Remanufacturing: Current and Historical Perspectives

Remanufactured Goods: An Overview of the U.S. and Global Industries, Market, and Trade
Washington, D.C.

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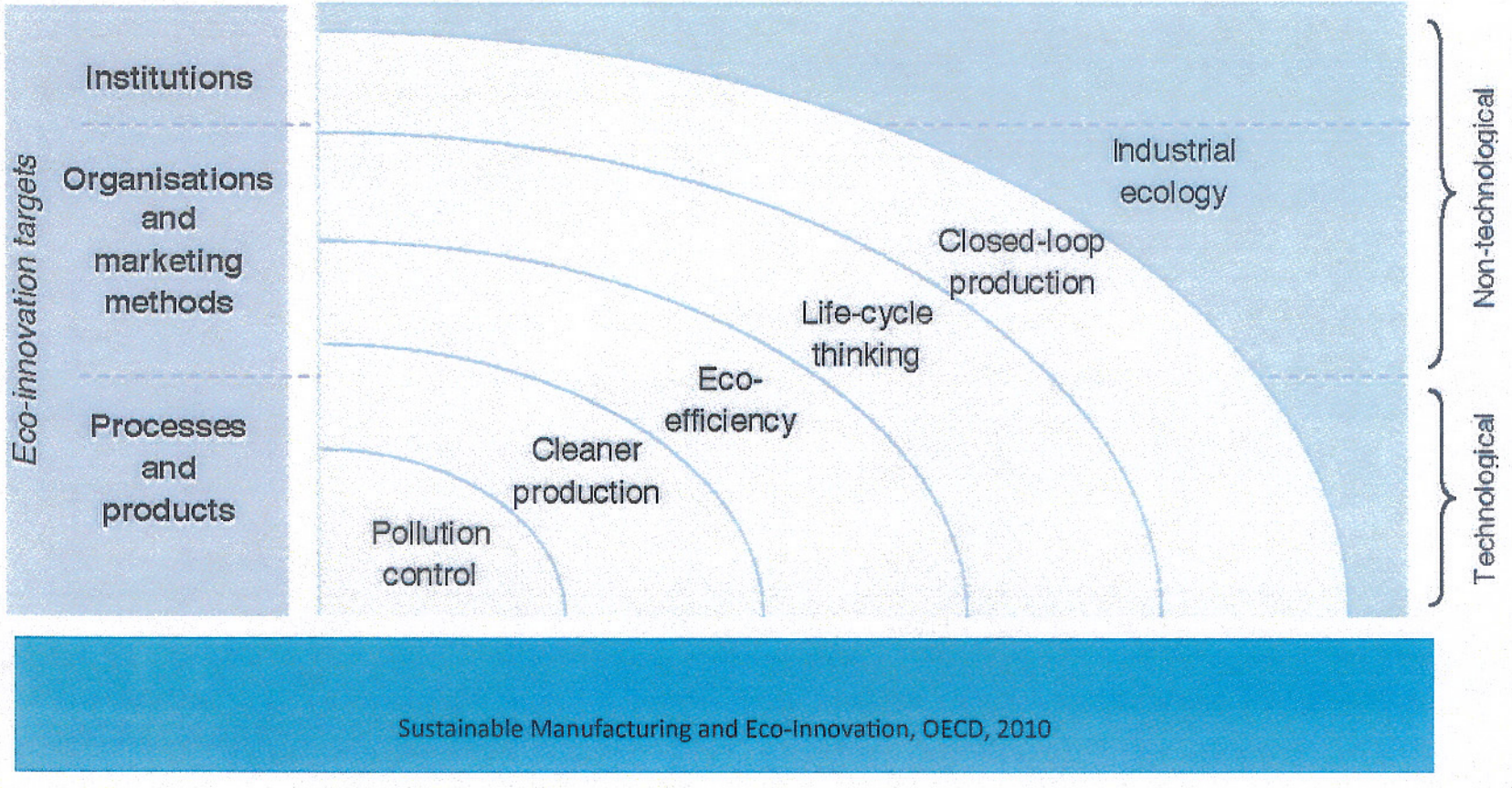
Why is Remanufacturing Critical?

Conceptual Relationship between Sustainable Manufacturing and Closed-Loop Systems



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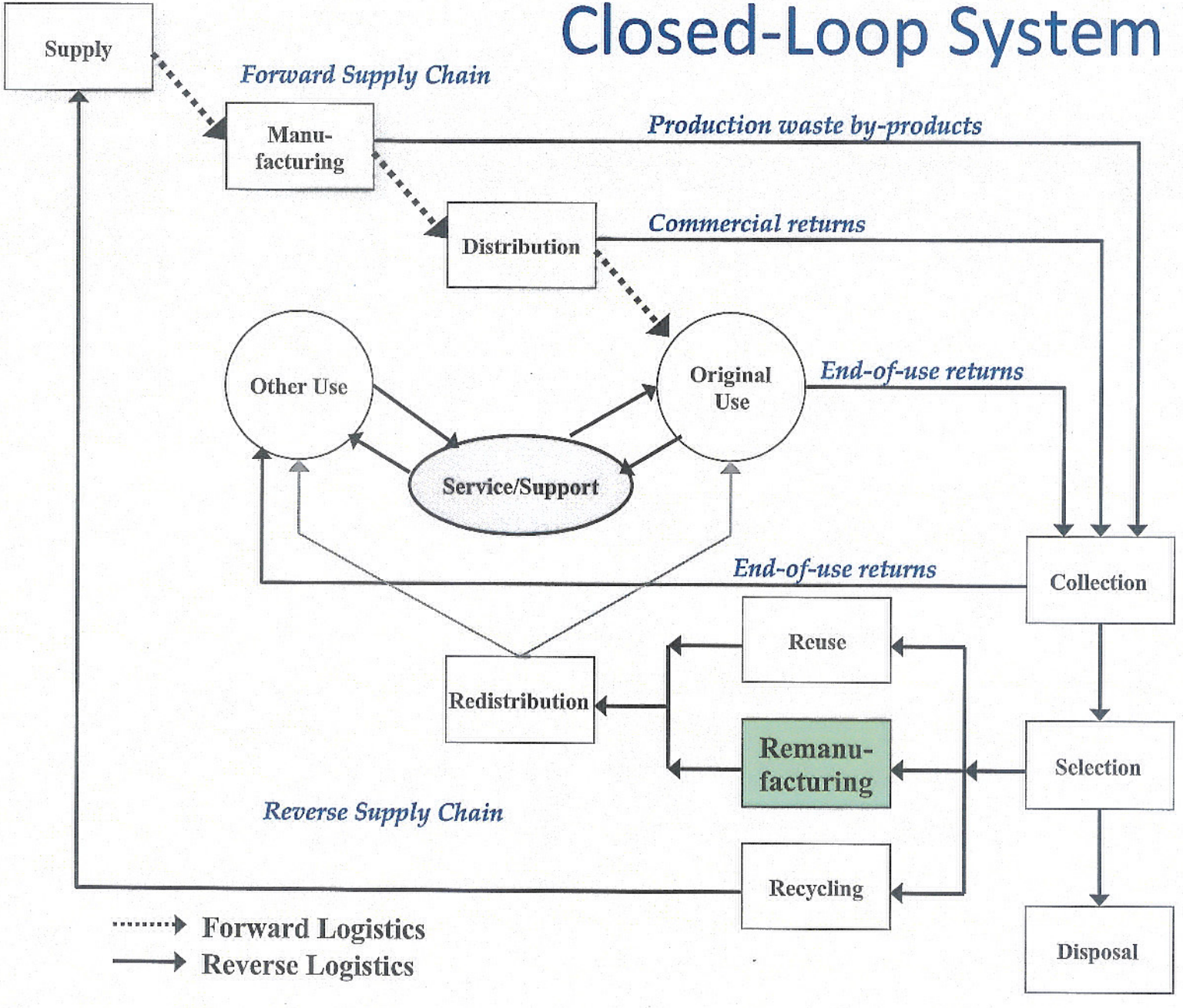
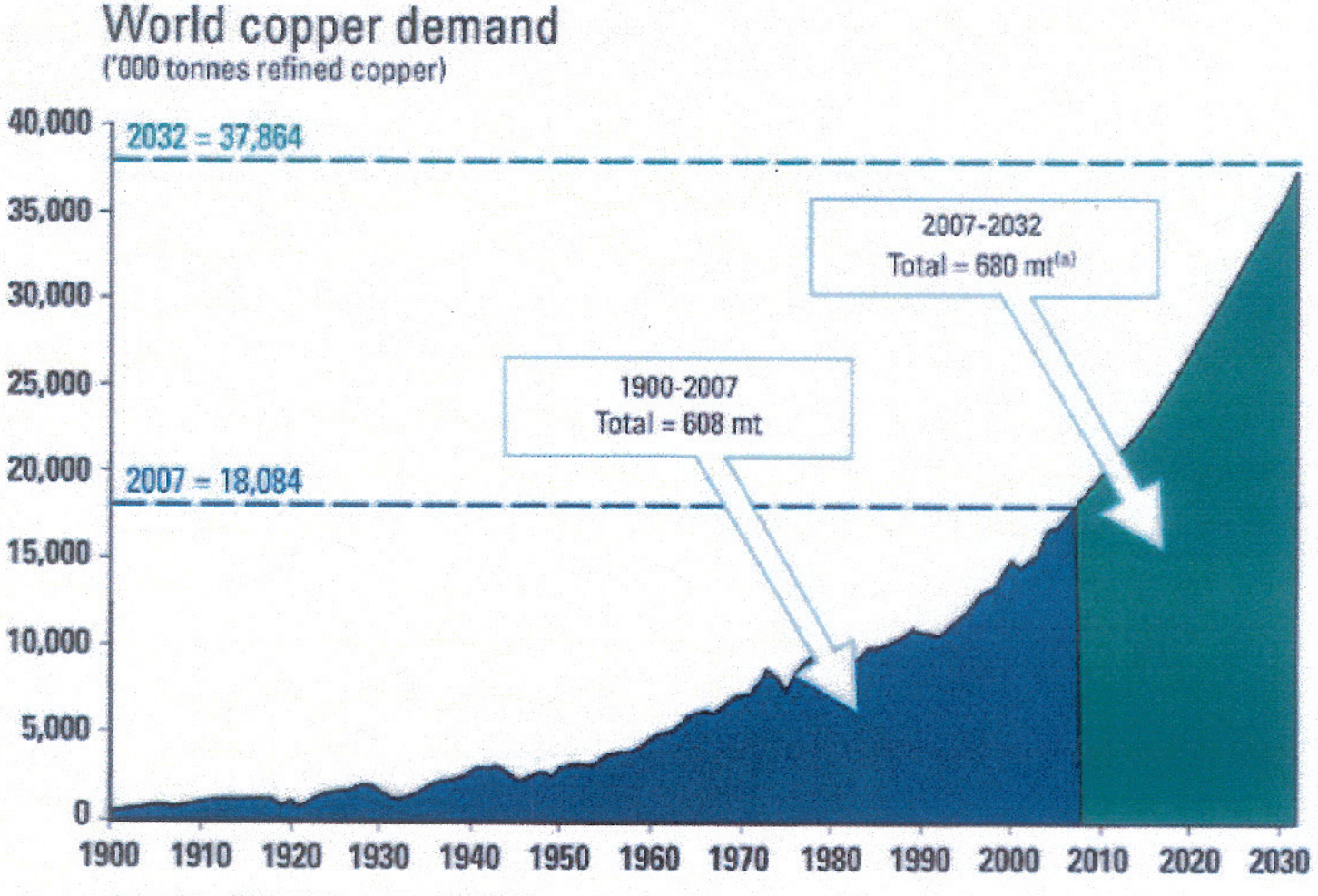
Closed-Loop System

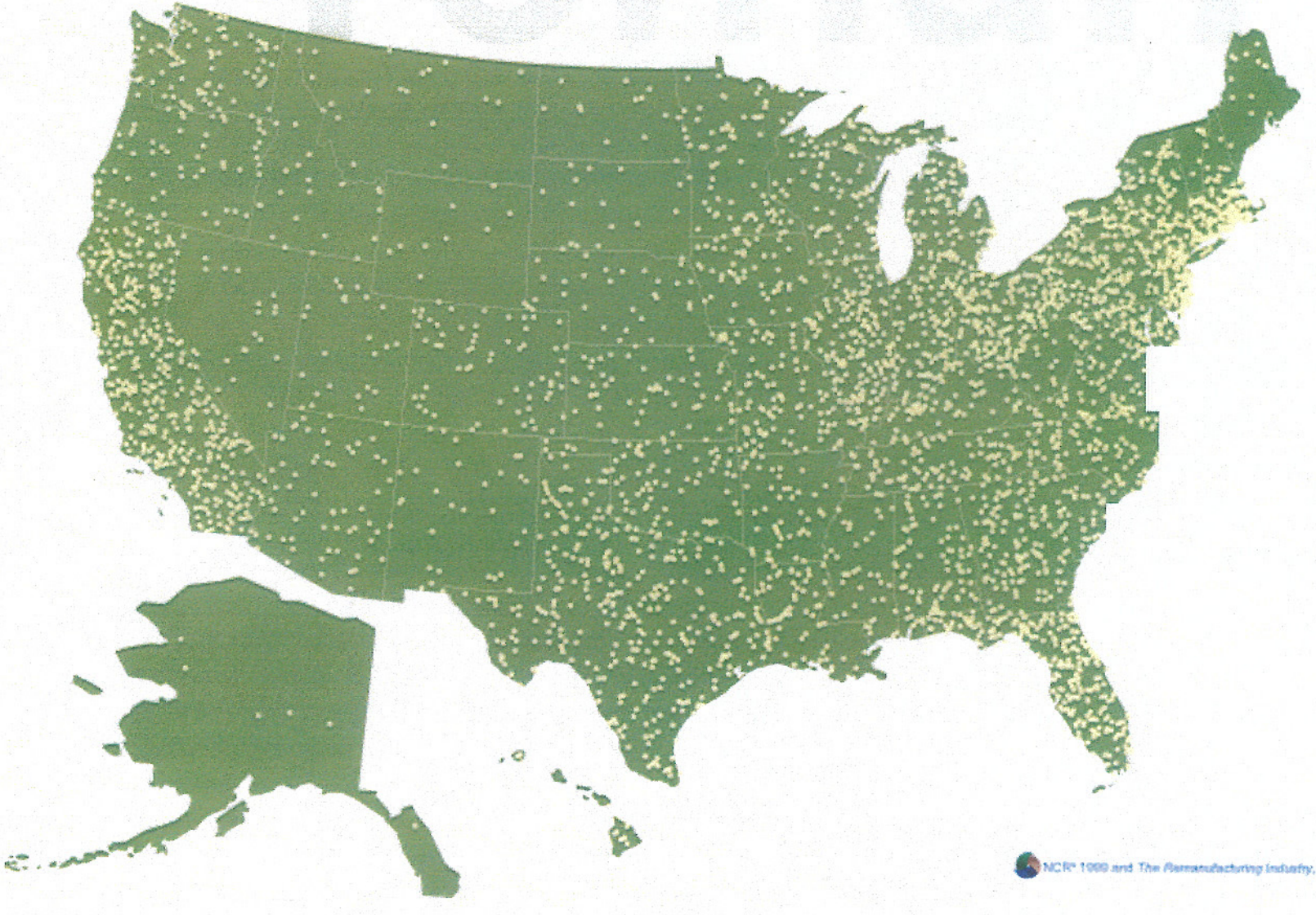


To satisfy demand the world may need to mine as much copper over the next 25 years as throughout history



Source of data: CRU Copper Quarterly (January 2008); CRU archive data.
(a) Future copper consumption based on a hypothetical world average growth rate of 3% p.a., based on a projection of similar growth patterns in world demand to the past 20 years.

Remanufacturing in the United States



NCR© 1999 and *The Remanufacturing Industry, Hidden Giant*, Boston University 1998

Benefits of Remanufacturing

Environmental:

- **Waste Minimization**

  product are *appropriately* dismantled and material are reused or recycled

- **Energy**

  significant process energy is recaptured

- **Materials**

  large percentage of old materials reused

- **Prevention**

  provide an economical incentive to design products for the environment

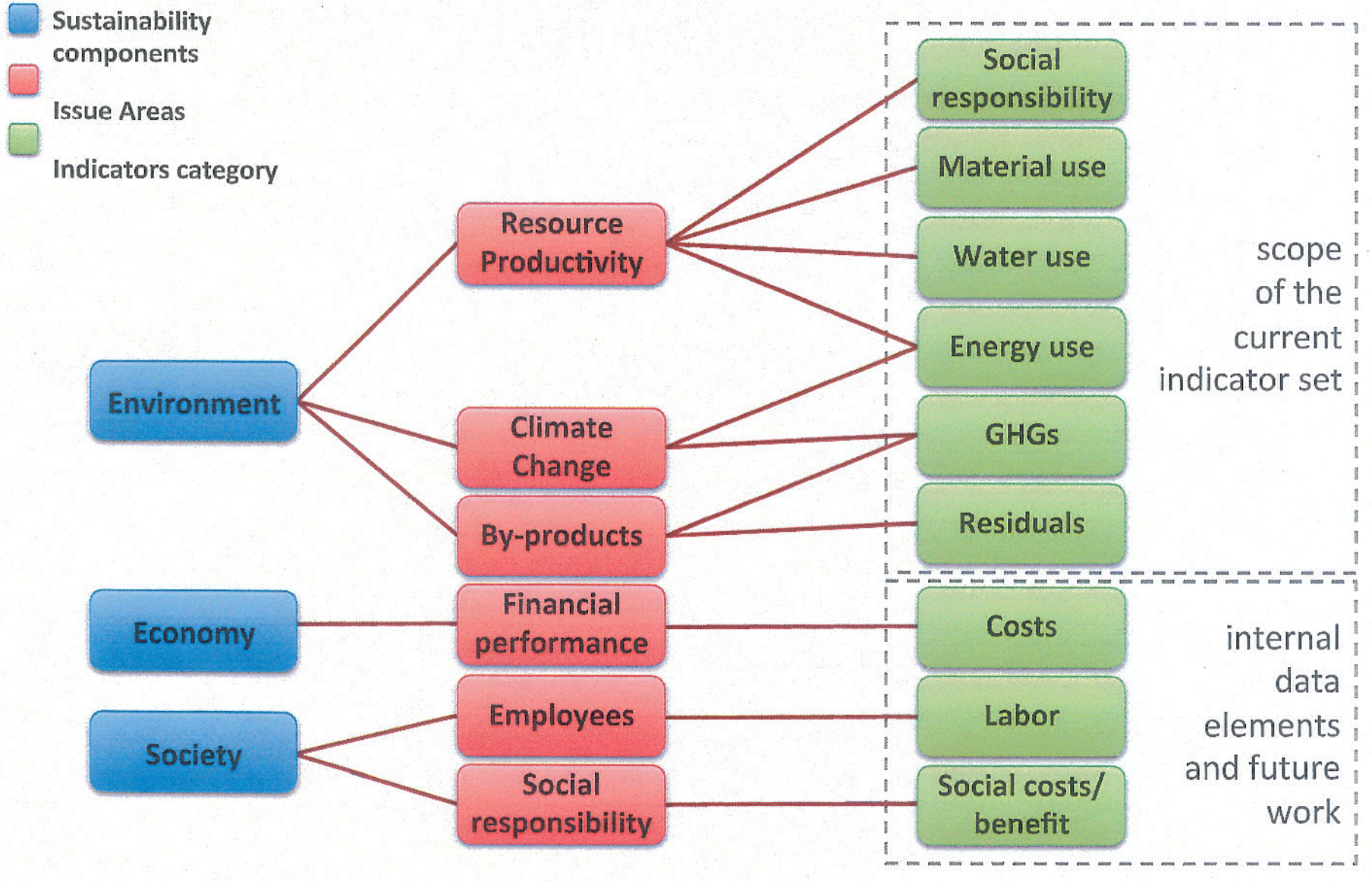
Economical:

Reman products are 25-50% cheaper than new

Labor:

Remanufacturing is a significant source for employment

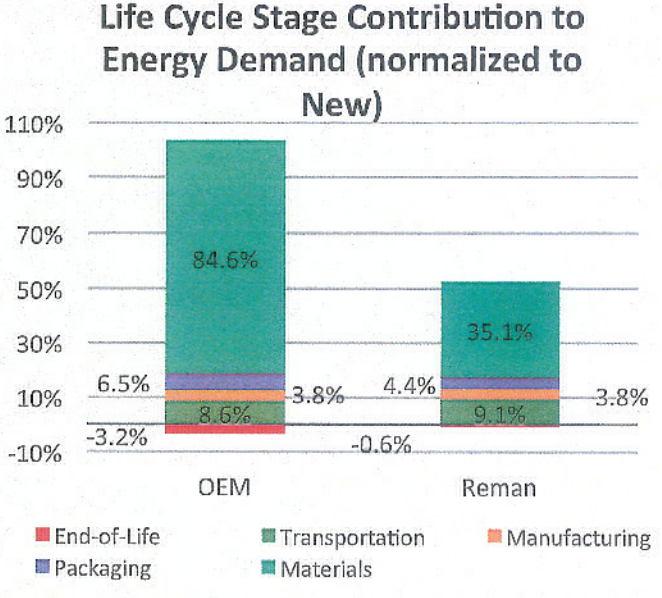
OECD Sustainable Manufacturing Indicator Categories

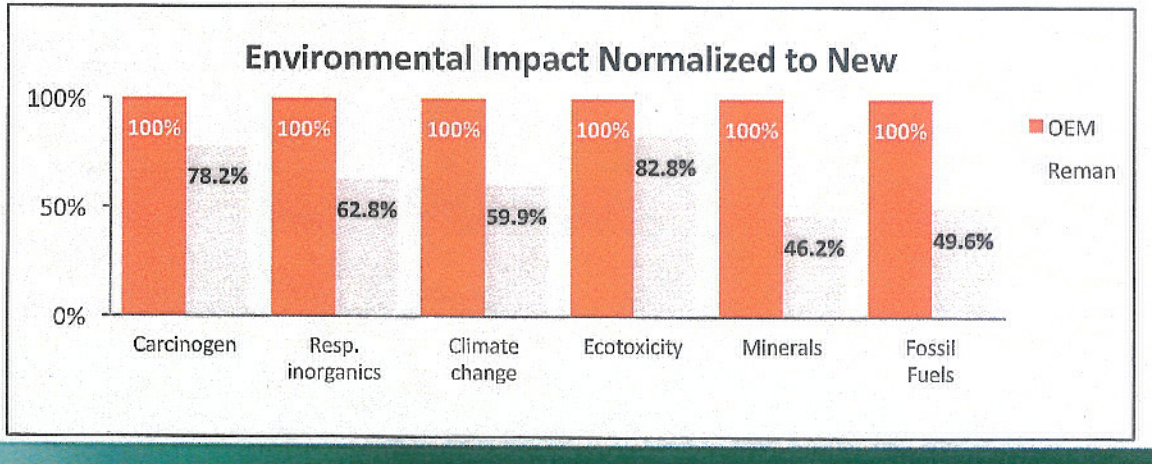


Remanufacturing Life Cycle Assessment

Full Life Cycle Assessment (LCA) modeling tools adapted to handle remanufacturing.

- Compliant with ISO 14040.
- Current model of office equipment shows that remanufacturing provides life cycle benefit significantly greater than just EOL recycling.





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Top Remanufacturing Sectors

- Aerospace
- Automotive
- Consumer Products
- Electrical Apparatus
- Furniture
- Heavy Duty/ Construction
- Imaging Products
- IT Equipment
- Locomotive Systems
- Machinery
- Medical Equipment
- Restaurant Equipment
- Tires

Reman Industry: History and Trends

- 1920 - 30s — emergence of mass production
- 1937 — Henry Ford established first organized Reman factory
- 1940's — WW II led to shortage of resources and greater need to remanufacture
- 1970's — issues such as solid waste disposal and energy conservation entered the national consciousness
- 1990 — RIT Remanufacturing Research Program established (Became C3R in 1997)
- 1995 — Remanufacturing Industries Council International Formed in Rochester, NY

Reman Industry: History and Trends

- 1998 - NYS to become 1st State to provide incentives for Reman products
  - legislation protecting Reman businesses introduced in NYS
  - the remanufacturing industry developed "Vision 2020"
- 1999 "The Automotive Parts Reman Industry Roadmap" developed Many States passed legislation aimed at protection of Reman businesses
- 2000's environmental conservation/compliance become a major challenge to industry Sustainable development and sustainable products are key to industrial development