Sustainable Supply Chain Management
Developing a Framework to Assess and Reduce Environmental Impacts from UCSB Procurement

A Master’s Group Project at the Bren School of Environmental Science & Management
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Project Objectives

The primary goal of this project was to develop and implement a framework that:

- Assesses the environmental impacts of purchases by UCSB
- Identifies areas to reduce environmental impacts by restricting, reducing or substituting targeted products for those with lower environmental impacts
- Performs an analysis of purchasing behavior to improve the effectiveness of sustainable procurement measures

In order to prescribe efficient strategies to reduce the environmental impacts that result from the University’s purchases

Project Background

The UC System Board of Regents has prescribed sustainability goals that include a pledge to reduce greenhouse gas emissions (GHG) to 1990 levels and to maximize procurement of environmentally preferable products (EPP) and services.

The UC system spends $2 billion annually on goods and services and UCSB expenditures account for $70 million of this total.

In 2013, UCSB transitioned to a centralized online purchasing system. This new system Gateway can capture detailed information for all purchasing transactions. Gateway can also be used as a tool to increase the sustainability of purchasing by affecting the types of products purchased, as well as the knowledge and behavior of purchasers across campus.
This process flow diagram of the project framework illustrates the phases and decisions necessary for assessing and reducing the environmental impacts which result from purchasing. After purchasing data is obtained, an EIO-LCA should be conducted to determine the product categories with the highest environmental impacts. Next, these product categories are analyzed based using process-based LCA and trade-off analysis to determine the feasibility and benefits of product restriction, reduction, or substitution from the supply chain. A survey should also be conducted to determine opportunities and barriers to sustainable purchasing from an operational and behavioral perspective. The substitution of high impact products with low impact products results in the creation of an Environmentally Preferable Product (EPP) List. The EPP list, restriction of products from the supply chain, and the behavioral information from the survey results can be integrated into the Gateway system. After this integration, more data can be obtained and the process repeated to continually monitor and improve sustainable procurement.

**Life Cycle Assessment (LCA)**
Compiles the inventory of energy and material inputs and outputs for a product or process. Evaluates the environmental impacts of these inputs and outputs.

**Economic Input Output LCA (EIO-LCA)**
A method that uses economic and environmental data to estimate environmental impacts of products.

**Process-Based LCA**
A method that uses material and environmental data to estimate environmental impacts of specific products from material extraction through disposal.

**Trade-Off Analysis**
Analysis of the environmental and operational trade-offs associated with substituting, reducing or restricting products within the supply chain.
The EIO-LCA tool used for this project is known as the Comprehensive Environmental Data Archive (CEDA). By pairing the purchasing data from UCSB with the CEDA database, environmental impacts were determined for each product category. Impacts include global warming potential (GWP), acidification, energy use, water use, and land use.

This project focused on GWP to align with the UC Sustainable Practices Policy targeting the reduction of greenhouse gases.

A breakdown of the top 10 product categories contributing to GWP focuses on four academic departments and Central Stores, the campus-wide distributor of office and cleaning supplies (Fig. 1). Each department was further analyzed to identify the environmental impacts from products specific to their operations. Figure 2 highlights Central Stores products with high GWP.

Process-Based LCA and Trade-Off Analysis for Copy Paper Products

In order to determine the comparative environmental effects of substitution versus reduction, a process-based LCA was conducted. Substitution requires transitioning from 30% recycled content paper (currently the most commonly used paper) to 50% or 100% recycled content. It was found that a reduction of 8% in overall use of copy paper was equivalent to substituting all paper with 50% recycled content paper (Fig. 3).
## Survey
Completed by 100 employees who make purchases for UCSB. The responses were used in order to determine barriers and opportunities for reducing the environmental impacts from purchasing.

### Major Findings
- 81% of survey respondents reported that their decisions about purchasing are affected by sustainability.
- The most frequent reason for not purchasing a sustainable option was not knowing where to find it (33% of respondents). Price was the second most popular explanation (19%).
- Many purchasers are unaware of sustainable purchasing guidelines.

### Opportunities
- Increased visibility of sustainable products on campus purchasing system.
- Develop a ranking system within Gateway to prioritize products that 1) meet UC approved third-party certifications 2) have vendor reported certifications 3) are uncertified.
- Increased visibility of sustainable guidelines on campus purchasing system.

## Recommendations for UCSB

### Tracking and Monitoring
of all campus purchases.

### Perform EIO-LCA
to identify target product categories.

### Conduct Process-Based LCA and Trade-Off Analysis
to most effectively eliminate, reduce, and substitute high impact products.

### Use Gateway as a Tool
to optimize sustainable purchasing.

### Administer Follow-Up Surveys
to improve the procurement process.

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