

# ***The GreenSCOR Model***

***Enabling Green Supply Chain  
Management Through SCOR***

***Supply Chain World  
North America***



**April 9, 2003**

# GreenSCOR merges supply chain and environmental management within a SCOR framework.

## Overview

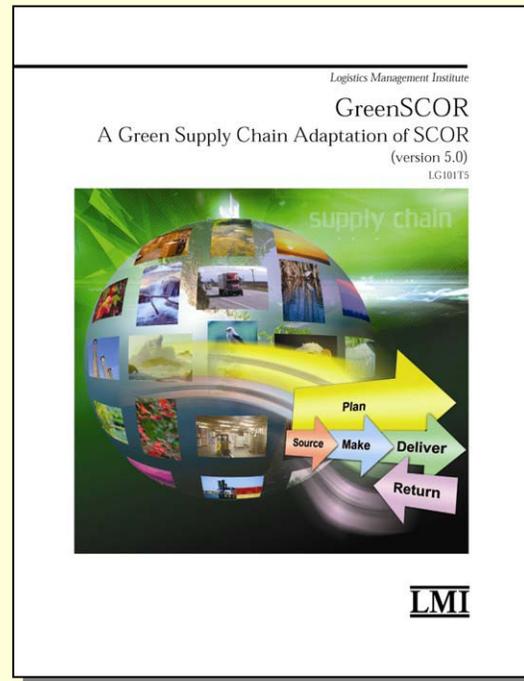
Supply chain processes produce a majority of a typical organization's environmental impacts.



### Environmental Management

Managing the environmental impacts of operations, including compliance, emissions, and remediation

## GreenSCOR Concept



### GreenSCOR Model



### Supply Chain Management

Managing the flow of material from supplier to end customer, including procurement, transportation, inventory management, and production



- **Background and Overview**
- **Supply Chain Management**
- **Green Supply Chain Management**
- **SCOR**
- **GreenSCOR**
- **Moving Forward**

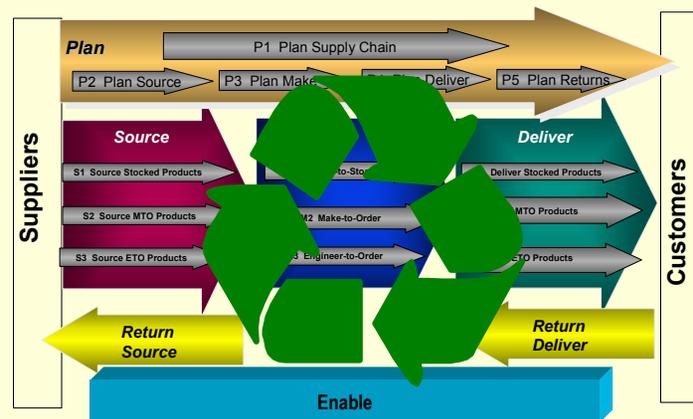
# **GreenSCOR concept is a product of green supply chain research.**

- **LMI evaluated green supply chain practices.**
- **We evaluated best practices.**
  - **Benefits gained**
  - **Resources required**
- **We reviewed case studies.**
  - **Approaches**
  - **Successes**
  - **Implementation hurdles**

# GreenSCOR was developed to provide an analytical green supply chain tool.

## Objective

- There was not a tool or framework for conducting green supply chain analysis when initial research conducted
- ADUSD (L&MR) SCI supported the development of a green supply chain tool



# **GreenSCOR provides a SCOR-based framework for analysis.**

- **GreenSCOR is built upon the SCOR model.**
- **This foundation allows a SCOR approach and framework for green supply chain projects.**
- **Using SCOR keeps the model generic enough for use in a variety of industries.**

SCOR is established as a robust and versatile supply chain analytical tool.

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# Supply chain management” has several definitions.

## Definitions of “Supply Chain Management”

**The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.<sup>1</sup>**

**A network of connected and interdependent organizations mutually and cooperatively working together to control, manage, and improve the flow of materials and information from suppliers to end customers.<sup>2</sup>**

[1] Martin Christopher, *Logistics and Supply Chain Management*, 1992, Pearson Education Limited, Essex, England.

[2] J. Aitken, *Supply Chain Integration within the Context of a Supplier Association*, Cranfield University, PhD thesis, 1998.

Defining “supply chain management” establishes the scope of GreenSCOR.

# **Supply chain management is based upon breaking apart silos.**

- **SCM involves single point management of material flows.**
  - **Purchasing**
  - **Receiving**
  - **Warehousing**
  - **Manufacturing**
  - **Distribution**
  - **Marketing**

# **Supply chain management also breaks down external barriers.**

Managing supply chain partners as a single organization increases efficiency and effectiveness.

- **Managing the supply chain involves managing external partnerships.**
  - Customers
  - Suppliers
  - 3PLs
- **Partnerships are based on collaboration.**
  - Data
  - Marketing
  - Profit
  - Expense
  - Design

# **Technology has played a key role in developing supply chain management concepts.**

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- **Ability to share and manage information across an organization**
- **Common data standards for sharing with partners**
- **Growth of the Internet as a ubiquitous data infrastructure**

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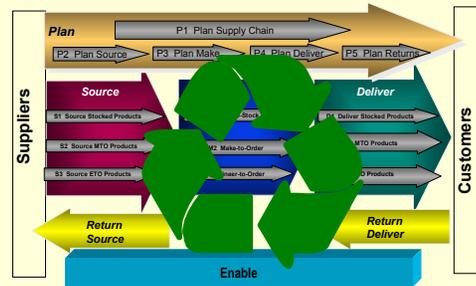
## Green SCM

# Green SCM is an emerging best practice.

## Green Supply Chain Management



Environmental Management



Green Supply Chain Management



Supply Chain Management

- Green SCM recognizes the disproportionate environmental impact of supply chain processes in an organization.
- Integrating environmental and supply chain management can reduce costs and increase efficiency and flexibility.

# **Commercial firms have had great success using Green SCM.**

**These examples are a small fraction of the successes from using Green SCM.**

**Texas Instruments:** Saves \$8 million each year by reducing its transit packaging budget for its semiconductor business through source reduction, recycling, and use of reusable packaging systems (20% annual savings).

**Commonwealth Edison:** Produced \$50 million in financial benefits from managing materials and equipment with a life-cycle management approach.

**Pepsi-Cola:** Saved \$44 million by switching from corrugated to reusable plastic shipping containers for one liter and 20-ounce bottles, conserving 196 million pounds of corrugated material.

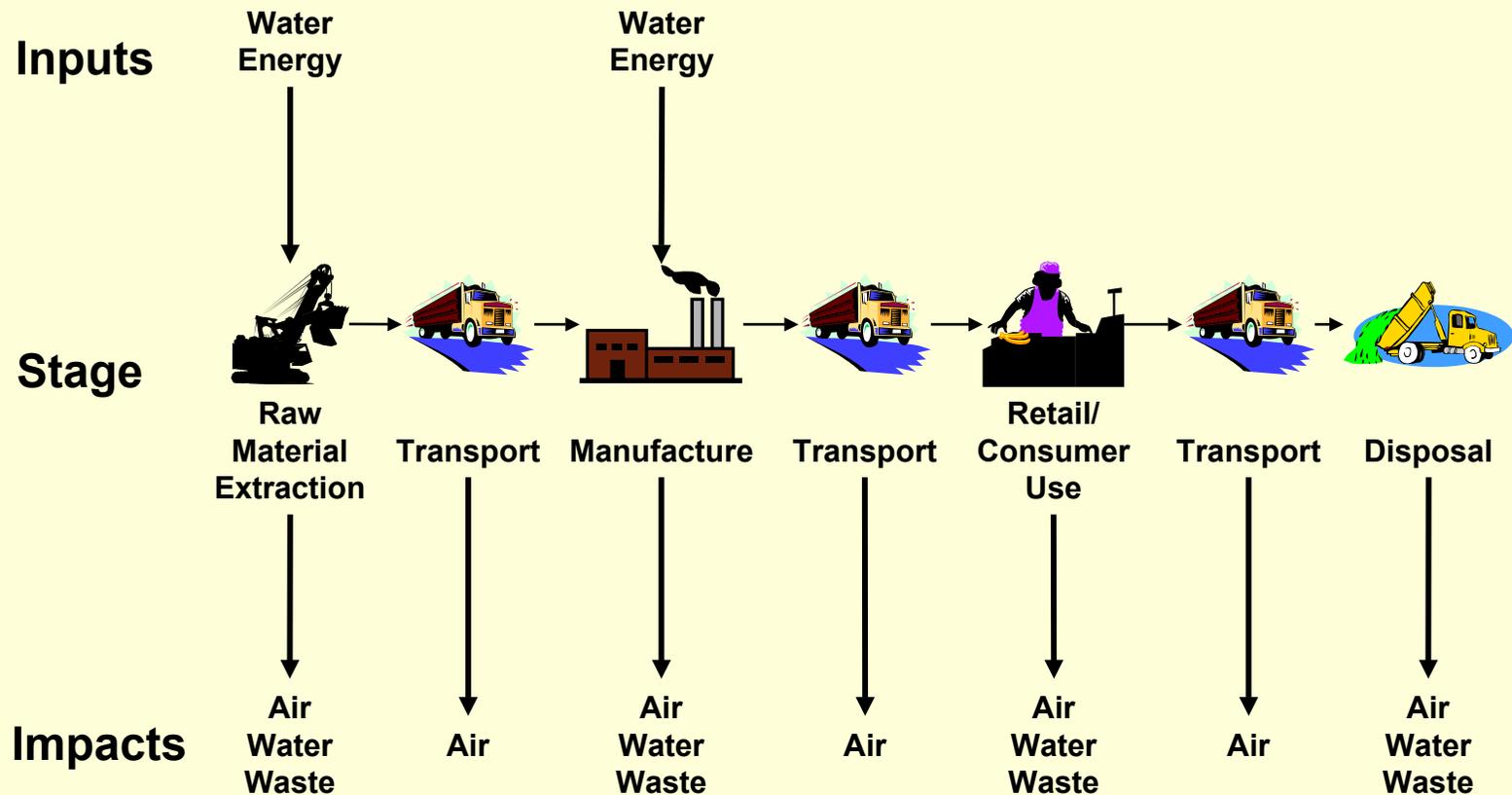
**Dow Corning:** Saved \$2.3 million by using reconditioned steel drums in 1995. Also conserved 7.8 million pounds of steel.

# Life Cycle Analysis

# Many Green SCM practices are based on life-cycle analysis.

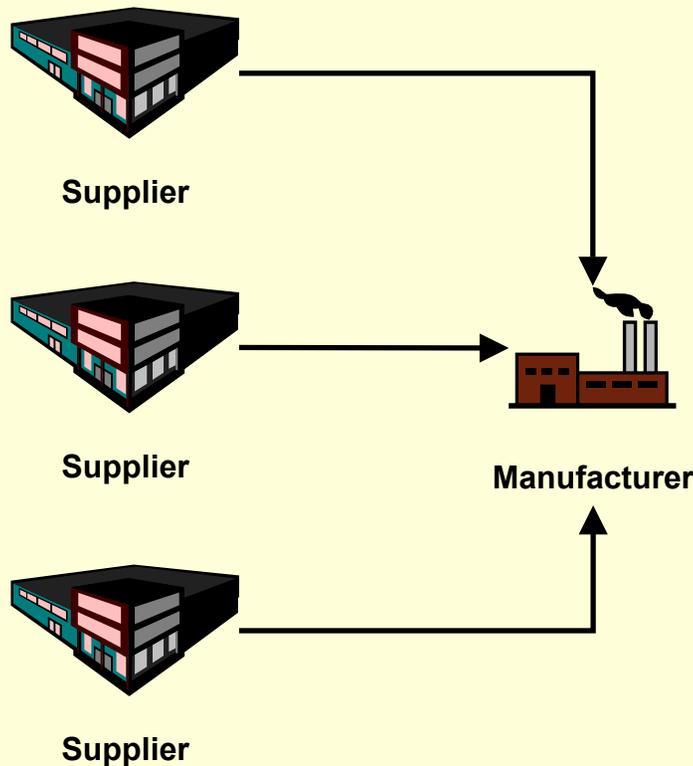
Environmental life-cycle analysis focuses on the impacts presented during each stage of a product's life.

## Environmental Life Cycle Analysis



# Current Green SCM focuses on the upstream supply chain.

## Typical Green Supply Chain Analysis



Manufacturer encourages suppliers to adopt green practices, environmental management systems, etc.

Focus is on the material content and environmental practices of suppliers.

This perspective is limited to the “Source” activities of the manufacturer and the “Make” activities of the suppliers.

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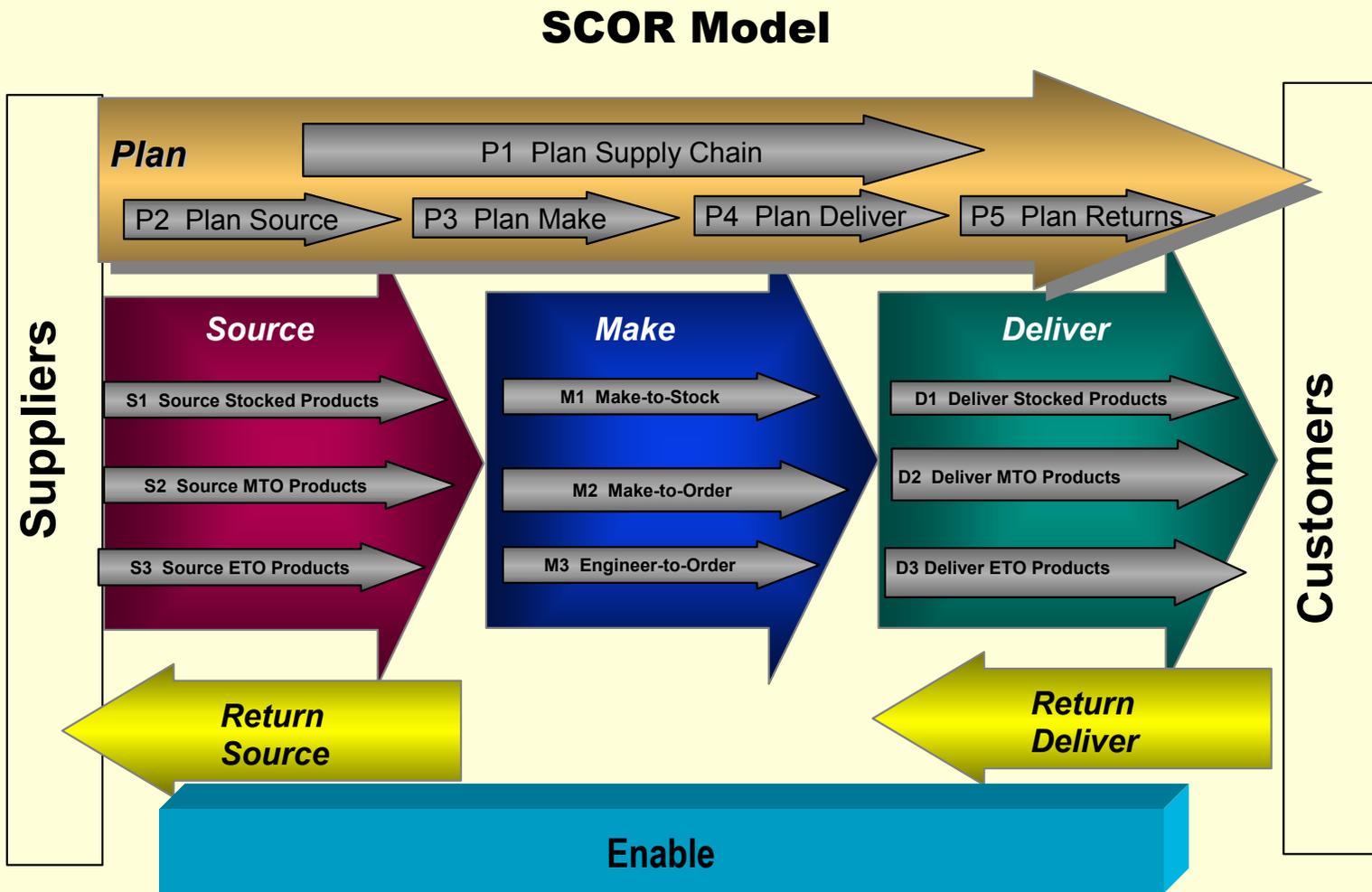
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# SCOR Model

# The SCOR model is a state-of-the-art commercial supply chain management tool.

SCOR model stands for Supply Chain Operations Reference model.



**SCOR**

# The *SCOR model* incorporates best practices from a variety of industries.

**Plan**



**Source**



## Supply Chain Operations Reference (SCOR) Model

- Developed by Supply-Chain Council
- Identifies performance measures, best business practices, and software requirements
- Participants are some of the largest and most successful companies
- Provides opportunity to share benchmarking data



*Procter & Gamble*



FUJITSU

UNISYS

EXABYTE



**Make**



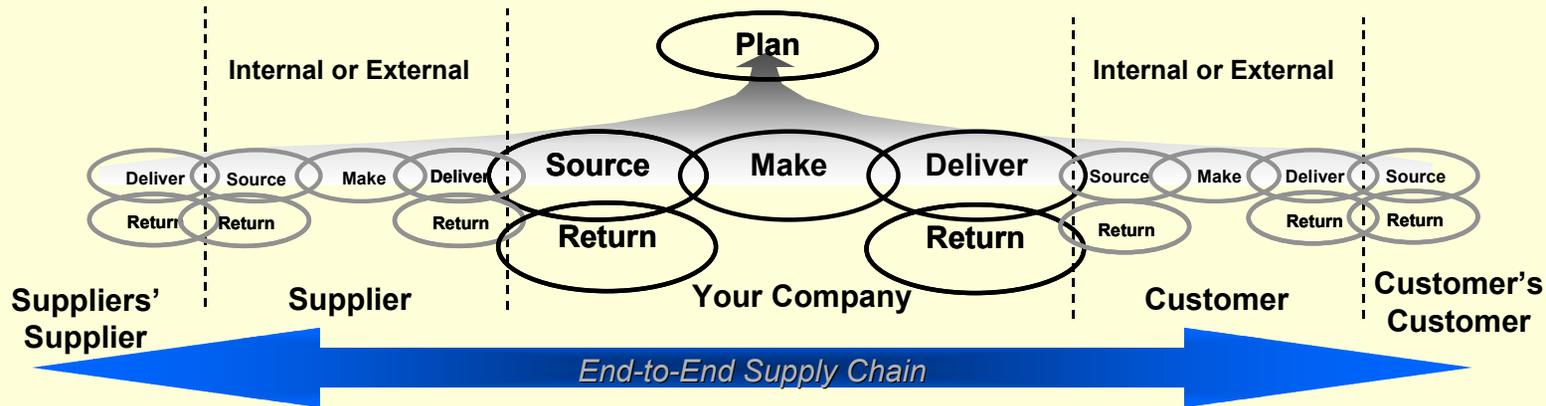
**Deliver**



**Return**



# SCOR drives an end-to-end view of supply chain performance.



**End-to-End View**

**SCOR elements are designed to be flexible and generic in order to fit almost any supply chain.**

Performance Attribute	Performance Attribute Definition	Level 1 Indicators
Supply Chain Delivery Reliability	The performance of the supply chain in delivering: the correct product, to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer.	Delivery Performance
		Fill Rates
		Perfect Order Fulfillment
Supply Chain Responsiveness	The velocity at which a supply chain provides products to the customer.	Order Fulfillment Lead Times
Supply Chain Flexibility	The agility of a supply chain in responding to marketplace changes to gain or maintain competitive advantage.	Supply Chain Response Time
		Production Flexibility
Supply Chain Costs	The costs associated with operating the supply chain.	Cost of Goods Sold
		Total Supply Chain Management Costs
		Value-Added Productivity
		Warranty / Returns Processing Costs
Supply Chain Asset Management Efficiency	The effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of all assets: fixed and working capital.	Cash-to-Cash Cycle Time
		Inventory Days of Supply
		Asset Turns

Source: The Supply Chain Operations Reference (SCOR) Model, version 5.0, The Supply-Chain Council



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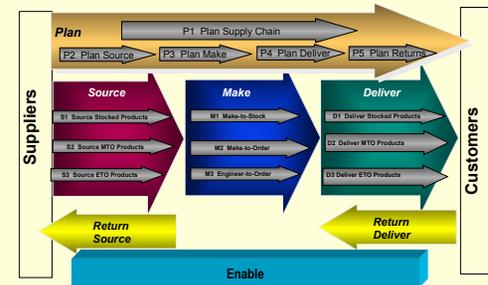
# Green SCOR Concept

# GreenSCOR is a modification of the *SCOR model* that includes environmental elements.

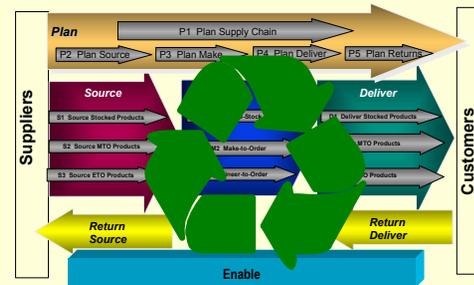
## GreenSCOR Development



Environmental Management



SCOR Model



GreenSCOR Model

A majority of the GreenSCOR modifications occurred in the “best practices” area of the *SCOR model*.

GreenSCOR modifies the existing *SCOR* structure to include environmental processes, metrics, and best practices.

GreenSCOR maintains the integrity of the current *SCOR model* by adding to the existing elements.



# GreenSCOR was developed through a systematic approach.

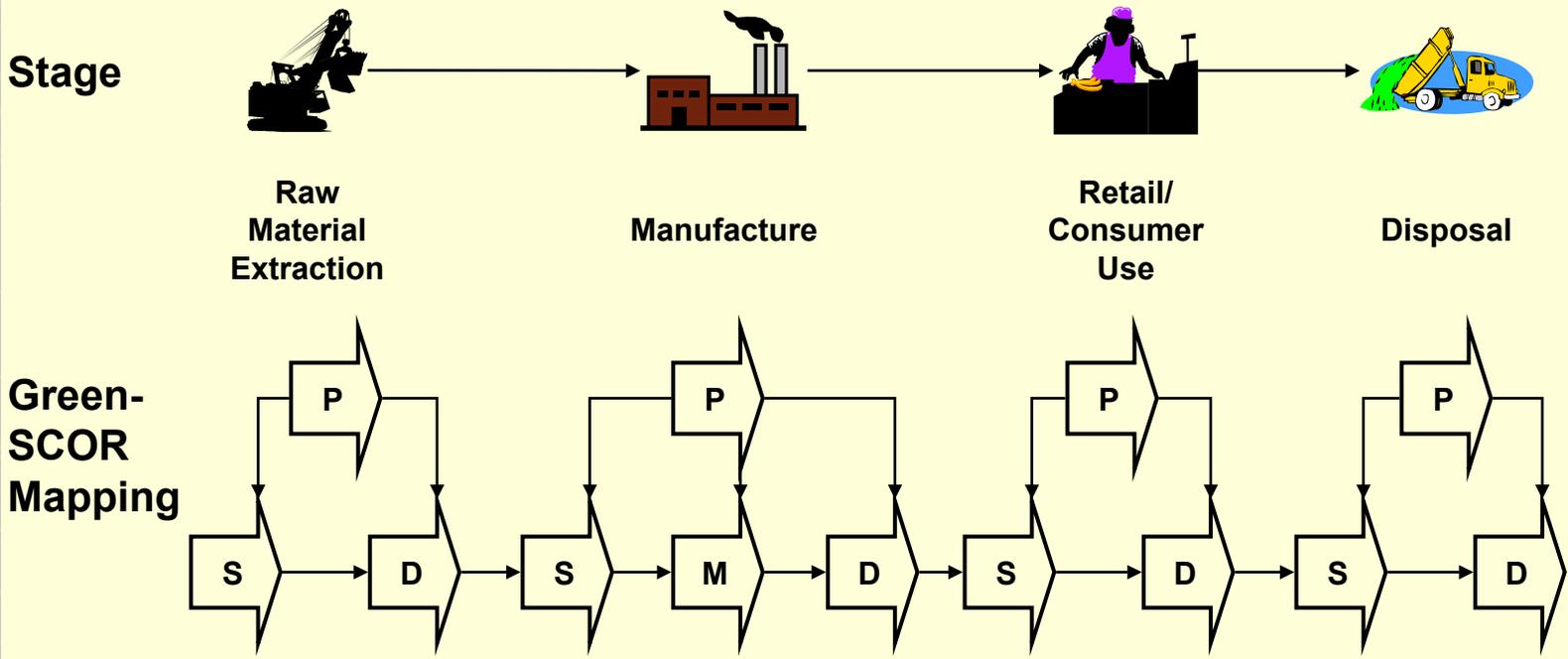
1. **Conduct background research on green supply chain best practices and metrics.**
2. **Evaluate the existing SCOR model processes for environmental impacts.**
3. **Modify the SCOR model to include environmental metrics and best practices.**
4. **Capture the changes in a report that specifies why each change is made and the impact on supply chain operations.**

A structured approach led to consistent development across the entire SCOR model.

# Concept

# GreenSCOR focuses on the impacts of SCM in each stage of the product life cycle.

## GreenSCOR Concept



# **GreenSCOR manages end-to-end environmental and supply chain operations.**

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- **Integrates environmental considerations into the entire supply chain management process**
- **Deepens the scope of environmental LCA**
- **Recognizes that supply chains consist of discrete decisions, each of which has environmental impacts**
- **Maximizes benefits of supply chain optimization efforts and environmental management efforts by merging the processes**

GreenSCOR is designed to remove the barriers between environmental and supply chain management.

# **Using GreenSCOR integrates environmental concerns into supply chain analysis.**

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- **Provides a systematic process whereby greening opportunities can be identified throughout a supply chain.**
- **Provides a single repository for green supply chain best practices linked to the affected processes**
- **Enables more efficient use of resources for greening efforts**
- **Increases visibility of the financial and operational benefits of green supply chain practices**

# **GreenSCOR addresses gaps in current Green SCM practices.**

- **Supply chain optimization efforts occur without environmental considerations**
- **Green supply chain analyses occur without key supply chain considerations**
  - **Focus tends to be on production processes used by a “member” of the supply chain**
- **There is no analytical tool for performing green SCM projects and supply chain optimization projects simultaneously.**

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# **GreenSCOR will be shared, promoted, and proven .**

- **Outreach through conferences and education**
- **Pilot study to prove the effectiveness of the model**
- **Inclusion in the SCOR model to capture input from other SCC members**

The goal is to have GreenSCOR additions become an integral part of the SCOR model.