

# Beyond Recycling: Unlocking Industrial Value Through Repair & Remanufacturing

Closing the \$Billions Gap in Circular Value Retention

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# Executive Summary: A Critical Strategic Gap

Recent findings from the **Circularity Index 2026** expose a critical gap in industrial sustainability strategies: **47.5% of major industrial firms have no quantitative targets for value retention**—specifically in repair, refurbishment, and remanufacturing. While many organizations have embraced recycling as a sustainability pillar, this narrow focus is fundamentally flawed. Recycling recovers materials, but value retention preserves embedded labor, energy, engineering, and capital.

The consequences of this gap are significant and compounding. Firms operating under a recycling-only mindset are leaving billions in economic value on the table, missing margin expansion opportunities, and increasing their exposure to supply chain volatility—all while weakening their positioning in the rapidly emerging circular economy.

This whitepaper outlines why leading firms must shift from a "**recycling mindset**" to a "**value retention model**", and how to operationalize this transformation across strategy, operations, finance, and technology.

## Billions in Lost Value

High-value components discarded prematurely, with raw material reinvestment replacing what could be retained.

## Missed Margin Growth

Secondary revenue streams and lifecycle services left untapped by firms focused solely on recycling compliance.

## Supply Chain Risk

Increased exposure to volatile raw material markets and geopolitical disruptions without value retention buffers.

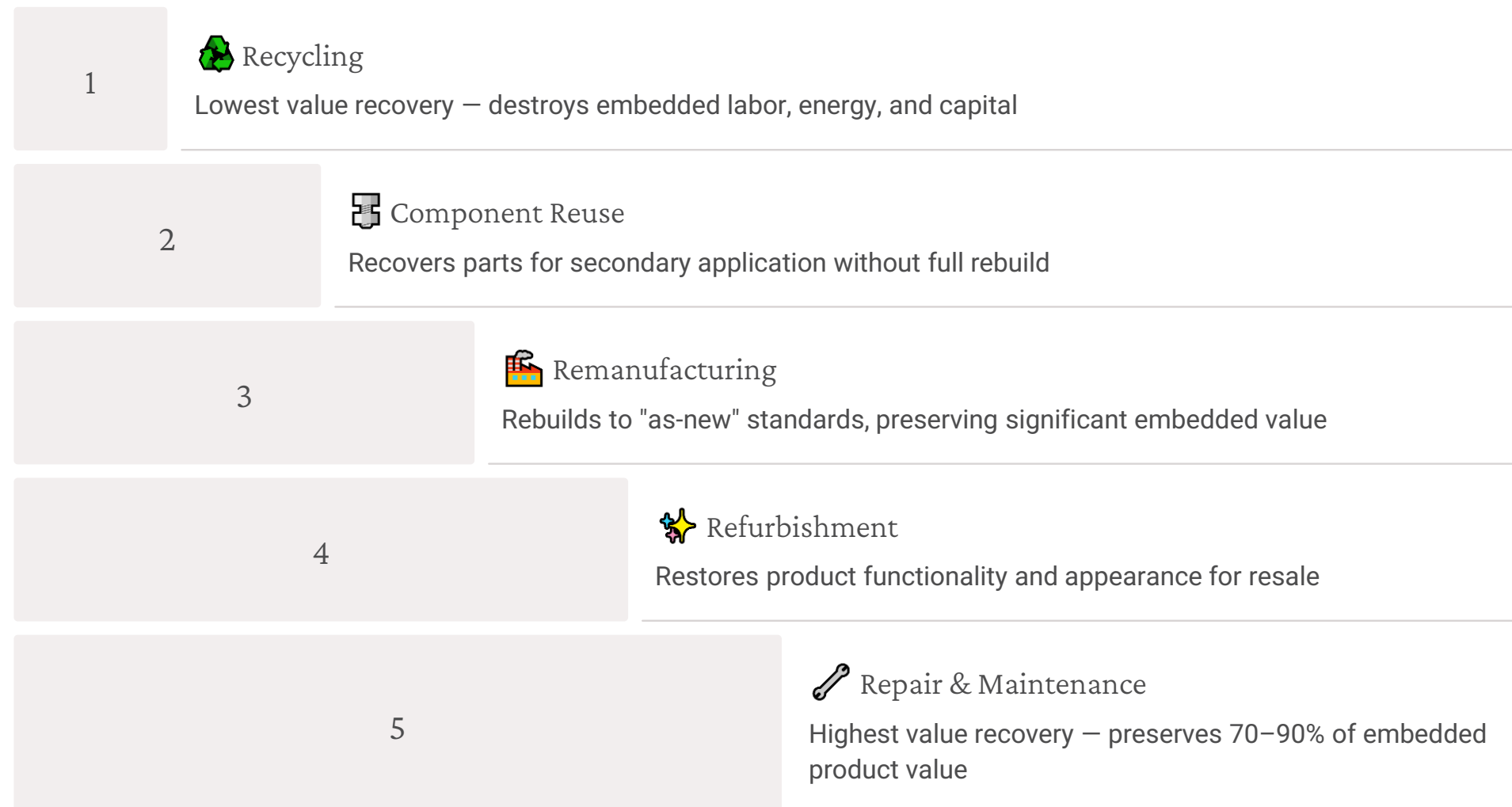
## Circular Economy Lag

Weak positioning as circular-native competitors gain ground in sustainability-driven markets.

# The Circularity Gap: Recycling Is Not Enough

Industrial firms have largely equated circularity with waste reduction, recycling programs, and ESG reporting compliance. However, recycling operates at the **lowest value recovery level** in the circular hierarchy. This misalignment between perception and reality is costing firms dearly.

The hierarchy of value retention reveals a clear spectrum from highest to lowest value recovery. Repair & Maintenance sits at the top, followed by Refurbishment, Remanufacturing, Component Reuse, and finally Recycling at the bottom. The critical insight: **recycling destroys most of a product's original value, while repair and remanufacturing preserve up to 70–90% of embedded value.**



# The Hidden Cost of the Recycling-Only Mindset

By failing to implement value retention strategies, firms are discarding high-value components prematurely, reinvesting unnecessarily in raw materials, and losing secondary revenue streams that could meaningfully expand margins. These are not marginal inefficiencies—they represent systemic strategic failures with compounding financial consequences.

Operationally, the recycling-only mindset creates increased dependency on volatile raw material markets, higher production costs driven by linear supply chains, and chronically underutilized after-sales and service ecosystems. Strategically, firms lack KPIs for lifecycle value optimization, treat circularity as compliance rather than growth, and suffer from weak integration between sustainability and core operations.

## Economic Losses

- Premature disposal of high-value components
- Unnecessary raw material reinvestment
- Lost secondary revenue streams

## Operational Inefficiencies

- Dependency on volatile raw material markets
- Higher costs from linear supply chains
- Underutilized after-sales ecosystems

## Strategic Blind Spots

- No KPIs for lifecycle value optimization
- Circularity treated as compliance, not growth
- Weak integration between sustainability and operations

## Root Causes of Inaction

- Measurement complexity requiring lifecycle tracking
- Organizational silos separating sustainability from operations
- Legacy business models tied to new product sales
- Limited remanufacturing infrastructure and reverse logistics

# Value Retention as a Strategic Growth Engine

Forward-looking firms are reframing circularity from a cost center to a **profit engine**. Remanufactured products can deliver 20–60% lower production costs with comparable or higher margins than new products. Industrial leaders embracing value retention strategies are already achieving 30–50% cost reductions in production, 2–3x increases in asset lifecycle value, and significant reductions in carbon footprint. Companies in heavy equipment, automotive, and electronics sectors are recovering core components, rebuilding to "as-new" standards, and selling at premium margins with sustainability credentials.



## Margin Expansion

Remanufactured products deliver **20–60% lower production costs** with comparable or higher margins than new products, directly expanding profitability.



## New Revenue Streams

Service-based business models, certified refurbished product lines, and spare parts ecosystems unlock entirely new income channels.



## Supply Chain Resilience

Reduced reliance on raw materials provides insulation from geopolitical disruptions and improves inventory efficiency across operations.

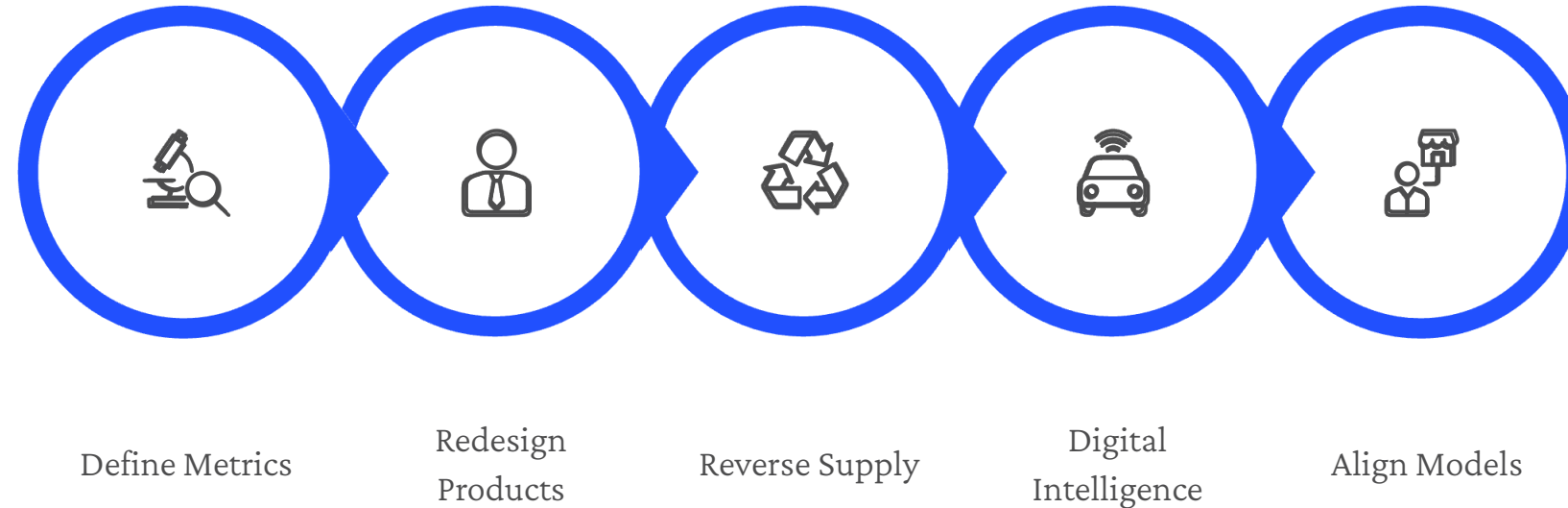


## Customer Retention

Lifecycle service contracts and sustainability leadership build increased brand loyalty and long-term customer relationships.

# The Shift: A Five-Step Strategic Framework

Transitioning from a recycling mindset to a value retention model requires deliberate, sequenced action across metrics, product design, supply chain architecture, digital infrastructure, and business model alignment. This framework provides a clear operational pathway for industrial leaders ready to capture the full value of circularity.



## Step 1: Define Value Retention Metrics

Move beyond recycling rates to include % of products repaired vs. replaced, remanufactured revenue share, and lifecycle value recovery rate.

## Step 2: Redesign Products for Circularity

Implement modular design for easy disassembly, durable components with extended lifecycles, and standardized parts for reuse.

## Step 3: Build Reverse Supply Chains

Establish product take-back systems, reverse logistics infrastructure, and dedicated refurbishment and remanufacturing hubs.

## Step 4: Integrate Digital Intelligence

Deploy IoT-enabled product lifecycle tracking, predictive maintenance systems, and digital twins for asset optimization across the value chain.

## Step 5: Align Business Models

Shift from product sales to product-as-a-service, introduce buy-back and upgrade programs, and actively monetize lifecycle services to capture retained value.



Firms that complete this transformation are achieving **2–3x increases in asset lifecycle value** and 30–50% cost reductions in production.

# Leadership Imperatives & The Cost of Inaction

Capturing the value retention opportunity requires coordinated executive leadership across every function. The **CEO** must reposition circularity as a growth and resilience strategy—not just ESG compliance. The **CFO** must develop financial models that capture lifecycle value and secondary revenue streams. The **COO** must integrate remanufacturing into core operations, not treat it as a peripheral activity. The **CDO** must enable real-time tracking of product lifecycle and value recovery. The **CMO** must leverage value retention to build a premium, sustainable brand narrative.

Organizations that fail to act will face margin compression from rising input costs, mounting regulatory pressure beyond recycling compliance, competitive disadvantage against circular-native players, and loss of relevance in sustainability-driven markets. The **47.5% of firms without value retention targets** represent a massive strategic gap—but also a multi-billion-dollar opportunity for those willing to move.

Recycling is the end of the line. Value retention is where the real value begins.

## Design for Longevity

Build products engineered for extended lifecycles, modularity, and ease of repair from the ground up.

## Monetize Product Lifecycles

Capture value at every stage—from initial sale through service, refurbishment, and remanufacturing.

## Operationalize at Scale

Build the infrastructure, digital tools, and business models to make remanufacturing a core competitive capability.

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