

# *Applying Environmental Lifecycle Assessment to Reduce GHG Emissions of State Purchasing*

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December 10, 2013



**Minnesota Pollution Control Agency**



# Project Goal

## Specific Project:

- Use LCA and practicality to select 1-3 expiring contracts
- Identify hotspots
- Work with stakeholders to identify options
- Develop new specification language
- Develop way to replicate this process for other contracts

## Big Picture:

- Applying life cycle approach to reduce GHG associated with government procurement
- Working within real procurement constraints
- Identifying data and technical knowledge needs
- Developing replicable system for future contracts



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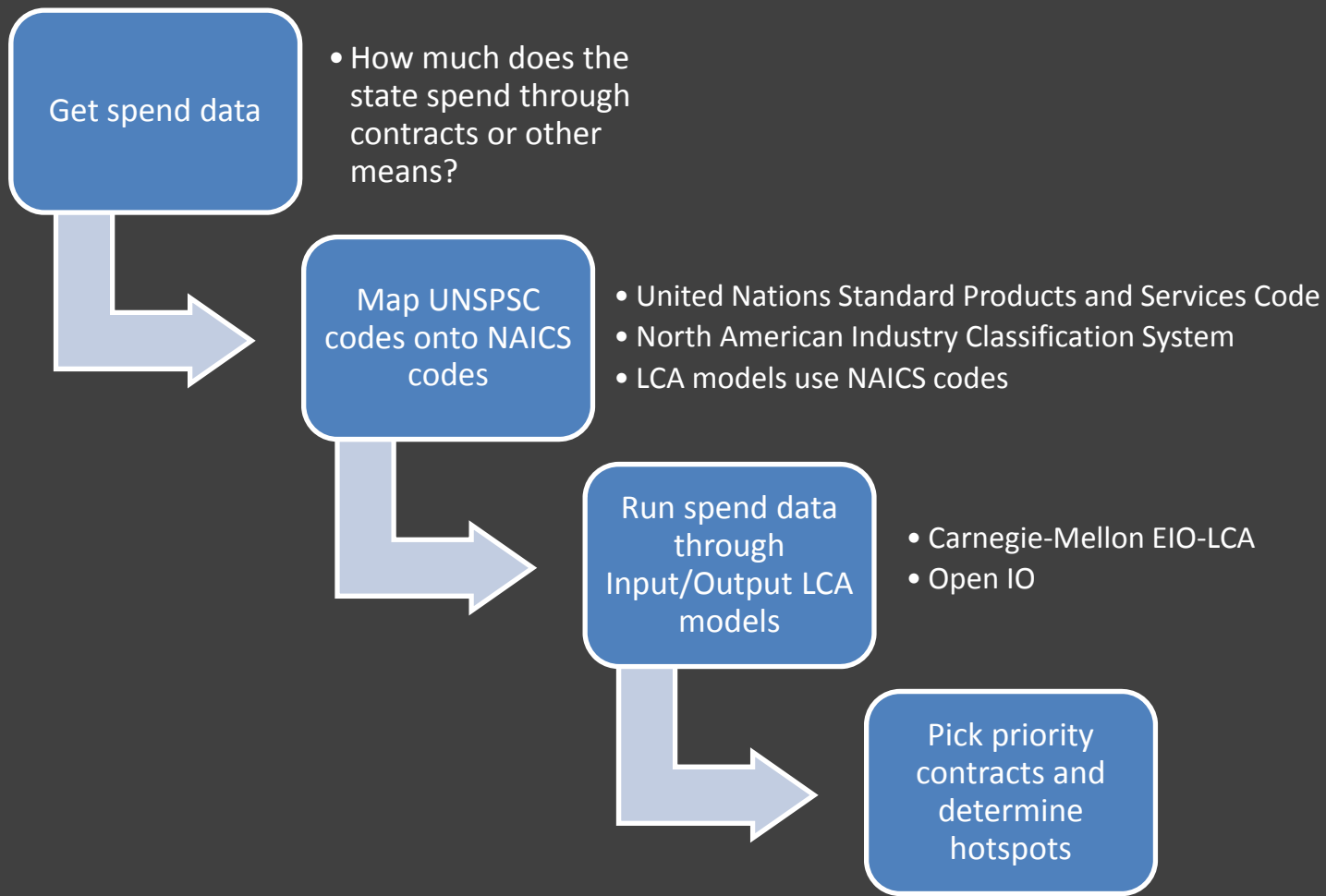
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**Minnesota Pollution Control Agency**

# How To *(technical)*



# How to *(practical & social)*

Meet with stakeholders

- What changes are doable?
- Ensure fair and open competition

Work with purchasers;  
integrate spec  
language

- Abide by purchasing rules
- Connect with existing product or service standards

Provide  
suggested  
procurement  
policy



# UNSPC Codes



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Version 15.1101

Search Code

Search Title

Code	Title
53102705	School uniforms
53102701	Military uniforms
53102708	Nurses uniforms
53102712	Paramedic uniforms
53102713	Ushers uniforms
53102710	Corporate uniforms
53102702	Customs uniforms
53102703	Police uniforms
53102709	Ambulance officers uniforms
53102706	Security uniforms
53102700	Uniforms

# NAICS Codes

## NAICS Code Description

### 315220 Men's and Boys' Cut and Sew Apparel Manufacturing

This industry comprises establishments primarily engaged in manufacturing men's and boys' cut and sew apparel from purchased fabric. Men's and boys' clothing jobbers, who perform entrepreneurial functions involved in apparel manufacture, including buying raw materials, designing and preparing samples, arranging for apparel to be made from their materials, and marketing finished apparel, are included.

**Cross-References. Establishments primarily engaged in--**

- Cutting and/or sewing materials owned by others for men's and boys' apparel--are classified in Industry [315210](#), Cut and Sew Apparel Contractors;
- Knitting men's and boys' apparel or knitting fabric and manufacturing men's and boys' apparel--are classified in Industry Group [3151](#), Apparel Knitting Mills; and
- Manufacturing fur or leather apparel and team athletic uniforms--are classified in Industry [315280](#), Other Cut and Sew Apparel Manufacturing.

2002 NAICS	2007 NAICS	2012 NAICS	Corresponding Index Entries
315225	315225	315220	Aprons, work (except leather, waterproof), men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315228	315228	315220	Athletic clothing (except team athletic uniforms), men's, boys' and unisex (i.e., sized without regard to gender), cut and sewn from purchased fabric (except apparel contractors)
315225	315225	315220	Bakers' service apparel, washable, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315225	315225	315220	Barbers' service apparel, washable, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315228	315228	315220	Bathing suits, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315221	315221	315220	Bathrobes, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315228	315228	315220	Beachwear, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315221	315221	315220	Briefs, underwear, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
315223	315223	315220	Caftans, men's and boys', cut and sewn from purchased fabric (except apparel contractors)
31522	31522	315220	Clothing, water resistant, men's and boys', cut and sewn from purchased fabric (except apparel contractors)

### Free Resources

- [SBA Size Standards](#)
- [2012 NAICS Structure](#)
- [2012 NAICS Revisions](#)

### Crosswalks

- [NAICS to SIC Crosswalk](#)
- [SIC to NAICS Crosswalk](#)



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# EIO-LCA

The screenshot shows a web browser window with the URL `http://www.eiolca.net/cgi-bin/dft/use.pl?newmatrix=US428PURCH2002`. The page header includes the Carnegie Mellon `eiolca.net` logo and the Green Design Institute logo. The navigation bar contains links for `LOG OUT`, `HOME >>`, and `BROWSE US 2002 PURCHASER MODEL...`. The main content area features three tabs: `Use Standard Models` (selected), `Create Custom Model`, and `Documentation`. The `Use Standard Models` tab contains a five-step configuration process:

- 1 Choose a model:**

Your current model is the **US 2002 Purchaser**, which is a **Purchaser Price Model**.  
([Show more details](#))

US 2002 (428 sectors) Purchaser
- 2 Select industry and sector:**

Search for a sector by keyword:

Or browse for a sector below:

Textiles, Apparel, and Leather | Men's and boys' cut and sew apparel manufacturing
- 3 Select the amount of economic activity for this sector:**

1 Million Dollars ([Show more details](#))
- 4 Select the category of results to display:**

Greenhouse Gases ([Show more details](#))
- 5 Run the model:**

This sector is comprised of one or more NAICS sectors, as described below:

# EIO-LCA

Carnegie Mellon

 eiolca.net

 Green Design  
INSTITUTE

HOME >> USE THE TOOL >> BROWSE US 2002 (428 SECTORS) PURCHASER MODEL >> DISPLAYING...

**Sector** #315220: Men's and boys' cut and sew apparel manufacturing  
**Economic Activity:** \$1 Million Dollars  
**Displaying:** Greenhouse Gases  
**Number of Sectors:** Top 10

#### Documentation:

[The sectors of the economy used in this model.](#)  
[The environmental, energy, and other data used and their sources.](#)  
[Frequently asked questions about EIO-LCA.](#)

[Change Inputs](#)

(Click here to view greenhouse gases, air pollutants, etc...)

This sector list was contributed by Green Design Institute.

	<b>Sector</b>	<b>Total t CO2e</b>	<b>CO2 Fossil t CO2e</b>	<b>CO2 Process t CO2e</b>	<b>CH4 t CO2e</b>	<b>N2O t CO2e</b>	<b>HFC/PFCs t CO2e</b>
	<i>Total for all sectors</i>	381.	322.	10.4	28.3	17.1	2.96
221100	Power generation and supply	162.0	159.0	0	0.438	0.990	1.03
484000	Truck transportation	27.0	27.0	0	0	0	0
211000	Oil and gas extraction	17.4	4.91	3.19	9.32	0	0
313310	Textile and fabric finishing mills	16.7	16.7	0	0	0	0
111920	Cotton farming	14.8	3.70	0	0	11.1	0
324110	Petroleum refineries	9.72	9.69	0	0.030	0	0
4A0000	Retail trade	8.62	8.62	0	0	0	0
325190	Other basic organic chemical manufacturing	8.13	7.29	0	0	0.836	0
313240	Knit fabric mills	8.05	8.05	0	0	0	0
492000	Couriers and messengers	6.40	6.40	0	0	0	0

[Download](#) 

[View Graph](#) 

If you are using this output as part of a project or paper, please cite appropriately.

Carnegie Mellon University Green Design Institute. (2013) [Economic Input-Output Life Cycle Assessment \(EIO-LCA\) US 2002 \(428 sectors\) Purchaser model](#) [Internet], Available from: <<http://www.eiolca.net/>> [Accessed 2 Oct, 2013]

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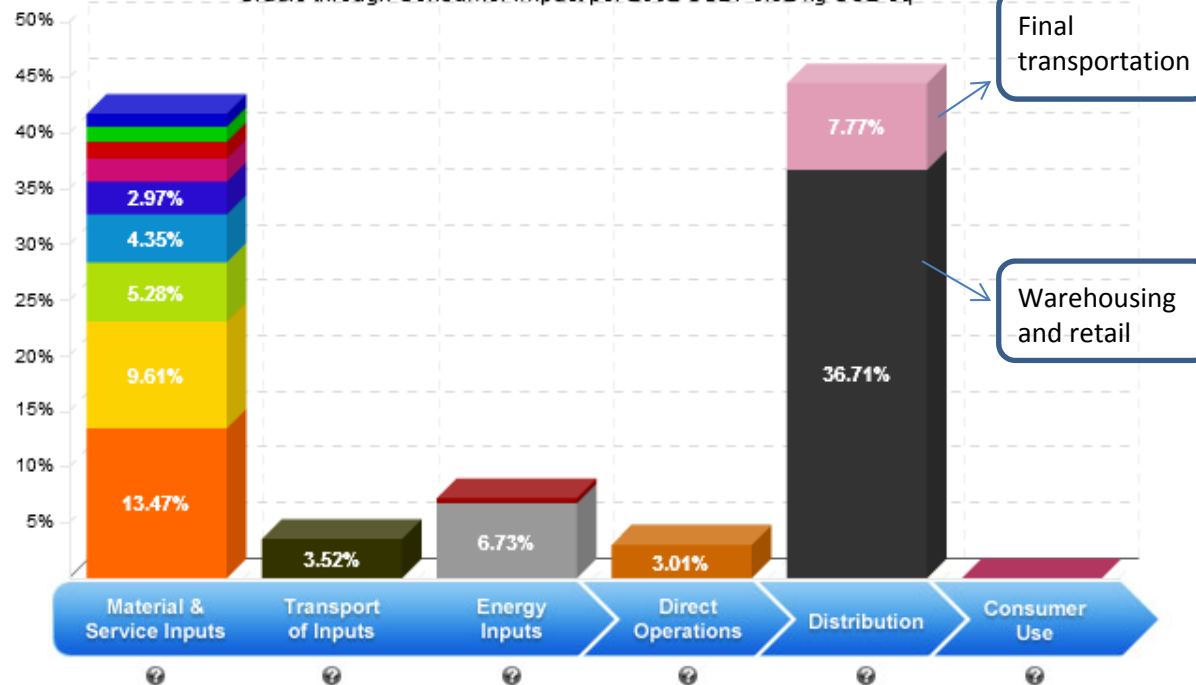
## Use the Model

- 1) Product Group
- 2) Product
- 3) Damage Category

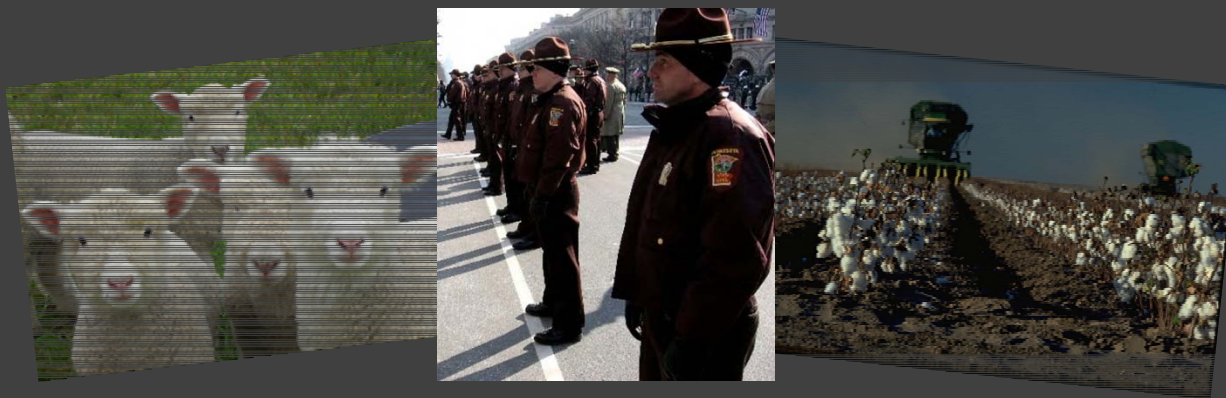
### 315290 - Other cut and sew apparel manufacturing

CLIMATE CHANGE

Cradle through Consumer Impact per 2002 USD: 0.92 kg CO2-eq



# Prioritizing



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# Prioritizing *(I/O LCA results)*

Purchasing Category	Annualized Contract Category Expenditure	Human Health	Ecosystem Quality	Climate Change	Resource Depletion	Water Consumption
Computer and Electronic Product Manufacturing	1	1	1	1	2	1
Transportation Equipment Manufacturing	2	2	2	4	4	4
Machinery Manufacturing	3	4	3	3	3	5
Petroleum and Coal Products Manufacturing	4	8	8	2	1	2
Chemical Manufacturing	5	5	5	5	5	6
Electrical Equipment, Appliance, and Component Mfg	6	6	6	6	6	7
Miscellaneous Manufacturing	7	7	7	8	7	9
Metal Product Manufacturing	8	3	4	7	8	10
Telecommunications	9	15	13	18	18	20
Food Manufacturing	10	9	9	10	9	3
Professional, Scientific, and Technical Services	11	19	18	23	22	17
Construction	12	12	11	15	12	16
Publishing Industries (except Internet)	13	16	15	17	20	18
Waste Management and Remediation Services	14	11	16	9	19	21
Furniture and Related Product Manufacturing	15	10	10	11	11	11
Textiles and Apparel	22	18	20	21	21	13

# Comparison of Scope: IT Services

## *ICT Standards, Metrics, and Certifications Scope Comparison*

ICT Standards, Metrics, and Certifications	Full LCA, Multi-Impact	Full LCA, GHG Only Impact	GHG Intensity/ Effectiveness of Operations	Energy Efficiency/ Productivity of Operations	Energy Efficiency Benchmarking	Energy Efficiency Pledge
Green Grid Life Cycle Assessment Data Centre Guidelines	Yes	No	No	No	No	No
Global e-Sustainability Initiative/GHG Protocol Product Standard ICT Guidance	No	Yes	No	No	No	No
Green Grid/ENERGY STAR Carbon Usage Effectiveness	No	No	Yes	No	No	No
GHG Intensity Metric (e.g. CO <sub>2</sub> per TB)	No	No	Yes	No	No	No
Energy Intensity Metric (e.g. kWh per bit)	No	No	No	Yes	No	No
Green Grid/ENERGY STAR Power Usage Effectiveness	No	No	No	Yes	No	No
ENERGY STAR Certification with a facility Portfolio Manager Score >75	No	No	No	No	Yes	No
ENERGY STAR Low Carbon IT Campaign — Power Management Pledge	No	No	No	No	No	Yes





# Specification Options: IT Services

## Service-Based

- Full GHG LCA of ICT service provided (CO<sub>2</sub>e per service provided)
- GHG Intensity of ICT Operations by service provided (CO<sub>2</sub>e per unit of service)
- Energy Intensity of ICT Operations by service provided (kWh per unit of service) and identify energy source and/or operations' electricity grid

## Operations Efficiency

- Carbon Usage Effectiveness of data center operations (ideally for the data center providing service to the State)
- Power Usage Effectiveness of data center operations (ideally for the data center providing service to the State)

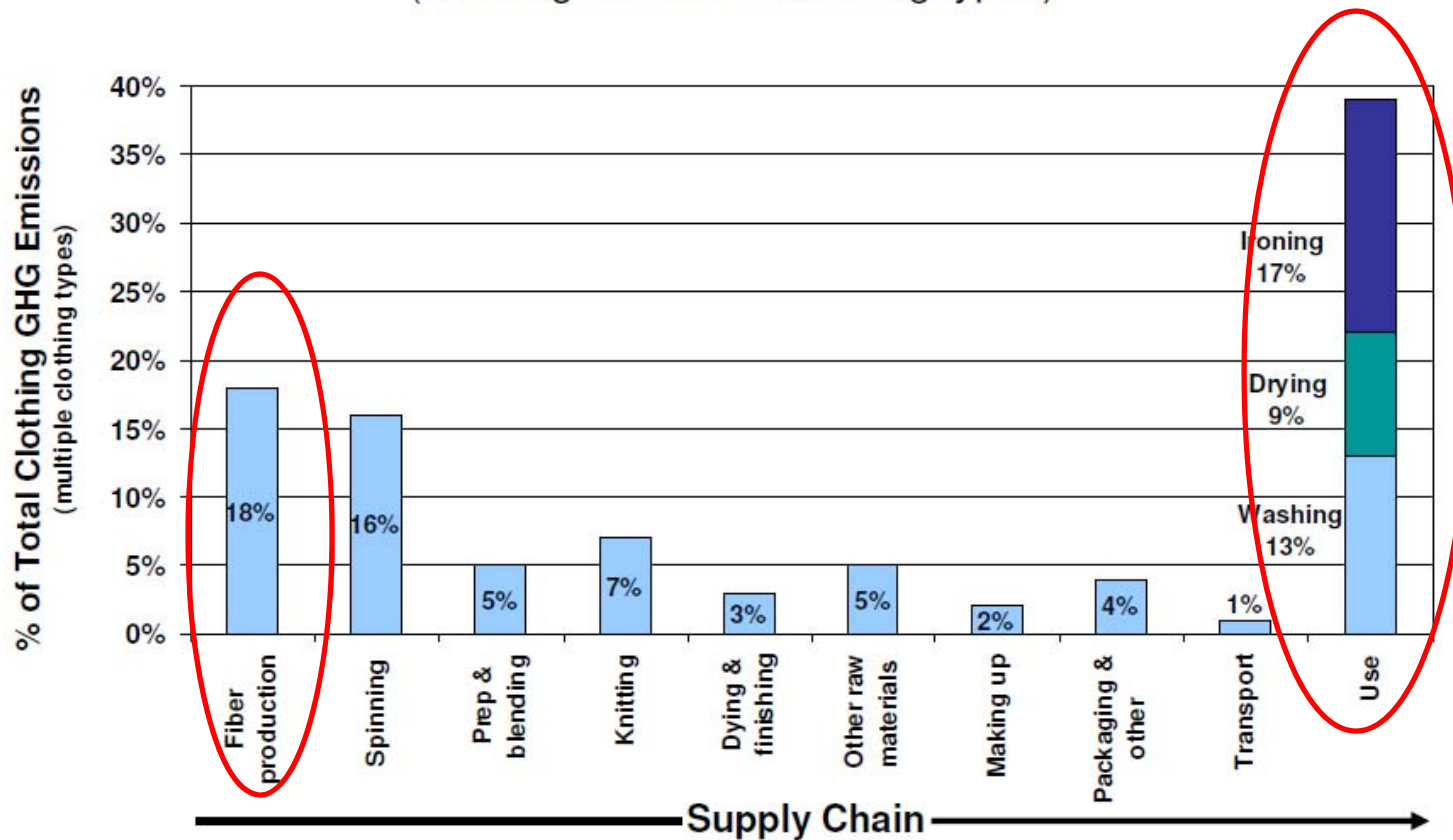
## Certification-Based

- ENERGY STAR certification for the data center providing the ICT service procured by the State
- Taken ENERGY STAR's Low Carbon IT Campaign pledge.



# Identifying Hot Spots

Chart 1: Aggregate Clothing Life Cycle GHG Emissions  
(Clothing retailer: all clothing types)



# Specification Options: Apparel

Hotspot	Reduction opportunity	Specification
Laundrying	Encourage cold water washing; discourage procurement of dry clean only items	<ul style="list-style-type: none"><li>• Preference will be given to vendors who provide low impact laundrying apparel instructions.</li><li>• Dry clean only apparel will be considered only if no other apparel with alternative care options is available.</li></ul>
Fabric production	Procure items made with lower GHG fabric production intensity	<ul style="list-style-type: none"><li>• Preference will be given to apparel fabrics with comparatively lower GHG fabric production intensity and longer expected wearable lives.</li></ul>
Durability	Procure more durable items	<ul style="list-style-type: none"><li>• Preference will be given to vendors who provide information on the estimated wearable life of apparel items.</li></ul>

# Specification Options: Apparel

Life Cycle Hotspot	Apparel Type	100% Points	50% Points	0% Points
50% Points: APPAREL CARE	All Apparel Types	<ul style="list-style-type: none"> <li>• Cold water wash + line/hang dry (to avoid ironing and tumble drying)</li> <li>• No Impact Care: Product care requires no water, energy or cleaning agents (excludes single-use items)</li> </ul>	<ul style="list-style-type: none"> <li>• Cold water wash + tumble dry</li> <li>• Hand wash</li> <li>• Warm water wash</li> <li>• Hot water wash</li> <li>• Iron</li> <li>• Tumble dry (low, medium, or high)</li> </ul>	<ul style="list-style-type: none"> <li>• Dry clean only</li> <li>• Machine wash separately</li> <li>• Wash before first use</li> <li>• Extra rinse cycle</li> </ul>
	50% Points: GHG INTENSITY OF FABRIC PRODUCTION	<b>Blouses</b>	<ul style="list-style-type: none"> <li>• 100% cotton</li> </ul>	<ul style="list-style-type: none"> <li>• 50% cotton/50% polyester blend</li> </ul>
<b>Coats and Jackets</b>		<ul style="list-style-type: none"> <li>• Down</li> <li>• Plastic-based</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton and cotton blends</li> </ul>	<ul style="list-style-type: none"> <li>• Wool</li> </ul>
<b>Shirts</b>		<ul style="list-style-type: none"> <li>• 100% cotton</li> </ul>	<ul style="list-style-type: none"> <li>• 50% cotton/50% polyester blend</li> </ul>	<ul style="list-style-type: none"> <li>• Silk</li> </ul>
<b>Trousers</b>		<ul style="list-style-type: none"> <li>• Cotton blends</li> </ul>		<ul style="list-style-type: none"> <li>• Wool blends</li> </ul>

# Data Needs

- Quantity purchased in a 12 month period
- Price per unit or other appropriate grouping of products
- Corresponding United Nations Standard Products and Services Code<sup>®</sup> (UNSPSC) code
- Mass or volume measurement appropriate to the product (e.g. 64 ounce container of detergent)
- Associated MSDS

# Sample model usage report

Product description	Unit measure (Mass, volume, number, per each)	Price per unit (\$)	Total quantity of units purchased	UNSPSC	Total spent (\$)
Cotton t-shirt	Box of 5	5.25	10	00112233	52.50
Wool pants	Box of 3	17.00	20	00112244	340.00
Polyester pants	1	12.50	10	00112222	125.00
Total			40		517.50

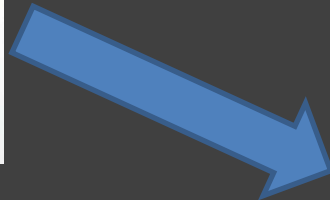
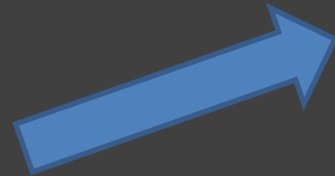
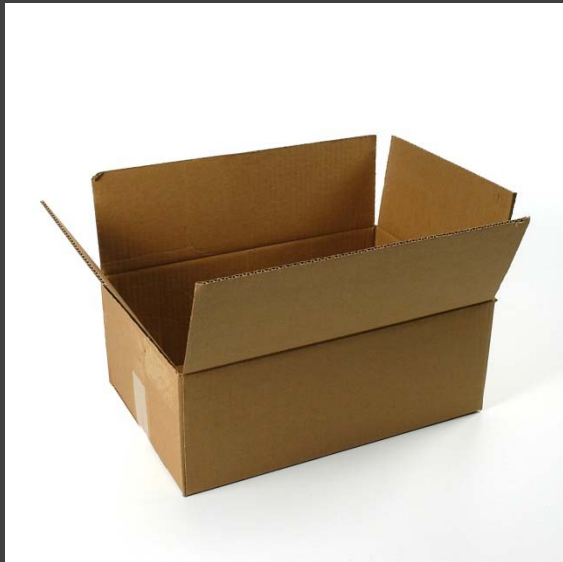


# Implications

- Training for purchasers or formalized partnership with environmental staff



# Reusable Packaging Pilot



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# Reusable Packaging: *Potential GHG savings*

Packaging type	Quantity	GHG emissions (kg CO <sub>2</sub> e per year)	# of uses	Lifetime GHG savings over 16 years (kg CO <sub>2</sub> e)
Cardboard Box	13,000	10,017	1	Not applicable
Plastic Box	2,167	61	100	159,296
Plastic Tote	2,167	231	100	156,576





# Questions?

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651-757-2276

Project documentation:

<http://www.pca.state.mn.us/dm0rb81>



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