers, TV’s and Cameras)

- IBM processed nearly 100 million pounds product end of life equipment and material with only 0.78% returned to landfills or incinerated.
- IBM Global Asset Recovery Services processed 88,512 metric tons of end-of-life product and material through its de-manufacturing centers, resold or reused over 4.6 million machines and processed an estimated 40,000 machines or 1.8 million pounds per week around the world.
Regulation, Initiatives or Incentives for remanufacturing

**Regulation**

Quality System Regulation (revision of Good Manufacturing Practices (GMP)) – To define remanufacturing, ensure quality of remanufactured products and identify parties responsible for remanufactured products

**Initiatives or Incentives**

China certified manufacturing companies with pilot remanufacturing enterprise status to acknowledge and encourage manufacturer involvement in remanufacturing industry

Government of China granted funds to further research into remanufacturing, enhance the role of research institutions and companies in pushing forward technological innovation in the remanufacturing sector
Reverse Logistics: How does it fit?
Need for reverse logistics - The core concept applies

Through choice of most profitable alternative:

- **Reconditioning** – when a product is cleaned and repaired to return it to a “like new” state
- **Refurbishing** – similar to reconditioning, except with perhaps more work involved in repairing the product
- **Remanufacturing** – similar to refurbishing, but requiring more extensive work; often requires completely disassembling the product
- **Resell** – when a returned product may be sold again as new
- **Recycle** – when a product is reduced to its basic elements, which are reused – also referred to as asset recovery
Reverse logistics provide support (raw materials) to remanufacturing

- Make money from waste
- Save the environment
- Sustainable solution
Reverse supply chain requirements can be organized at either consumer or industry level by key industries.
Potential reverse logistics hubs / sourcing locations

- Mobile Devices
- Printer / Cartridge
- Battery
- Engines / transport equipments

Locations:
- China
- Hong Kong
- Singapore
- Malaysia
Strong growth trend of manufacturing industry with CAGR of 25%

Indicates Vietnam as a strong and sustainable manufacturing source in the region
Transport equipment, electronics and electrical equipment are the key industries for remanufacturing.

Breakdown of manufacturing industry by gross output:

- Food products: 21%
- Non-metallic mineral products: 4%
- Chemicals and chemical products: 6%
- Fabricated metal products (except machinery and equipment): 6%
- Transport equipment: 26%
- Rubber and plastics products: 5%
- Wearing apparel: 5%
- Textiles: 5%
- Basic metals: 5%
- Computer, electronic and optical products: 7%
- Electrical equipment: 4%
- Others: 4%

Key industries with remanufacturing potential in Asia Pacific:
Moving up value chain - Remanufacturing

1986
Transition of Vietnam Economy

Joined World Trade Organization (WTO)

2007

Focus on
- Infrastructure development
- Human resources training
- Social-economic development

Move up the value chain by not only manufacturing quality products at low cost

New Business Model - Remanufacturing

2010

2020
Opportunity to emerge as remanufacturing hub

Vietnam can emerge as a remanufacturing hub due to:

- Low manufacturing cost
- Strong and sustainable manufacturing industry
- Strategic location surrounded by major production and logistics hubs
Potential countries to source used core...

### Source of used products

**Transportation Equipment**
- Thailand
- Malaysia
- China
- Indonesia

**Electronics, mobile products**
- Taiwan
- Malaysia
- Singapore
- Indonesia
- Hong Kong
- China

**Printer / Cartridge**
- Malaysia
- Singapore
- Thailand
- Taiwan
- Hong Kong
- China

Remanufacturing in Vietnam
Remanufacturing hub for transportation equipment

As remanufacturing hub for transportation equipment such as power steering, rack and pinion gear, power steering pump and so on

Used parts collected from other countries

Disassembly of used parts

Cleaning and surface treatment of subparts

Used alternator (Left)
Rемanufacturer alternator (Right)

Final Testing

Reassembly

Reconditioning

Source: Shin – Etsu Denso Co. Ltd.
Collected and remanufactured

Developed robust reverse supply chain to collect used cartridge, printer, battery and mobile devices for remanufacturing

Remanufacturing in Vietnam

Raw materials from other countries

Support by Key Manufacturers: Fuji-Xerox, GE and Nokia

Remanufactured products

To be distributed
What needs to be done?

- Efficient reverse supply chain
- Increase awareness in remanufacturing
- Government incentive
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