



*Greening the Supply Chain, Green Purchasing  
and the Economic Challenges and Benefits*

*Your State/Global Resource!*

## K. Lyons Work/Research History (State/Global Resource!)

- 1980/6 – USAF – Supply Chain/Contracting (Corporate Trends)
- 1986 – St Peter s Medical Center/Pharmaceutical Supply Chain; CSR
- 1987/8 - Rutgers, NJ Recycling Act; Supply Chain Response; Supply Chain Waste Research (Archeology)
- 1992 - US Federal Executive Orders (13101); NJ EO; Research, LCA, Waste Prevention, Recycling, Product Life Cycle Research
  - Rio Summit; Talloires Declaration (Colombia, Peru, Brazil, etc)
- 1997 – N. Ireland - SCM/Green Purchasing Program
- 1998 – SC Environmental Archeology/Logistics GHG
- 1999 - Energy Grid, GHG-Carbon Impact
- 2004 – Modified Strategic Sourcing (Construction, etc.); GP Coop
- 2005 - Alternative Energy Carbon-Impact Research
- 2011 – Off-Shore Wind

Kevin Lyons, Ph.D. <http://purchasing.rutgers.edu/green>



# The Green Concept

## Sustainability, Sustainable Development, etc.

Sustainable development is a pattern of resource use that aims to meet human needs while preserving the natural environment so that these needs can be met not only in the present, but also for future generations.



(UN, Brundtland Commission, 1983). Development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."

"Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition". Signed by President Clinton in 1998, this policy strengthens the Federal government's commitment to buying recycled content and other environmental products.

Excerpt from Federal Executive Order 13101

## Greening the Community Inventory; Video

- Sussex Green Certification
- Eco Awards
- Eco Orgs
- Green Goods/Svcs
- Gardens
- Water Resources
- Restaurants
- Recycling Ctrs
- Storm Water
- Alternative Power
- Bikes and Trails
- Public Transportation
- Trees
- Public Works
- Mayor's Office
- Grants
- School Projects

## Rutgers Green SCM/Purchasing (1988 – Present)

In order to be good stewards of the environment, we should buy products and services that conserve energy, water and other natural resources.

### Green Purchasing:

minimizes negative environmental effects through the use of environmentally friendly products, practices and attributes.

is a way of adding environmental considerations to the price and performance criteria that businesses use to make purchasing decisions.

attempts to identify and reduce environmental impact as well as maximize resource efficiency.



# Green Supply Chain- Purchasing Research



- 🌐 Product Development, Design, Performance, & Cost
  - Environment and Health Impacts – Eco-Labeling
  - Total Cost of Ownership
  - Global Warming and Climate Change
  - Raw Material Data (Marketplace Availability and Eco-Impacts)
  - Green Products and Services Data (**eProcurement/Oracle**)
  - Competitive Procurement Process and Strategic Sourcing
  - Green Contract Language and Evaluation Criteria
  - End of Life Data (**Waste Management/Recycling**)
- 🌐 Annual Spend (Bottom-line Expectations)
  - Life Cycle Assessment/Cost
  - Return on Investment - ROI
- 🌐 Corporate and Organizational Reporting (Sox and Environmental Reporting); CSR
- 🌐 **Multiple Academic Departments (REI, Engineering, Public Policy, Business, Marine, etc.)**

## Energy Purchased on the New Brunswick / Piscataway / Newark / Camden Campus – F/Y 2009-10 - Resource Data

<p>\$2.5 Billion Assets 6200 Acres \$550 Million/Yr Commodities and Services</p>	<p>Electric \$23,300,000.00 Natural Gas \$ 35,700,000.00 <u>Water \$ 3,700,000.00</u> Totals \$62,700,000.00</p>	<p>900 Buildings 6200 Tons/Waste 26 Waste Commodities 63% Recycling Rate Cost Reductions 10yrs!</p>
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- Electric – Purchase, 292,100,000 kWh – Produce 115,000,000 kWh = 407,100,000 kWh per year
  - Natural Gas – Purchased 2,988,738 dekatherms
  - Oil – 290,000 gallons
  - Water – 566,000,000 gallons
  - Carbon Footprint – 345,197 tons CO2
- Software installed through networks  
Places computer into sleep mode  
Based on 40,000 Computers  
Installation Cost \$660,000.00  
Annual Savings \$480,000 - \$800,000  
Annual Reoccurring Cost \$80,000  
1 Year payback  
Annual Net Savings \$640,000.00

<http://purchasing.rutgers.edu/green/>

Rutgers the State University of New Jersey

## Rutgers Green Purchasing Policy and Guidelines

### A. Goal

In accordance with the University's Purchasing Policy, Rutgers is committed to the use and purchase of environmentally and socially responsible materials and products. Departments are expected to support this policy in accordance with established guidelines and procedures contained in this Green Purchasing Policy. This document is a way in which Rutgers' procurement decisions are made using multiple factors. These procurement decisions include economic criteria as well as strong commitments towards environmental protection.

### B. Assessment of Current Status and Opportunities

The Rutgers' Purchasing Department and those Administrative Units with delegated purchasing authority are responsible for the procurement of goods and services for the entire Rutgers University System.

#### Selected Goals:

- To develop and maintain a consistent 'cradle-to-cradle' supply chain and purchasing process which considers economic, ethical, social and environmental impacts for all contracts and purchases; where all waste should first be eliminated or avoided and where any remaining waste be considered feedstock for new product development.
- To integrate green purchasing concepts and products into architectural designs, final construction documents and into the final construction of all Rutgers buildings, renovations of property or facilities owned by Rutgers.
- To utilize environmentally responsible biodegradable solvents and citrus-based, rather than oil-based, cleaners.
- To utilize bio-based products, fuels and solvents (e.g. soy-based inks and lubricants).
- To purchase equipment and fleets which utilize alternative fuel and/or alternative environmentally responsible energy methods; target and help Rutgers develop new sources of alternative fuel that can be produced at Rutgers utilizing Rutgers waste.
- To conduct research and procure alternative energy from reliable, certified alternative energy suppliers.
- To make use of recycled paper: used paper is turned into scratch pads for distribution to departments on campus.
- To procure recycled content office supplies (folders, writing pads, etc.).
- To procure environmentally responsible and ergonomically designed furniture and furnishings including floor coverings and window treatments.
- To reuse packing material and plastic bags.
- To comply with New Jersey State recycling policies and regulations and identify, implement and record data for new categories of recycling.
- To increase recycled content offerings across all commodities.
- To recycle ink and toner cartridges.

# Green Purchasing Policy

Consumption (is it needed?)  
> **Zero Waste**

Cradle-to-Cradle concepts  
(more than price!)

Green Buildings (Design,  
Landscaping, Construction,  
Renovation)

BioBase, Biodegradable, etc.

Energy/Water Conservation

**Eco-Labels; Certifications**

Corporate Social &  
Environmental Reporting

# Global Corporate Social and Environmental Reporting

- Community
- Diversity
- Environment
- Ethics
- Financial Responsibility
- Human Rights
- Safety



Criteria we will be considering when we procure an item will be:

- The availability of the item; the potential impact of procurement on the solid waste stream
- The economic and technological feasibility of producing the item; and
- Other uses of the recovered materials used to produce the item.
- Ethics and Socially Responsible policies and practices

• Items you may want to share could include:

- Company/Corporate annual report (current or prior year) highlighting current green initiatives
- Documents presenting ideas for new green initiatives
- Company/Corporate policies regarding office recycling, reducing packaging, etc.

If your company does not have a policy or initiative in place currently, we would be happy to work with you to develop a plan that fits your company's specific needs.



PRODUCED & NARRATED BY LEONARDO DICAPRIO

Available on **DVD Now**  
**THE 11<sup>TH</sup> HOUR**  
[CLICK HERE TO WATCH THE TRAILER](#)





Business Roundtable is an association of chief executive officers of leading U.S. companies with nearly \$6 trillion in annual revenues and more than 12 million employees. Member companies are committed to working with policymakers, NGOs and consumers to make their communities stronger and more sustainable. *Enhancing Our Commitment to a Sustainable Future* explains what they are doing to promote better business and a better world.



John Engler is president and CEO of the National Association of Manufacturers (NAM), the largest industry trade group in America representing small and large manufacturers in every industrial sector and in all 50 states. A former three-term governor of Michigan, Mr. Engler became NAM president on October 1, 2004 and was elected President of the Business Roundtable (commencing 1.15.11)

# Why consider the environment?

Purchasing with a green mindset can:

- Reduce energy and water consumption (which can reduce costs)
- Improve resource use efficiency
- Reduce waste (which can reduce waste disposal costs)
- Reduce environmental health impacts of goods and services.

Small steps are important as they may lead to knowledge and experience that can stimulate new projects and approaches.

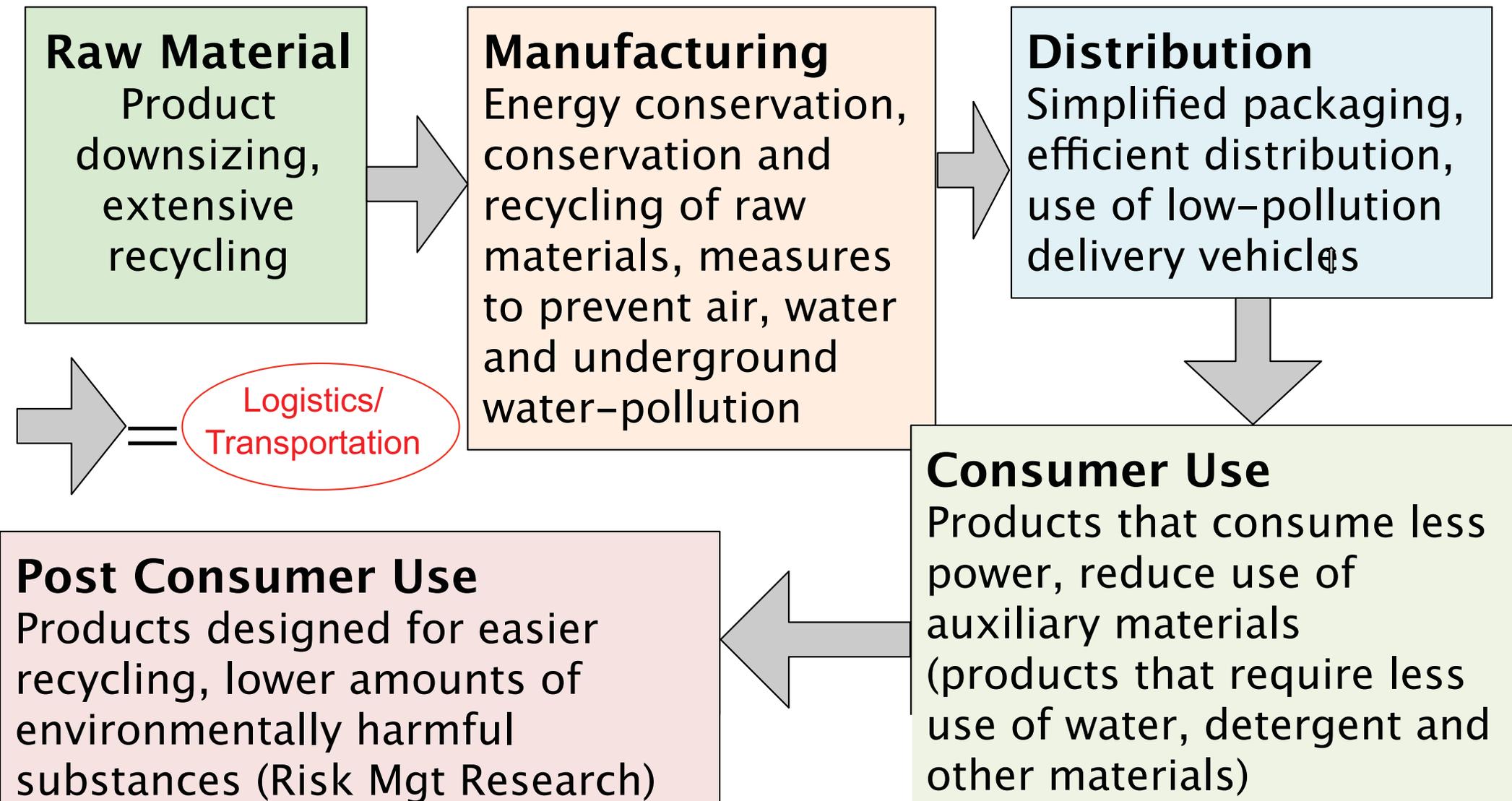
## Potential Benefits of a Green supply chain

- 🌐 Improves Agility – Green SCM help mitigate risks and speed innovations
- 🌐 Increases Adaptability- Green supply chain analysis often lead to innovative processes and continuous improvements.
- 🌐 Promotes Alignment – Green SCM involves negotiating policies with suppliers and customers, which results in better alignment of business processes and principles
- 🌐 Bring Value to the Organization
  - Agency/Organizational Decision-Makers
  - Risk Management Reductions and Financial Savings

# Life Cycle Assessment (LCA, NPV)

ISO 14040 Criteria (research investment, risks, decisions)

Reverse Logistics: Opportunity/Innovation



# Supply Chain Environmental Archeology; Waste Research - The Concept

- History – Question (SCM is everywhere!)
  - Merge Supply Chain and Environmental Mgt/ISO 14001
  - Challenge Waste/Recycling Concepts
  - Challenge WMX and Industry (separate trucks)
  - Waste as Feedstock/Commodity
  - Upstream Design and Technology (Waste Prevention)
  - Technology Development along the SC
  - Methane and Waste Research
  - New Emerging Contract Development



# Green Purchasing and Waste Research Supply Chain Archeology



A Supply Chain  
Manager s and  
Purchaser s  
Perspective On:

Understanding the  
History, Behavior,  
Movement and  
Business of Waste;



<http://www.sustainabledevelopment.loreal.com/>

[http://www.garnierusa.com/en/us/pure\\_clean/index.aspx#/home](http://www.garnierusa.com/en/us/pure_clean/index.aspx#/home)

Consumerism, Consumption and the Linking and Integrating of Solid  
Waste into the Supply Chain Management Process



# Waste is a Commodity!

Mack Truck/  
Volvo



## Rutgers Eco-Complex Resource Renewal

- Anaerobic digester
- Food waste = ENERGY



**Rutgers EcoComplex**

The RUTGERS EcoComplex is RUTGERS University's Environmental Research and Extension Center. It is the nation's first research, technology development and outreach center that is dedicated to enhancing the environment and agriculture through education, outreach and green business development.

[MORE >](#)



# Projects From Recycled Plastic Polymers

<http://www.youtube.com/watch?v=0hE-ymdio44>

[http://www.youtube.com/watch?v=3dD3ml\\_t77Y&feature=related](http://www.youtube.com/watch?v=3dD3ml_t77Y&feature=related)



Corporate  
Logistics and  
Packaging



A 120-ton diesel locomotive crosses newly built plastic lumber bridge at the Army's Fort Eustis installation in Newport News, Virginia.

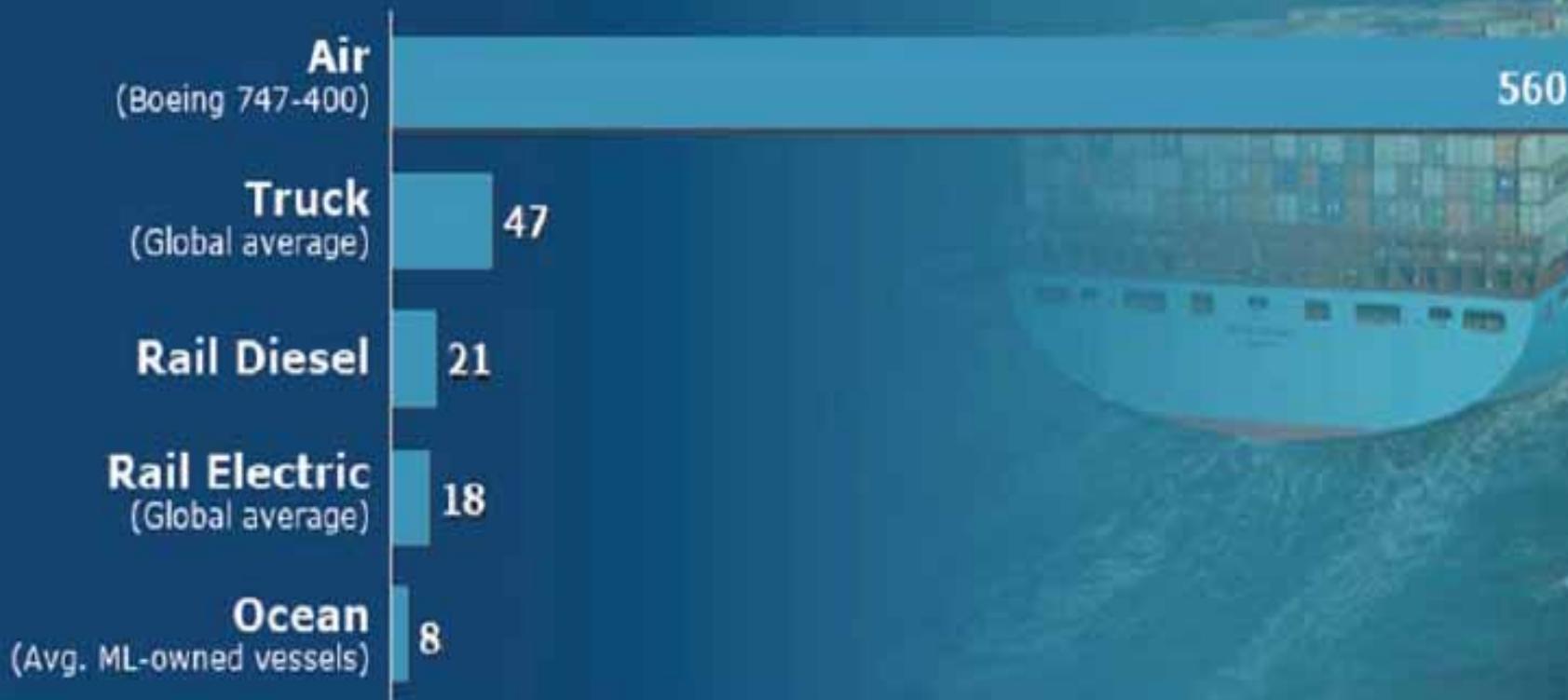


# Sustainability Green Logistics

- How can manufacturing industry develop & deliver the physical movement of product in the complete supply chain so that it meets the short & long-term needs of individual customers & the wider society?

# Mode selection has significant impact on a company's carbon footprint

Grams of CO<sub>2</sub> emitted by transporting 1 ton of goods 1 Km



# Decision Green<sup>SM</sup>

UPS's approach to environmental sustainability

Decision Green<sup>SM</sup>

UPS Transport & The Environment

## Rutgers University

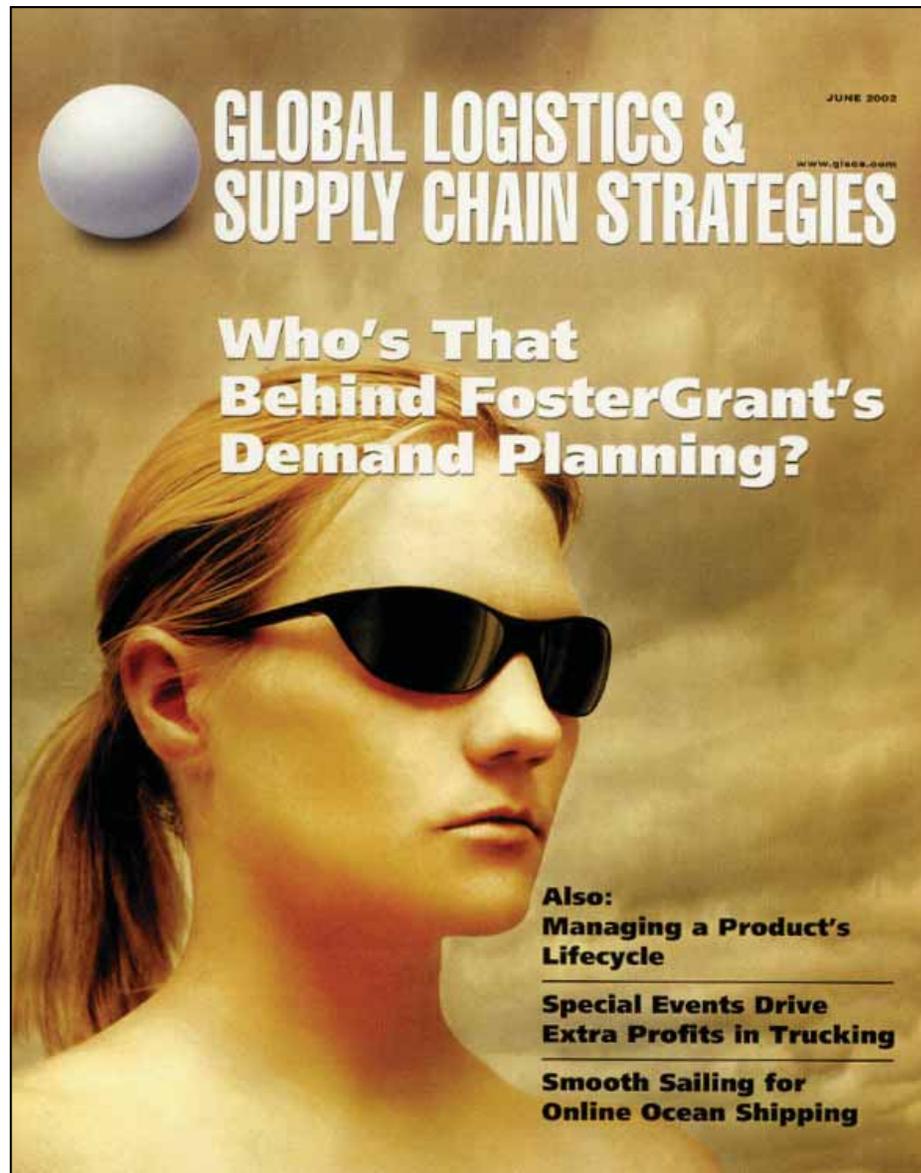
New Brunswick, NJ

April 2009





<http://www.fostergrant.com/>



Kevin Lyons, Ph.D.  
CPO, Research  
Professor, Rutgers  
University

Darrin S. Weigle  
VP Supply Chain  
Management  
AAi.FosterGrant,  
Inc. (1999 – 2003)



**When executed properly, a “Perfect Request” Supply Chain Management strategy should facilitate the following benefits:**

**CONSUMER GOODS SUPPLIER:**

- Reduced Inventories
- Higher LIFR (Line Item Fill Rate)
- Increased Gross-Margin Contribution
- Increased Profitability (reduced Gross-to-Net liabilities)
- Shorter Lead-times
- Stronger Cash-flows

**RETAILER:**

- Improved Sell-Through Performance
- Improved In-Stock Performance with less inventory at retail
- Reduced markdowns
- Increased gross-margin contribution per square foot



**Researched  
and Identified  
Green  
Implementation  
Strategies**

# Demand Planning & POS



**MISSION** – To forecast projections of AAI.FosterGrant's future “POS” demand (that are both timely and highly accurate) through the application of quantitative techniques, the facilitation of qualitative input (CPFR, Merchant Input), and adherence to the SCM workflow to support the achievement of corporate financial goals – revenue, gross margin, cash flow.

## METHODOLOGY

- Directly forecast **neither** Customer Orders nor Shipments
- Generate highly accurate Retail POS Forecasts (short & mid-range)
- Translate Retail POS Forecasts into DC-Shipping Forecasts (Dist Ctr)

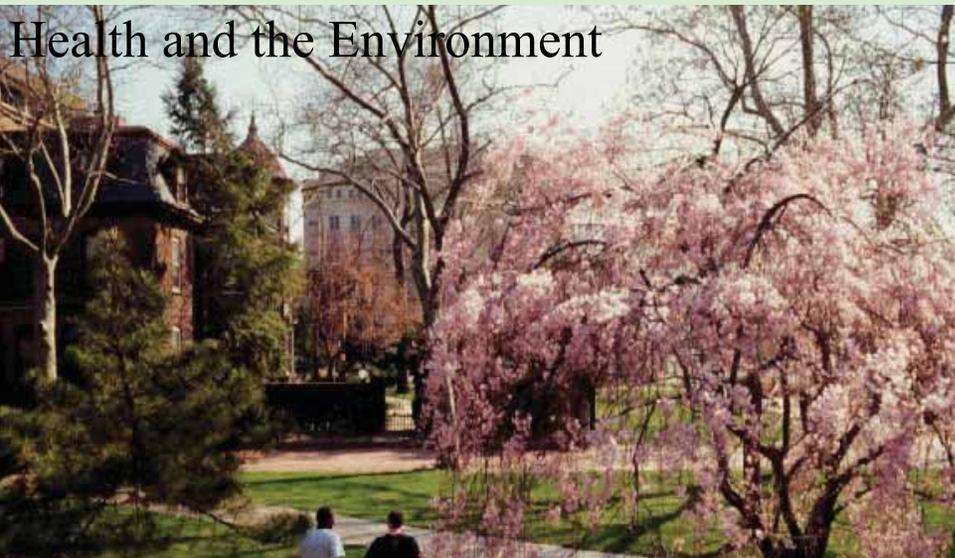
## REQUIREMENTS

- Facilitate “hands-on” maintenance of POS history
- Manage demand through distinct “demand streams”
- Incorporate qualitative inputs (CPFR, Merchants)
- Support “new product” introductions
- Deploy robust exception-management capability

# Greening the Supply Chain; A Case Study and Success Stories by Dr. Kevin Lyons



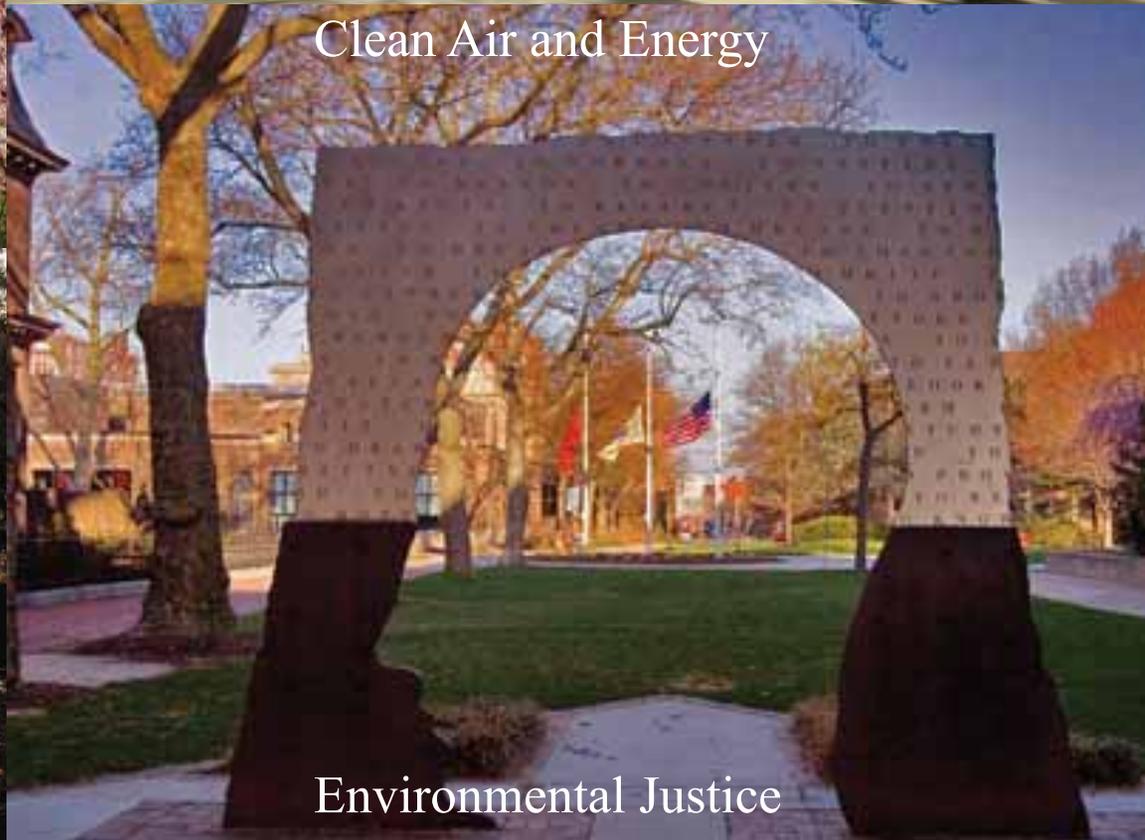
Health and the Environment



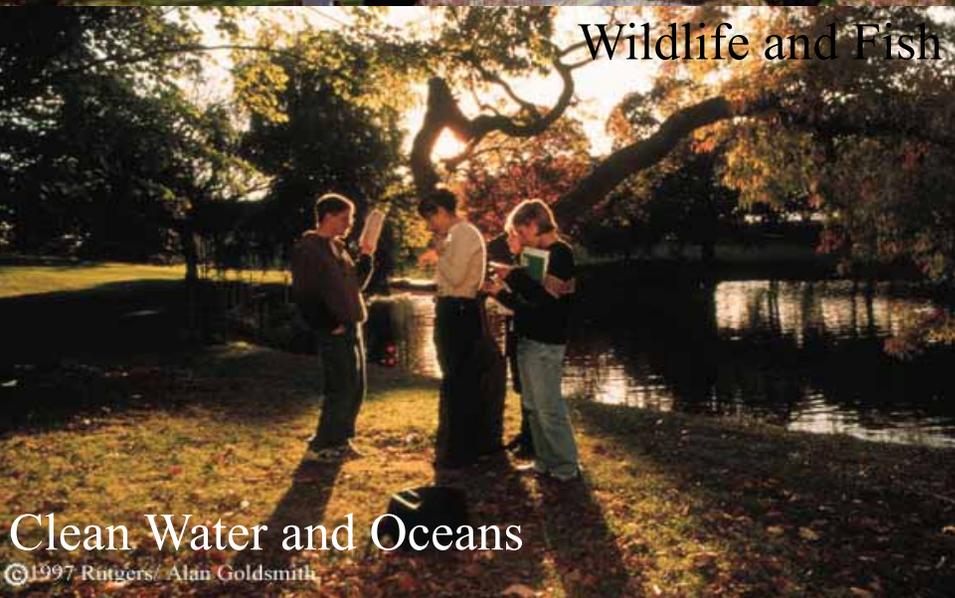
Global Warming



Clean Air and Energy



Wildlife and Fish



Clean Water and Oceans

Environmental Justice



## 30% Cost and Energy Reduction Rutgers PC-Laptop Purchasing Program



Rutgers  
Green  
Cooperative  
Purchasing  
Program



- EPEAT/ISO 14001

- Energy Star

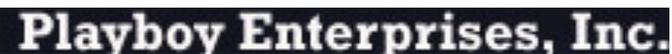


- Environmental Mgt Plan

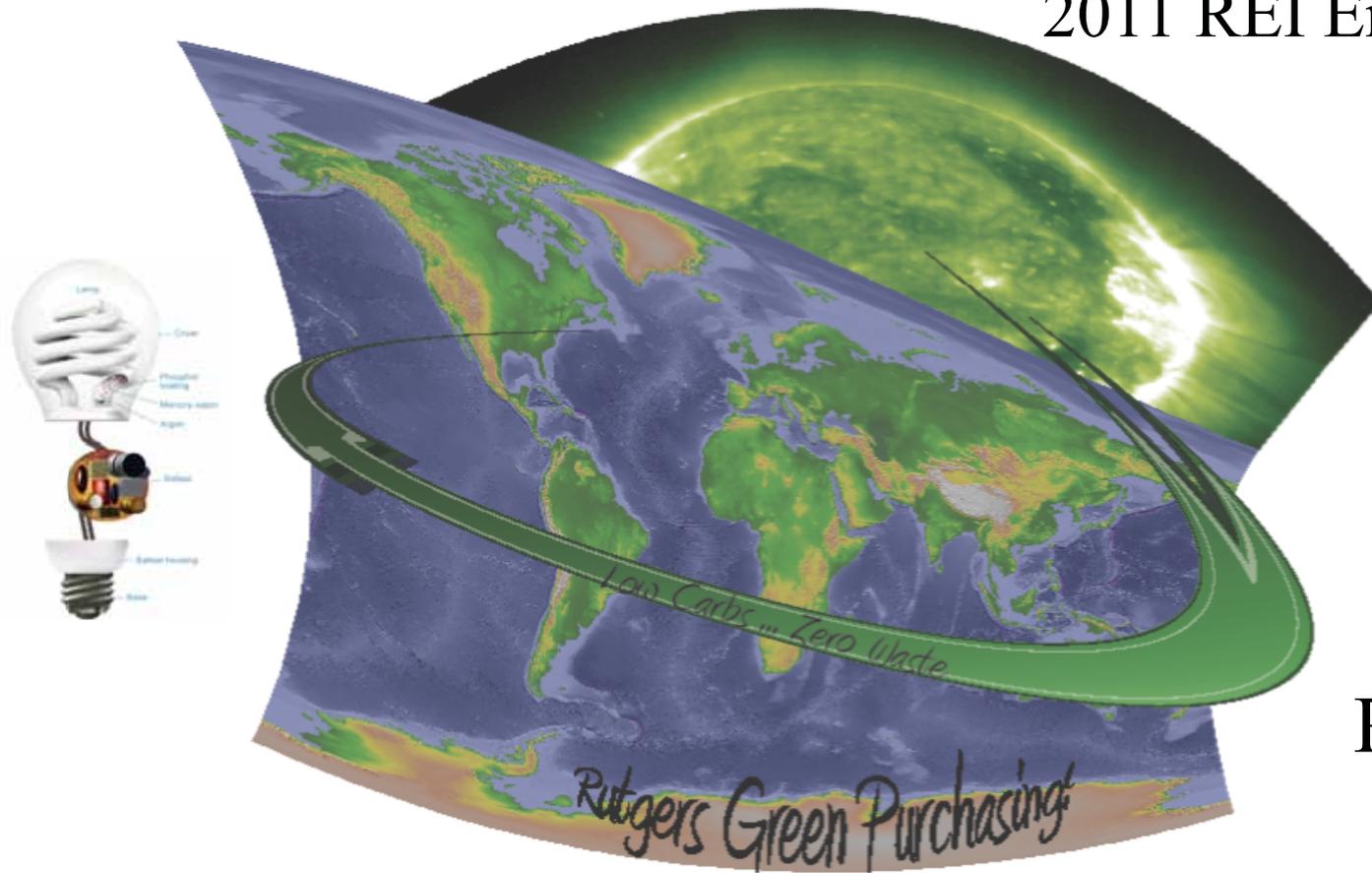
- Corporate Social and Environmental Reporting Criteria

- Extended Product Responsibility (Recycling On-Site)





2011 REI Energy Innovation Contest



Rutgers University  
Product Carbon/  
Climate Impact  
Research;  
Product Labeling and  
Certification

Measuring carbon emissions at every step of the supply chain could lead to valuable energy and cost saving opportunities (for the General Public, Rutgers, and our Manufacturers). “Carbon Footprinting” is a way to measure the impact human activities have on the environment, in terms of the amount of greenhouse gases produced, measured in units of carbon dioxide.

*The University installed one of the largest ground mounted solar arrays on any one campus in the United States. The 1.4 mega Watt system provides 10% of the power to the Livingston campus. The project cost was 10 million dollars. \$4,900,000 dollars of the project was funded through a BPU Core Solar rebate. Currently the University is expected to make \$1.1 million for the first year on its SRECS*



# Rutgers Livingston Campus Solar Parking Lot Canopy

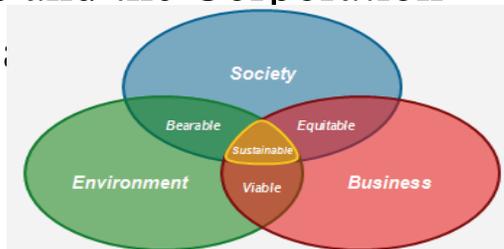
## \$40Million/15 Year Lease

### Capital Project Planning Guide



- Society

- The Corporation and Its Stakeholders
- Corporate Citizenship
- The Social Responsibility of Business
- The Shareholder Primacy Norm
- CSR, Citizenship and Sustainability Reporting
- Responsible Investing
- The Community and the Corporation
- Taxation and Corporate Citizenship
- Corporate Philanthropy Programs
- Employees and the Corporation
- Managing :



- Environment

- Operations Management
- Life Cycle Analysis
- A Balanced Look at Climate Change
- Non-anthropogenic Causes of Climate Change
- Sulfates, Urban Warming and Permafrost
- Conventional Energy
- The Kyoto Protocol
- Green Building
- Green Information Technology
- Transportation, Electric Vehicles and the Environment
- Geo-Engineering
- Carbon Capture and Storage
- Renewable Energy
- Solid, Toxic and Hazardous Waste
- Forests, Paper and Carbon Sinks
- Water Use and Management
- Water Pollution

## Designing Sustainable Products and Services

- Central Challenge: To develop sustainable offerings or redesign existing ones to become eco-friendly.
- Competencies Needed: The skills to know which products or services are most unfriendly to the environment. The ability to generate real public support for sustainable offerings and not be considered as “greenwashing.” The management know-how to scale both supplies of green materials and the manufacture of products.
- Innovation Opportunities: Applying techniques such as biomimicry in product development. Developing compact and eco-friendly packaging.

## Developing New Business Models

- Central Challenge: To find novel ways of delivering and capturing value, which will change the basis of competition.
- Competencies Needed: The capacity to understand what consumers want and to figure out different ways to meet those demands. The ability to understand how partners can enhance the value of offerings.
- Innovation Opportunities: Developing new delivery technologies that change value-chain relationships in significant ways. Creating monetization models that relate to services rather than products. Devising business models that combine digital and physical infrastructures.