

UBC Social Ecological Economic Development Studies (SEEDS) Student Report

Triple Bottom Line Impact of Local vs. Non-local Procurement Practices

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TRIPLE BOTTOM LINE IMPACT OF LOCAL VS. NON-LOCAL PROCUREMENT PRACTICES

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1. Introduction

The BuySmart Network describes social purchasing as a "...process by which organizations buy goods and services taking into account not only the economic value for money (price, quality, availability, functionality) but also the environmental, social, and ethical impacts of these goods and services - at local, regional, and global levels."¹ The supply chain is often seen as the fundamental driving force across all industries and is where the difference in strategy can drive varying impacts on the overall health of the firm.

Some countries like the USA and Japan have rolled out Green Procurement Programs focussing more on environmental issues. Currently in Canada, Ontario and Quebec account for about 70% of Canada's furniture manufacturing industry, a group that had about \$10.5 billion in sales in 2009. Just over half of all furniture sales in Canada are imports, including many products brought in by Canadian manufacturers who admits that the price difference between imports and domestically made products can vary from 30-50% to more than double.² According to [furniturelink.ca](http://www.furniturelink.ca), which provides a comprehensive list of over 355 Canadian furniture manufacturers, there are 92 businesses that serve the "office or institutional" production space, only 9 of which are in B.C.³

Sustainable procurement, should seek to achieve an appropriate balance among the pillars of sustainable development: (i) economic; (ii) social, with due regard to human rights, social justice and work environment; and (iii) environmental, both global and local. When assessing the comparative differences between local and non-local purchasing differences, it is important to be inclusive of financial, environmental and social factors. In practice, most assessment is done on the financial and environmental impact given its ease of measurement. It is this paper's intentions to also include the

¹ BuySmart Network's "[Sustainability Purchasing Trends and Drivers](#)," 2008.

² Flavelle, Dana. "Furniture Makers Fight Back against Imports." *Thestar.com*. Toronto Star, 20 Sept. 2010. Web. 14 Oct. 2010. <<http://www.thestar.com/business/article/863883--furniture-makers-fight-back-against-imports>>.

³ Harrison, Stephen. "A Searchable Furniture Directory of over 355 Canadian Manufacturers of Home, Office, Patio, Hospitality and Institutional Furniture." *Canadian Directory of Furniture Manufacturers: Furniture Link Canada*. Web. 01 Apr. 2011. <<http://www.furniturelink.ca/>>.

impact on social factors to conduct a more holistic analysis of the benefits (and costs) of local or non-local procurement policies, particularly its impact on the UBC Supply Management Office.

2. Approach

A three-stage approach was adopted so as to obtain the best results, combining literature a review, quantitative analysis, and expert interviews. As the study depends heavily on procurement data, it was agreed that these data would be provided by the UBC Supply Management Office in view of the sensitive nature of such data and also to enable the study to move forward as smoothly as possible. Environmental impact is analyzed via the use of SimoPro 7.0⁴ to determine carbon and/or emission outputs. For the purpose of this research project, office furniture was chosen as the functional units. The research methodology included determining the specific material composition of the furniture models and acquisition of manufacturing data from individual suppliers. These data were compiled and used in conjunction with pre-existing data, specifically from the databases mentioned above purchased in conjunction with the SimaPro 7.0 LCA software, to develop the life cycle inventory of the chosen furniture models. The life cycle stages included in the study extended from raw-material extraction through to waste management. Social benefits of procurement decisions are discussed in a qualitative discussion with consideration of economic and social welfare implications. Additional considerations will be also be given to firms who proactively look for opportunities to not only minimize their risks but actually reorganize profit opportunities to fully integrate social and environmental sustainability strategies in their purchasing practices.

In addition to attempting to quantify the financial, social and environmental impact of local versus non-local procurement, additional exploration will be made of the “economics” of local procurement. In particular, assessment of how global trade and comparative advantages are distorted

⁴ "About SimaPro | PRé Consultants." *Life Cycle Consultancy and Software Solutions | PRé Consultants*. Web. 02 Apr. 2011. <<http://www.pre.nl/content/simapro-lca-software/>>.

when local procurement policies are given preference over pure market forces. This allows for a Full Cost Accounting (FCA) of UBC's procurement practices as defined by the International Institute for Sustainable Development. FCA goes beyond traditional accounting by examining changes in direct, indirect, contingent and less-quantifiable costs and savings over the longer term. By using a FCA approach to assessing the impact of UBC's procurement practices, it will ensure that the costs of past, present and future activities are incorporated, to some degree, in decisions made by UBC.

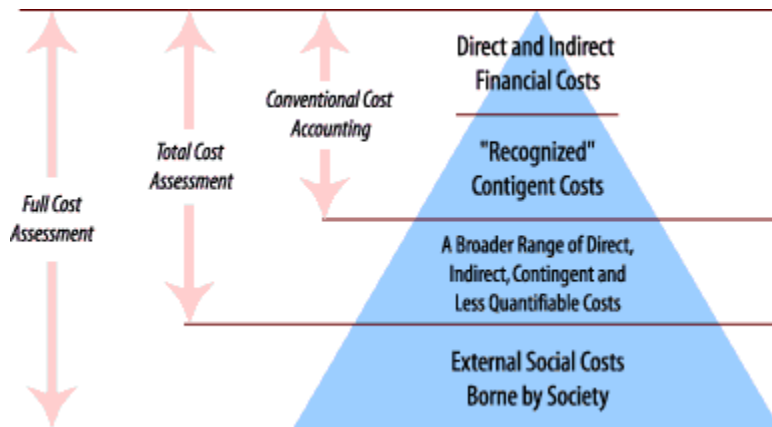


Figure 1 Relationship between total cost assessment and other approaches to environmental and social accounting⁵

3. Environmental Analysis

3.1 Background

The aim of this study is to compare the environmental effects during the whole life cycle (from raw material extraction to disposal) of the usage of selected furniture products in order to isolate areas which contribute the most to the overall environmental footprint. It is of great interest to have this comparison, since the study aims to identify the magnitude of various CO₂e contributors to the product's overall life cycle in order to further compare whether economic benefits justify the environmental costs.

⁵ Total Cost Assessment | Business Tools | Strategies & Tools." *Total Cost Assessment, Case Studies For This Topic*. International Institute for Sustainable Development (IISD). Web. 02 Apr. 2011. <http://www.iisd.org/business/tools/systems_tca.asp>.

Apart from the academic focus of this study, the results of a similar analysis carried out at a higher scale could be employed in order to select the most “environmentally-friendly” furniture products which optimize the triple bottom line. Since the main objective of the environmental analysis is to compare and evaluate the environmental impacts of the employment of the different furniture products, the LCA can be defined in an accounting framework.

3.2 Database overview

Environmental analytics relied on the use of SimaPro 7.0 which provided the platform to collect, analyze and monitor the environmental performance of products and services of the selected furniture products. SimaPro was chosen given its ability to easily model and analyze complex life cycles in a systematic and consistent manner, following the ISO 14040 series recommendations while following the data exchange format complying with the ISO/TS 14048 data documentation format.

Databases used in the analysis include:

- Ecoinvent v2 which contains life cycle inventories for nearly 4,000 industrial processes.

Ecoinvent databases include unit processes and calculated results within a system in sectors such as energy, transport, building materials, chemicals, washing agents, paper and board, agriculture and waste management⁶.

- Emission data for the LCA uses the US Input Output Database which contains environmental data compiled from the Toxic Releases Inventory 98 (TRI), Air Quality Planning and Standard (AIRS) data of the US EPA, Energy Information Administration (EIA) data of the US department of Energy, Bureau of Economic Analysis (BEA) data of the US Department of Commerce (DOC), National Center for Food and Agricultural Policy (NCFAP) and World Resource Institute (WRI).

This database allows the analysis to assess the impacts from small and medium sized enterprises and diffuse sources such as transport.

⁶ Althaus, Hans-Jorg, Gabor Doka, and Roberto Dones. *Overview and Methodology Data V2.0*. Tech. Dubendorf: Swiss Center for Life Cycle Inventories, 2007. Print.

- The Dutch Input Output database provided an overview of how the average consumer distributes spending over 350 categories, such as buying tomatoes, driving to work and maintaining the garden; this database made a link between these categories and the economic sectors thus providing insight into trade flows between these sectors.
- The Japanese Input Output database was developed by the Environmental Technology Laboratory of the Corporate Research & Development center of Toshiba Corporation which utilizes the 2000 IO Table of Japan and contains approximately 400 domestically industrial sectors.
- The overseas burdens for aluminium, iron ore, copper ore, lead ore, zinc ore, coking coal, steam coal and others, crude oil, LNG, and LPG were obtained using the Process Analysis method (traditional LCA inventory), and added up with the domestic environmental burdens⁷.
- The IVAM database collected by IVAM Environmental Research, Amsterdam, the Netherlands, focuses on materials, transports, energy and waste treatments (however it focuses more on Dutch data).

3.3 Functional unit

Definition of function

In the model we selected product systems from two manufacturers that provided the information necessary for us to carry through a consistent and comparative analysis. A functional unit is defined as the complete cradle-to-grave processes and components of a piece of office furniture and will be described as a “system” given the holistic incorporation of the product’s entire life cycle. Five furniture systems are used in the analysis made by Steelcase and Haworth.

⁷ Althaus, Hans-Jorg, Gabor Doka, and Roberto Dones. *Overview and Methodology Data V2.0*. Tech. Dubendorf: Swiss Center for Life Cycle Inventories, 2007. Print.

Functional unit, which quantifies this function

The functional units for this study are based on empirical measurements. Empirical measurement units were chosen as specified by SimaPro. The average weights of the sample systems were between 20kg and 122kg.

Selected sample products

Three of the four Steelcase sample product systems (Siento, AirTouch and Garland) selected are based on LCA studies completed by Spitzley et al. on Steelcase office furniture products⁸. Data for the Think chair system is obtained from the Steelcase website which has provided an Environmental Product Declaration for this system⁹. The two Haworth systems were provided by Steve Kooy, Senior Environmental Engineer & Sustainability Team Leader of Haworth Inc.

Material	Siento	AirTouch	Garland	Think	Zody
Steel	14.651	22.861	23.995	4.776	8.360
Aluminum		12.701		2.817	6.418
Plastics	6.622		0.680	7.256	5.262
Non-ferrous metals	6.078				
Leather	1.179				
Particleboard		15.014	72.257		
Playwood			18.234		
Cherry			3.901		
Laminate		1.451			
Polyurethane foam					0.907
Adhesive and plastics		0.499	0.862		
Backing material			0.726		
Card board				0.227	
Rubber				0.024	
Other	0.771		1.406		0.168
Total	29.302	52.526	122.062	15.100	21.115

Table 1 Material composition and weight of selected product systems in kg

⁸ Bernhard, David V., Bernhard A. Dietz, and Gregory A. Keoleian. *Life Cycle Assessment of Office Furniture*. Rep. Ann Arbor: University of Michigan Center for Sustainable Systems, 2006. Print.

⁹ *Environmental Product Declaration A Presentation of Quantified Environmental Life Cycle Product Information for the Think Work Chair in North America*. Tech. Grand Rapids: Steelcase, 2004. Print.

3.4 System Boundaries

Boundaries in relation to nature

In this LCA we are taking into account the entire life-cycle of the product systems, from the raw material (oil, wood and metals) to the moment they totally lose their value (disposal). Recycling of the chairs is not included in the study; although these operations revalue the products they do not have relevance when assessing local and non-local procurement best practices. The material production phase includes the extraction of the raw materials as well as the materials manufacture, which is the processing of the raw materials into intermediate materials. This phase also includes transportation of raw materials to the location where they are processed into intermediate materials.

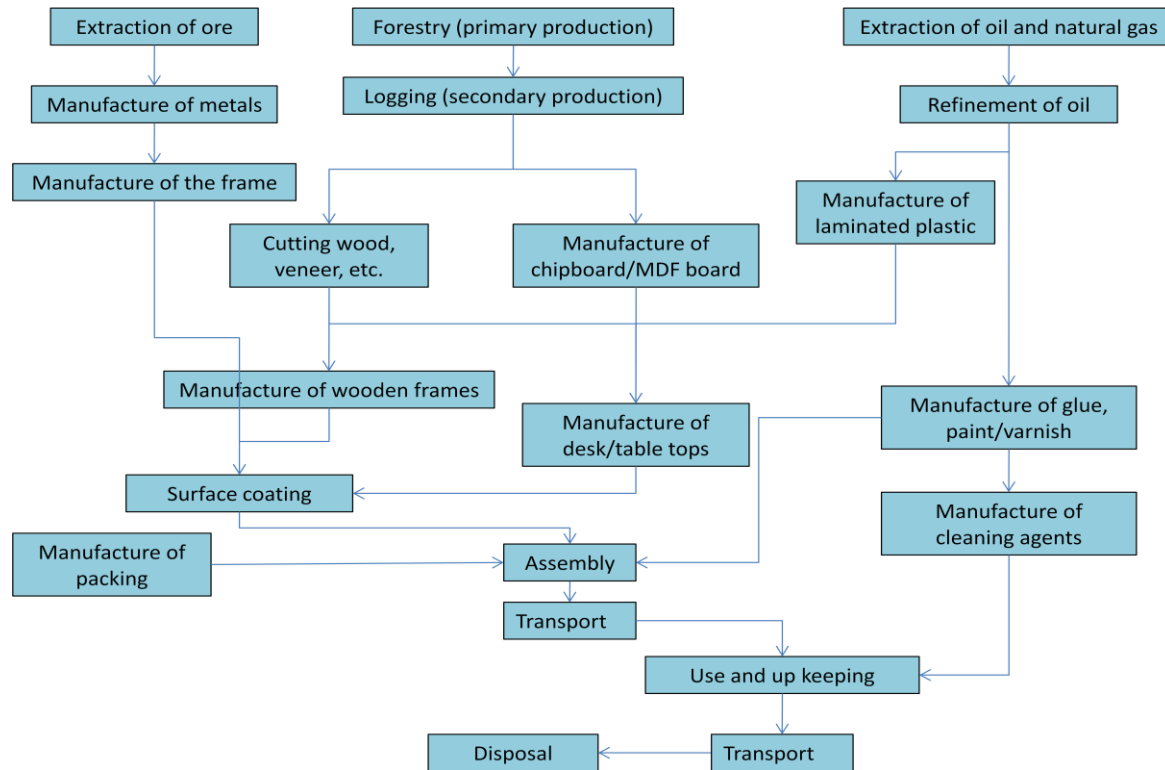


Figure 2 LCA system boundary

Geographical boundaries

Local procurement is defined as furniture units that are manufactured and assembled within the province of British Columbia. Non-local is defined as all areas outside of the province of British Columbia

Time horizon

This study is retrospective, because it is accounting for the environmental impact of different furniture systems. The purpose of this is therefore not to make future predictions.

Cut-off criteria

One of the cut-offs performed in the study is the omission of the “usage” part of the furniture, since it is considered that the performance of the chairs during their life would be the same. Another cut-off is the recycling or reuse of the furniture given the lack of significance to this study.

3.5 Distribution Modelling

Product	Part	Starting Point	Ending Point	Distance (km)	Weight (kg)
AirTouch	Particleboard Cores	Western US	Tijuana, Mex	1,598 Land	15.01
AirTouch	Column Extrusions	Eastern US	Juarez, Mex	3,829 Land	10.52
AirTouch	Tube Support	Grand Rapids, MI	Grand Rapids, MI	na	6.33
AirTouch	Curved Plate	Grand Rapids, MI	Grand Rapids, MI	na	4.06
AirTouch	Mounting Plate	Grand Rapids, MI	Juarez, Mex	2,903 Land	5.38
Siento	Base	Jinan, China	Los Angeles, CA	10,073 Sea	2.72
Siento	Base	Los Angeles, CA	High Point, NC	3,958 Land	2.72
Garland	Particleboard Cores	Western US	Grand Rapids, MI	3,861 Land	72.26
Garland	Veneer	Eastern US	Grand Rapids, MI	965 Land	6.49
Garland	Plywood Drawers	Grand Rapids, MI	Grand Rapids, MI	na	18.23
Think	Unknown				15.10
Zody NA)	Unknown				21.11
Zody(Chn)	Unknown				21.11

Table 2 Delivery distances of selected sample systems

For the AirTouch product, three separate assemblies are produced by individual suppliers and are consolidated in a single location prior to customer delivery. This product consolidation is modeled as part of the life-cycle. The work surface is produced by part supplier in Tijuana, Mexico; the central column is produced by a metal fabricator in Juarez, Mexico and the base is produced by a metal fabricator in Grand Rapids, Michigan. The product is consolidated at the Steelcase facility in City of Industry, California. The Garland product ships from Grand Rapids, Michigan while the Siento product ships from Brayton in High Point, North Carolina. Due to lack of available data, start points for the

Lifeform system was based on closest available sources of individual components. Shipping is from Formway’s primary production facility in Wellington, New Zealand. No distribution data is available for the Zody and Think system’s distribution channels.

All deliveries are assumed to use diesel trailers for the land shipment and fossil fuel tankers for sea transport distances. Data from Franklin Associates are used in the SimaPro model.

3.6 End of Life Modeling

End of life modelling of the sample chairs is based on US EPA’s data (Municipal Solid Waste in the United States; October 2003, Washington D.C.). Using data on durable goods such as appliances and other office furniture products, specific recovery rates for different materials were derived. It is also assumed that all remaining material after recovery is either combusted at a rate of 14.7% or dumped into landfills at a rate of 55.7%. The remaining waste is processed through unknown waste treatment methods accounting for the remaining 29.6%.

Material in Waste Stream	Recovery Rate	Comment
Ferro metals	28.0%	
Copper	60.0%	
Magnesium	60.0%	
Zinc	60.0%	
Aluminum	0.0%	According to source negligible for durable goods
Non-ferro metals (others)	60.0%	
Glass	0.0%	According to source negligible for durable goods
Polyethylene (PE)	5.5%	
Polyethylene terephthalate (PET)	5.5%	
Polypropylene (PP)	5.5%	
Polyvinylchloride (PVC)	5.5%	
Plastics (others)	5.5%	
Wood	15.0%	According to source for containers and packaging
Paper	55.0%	According to source for containers and packaging
Cardboard	55.0%	According to source for containers and packaging

Table 3 Specific recovery rates for various materials

3.7 Impact categories and impact assessment method

The impact categories that are considered in the model provided by SimaPro are:

- Climate change (Emissions to air like hydrocarbons, carbon dioxide, methane etc.)
- Ozone layer (ozone depletion potential)
- Ecotoxicity (Emission to water, air and soil)
- Respiratory organics (Emissions to air, all kind of organics)
- Respiratory inorganics (Emissions to air, SO₂, NO_x)
- Carcinogens (Arsenic, Benzene, Cadmium, Heavy metals etc.)
- Radiation (Emissions to air and water from Cobalt, Radon, Plutonium etc.)
- Acidification/ Eutrophication (Emissions to air, Nitrogen, Ammonia etc.)
- Land use (emission from raw material, traffic, etc.)
- Minerals (Aluminum, Iron, Lead, Copper, etc.)
- Fossil fuels

3.8 Results

In the analysis of the Siento, Garland and AirTouch furniture systems through Simapro 7.0, appendix 1-3, summarizes the environmental impact of the respective sample systems. Table 4 shows the carbon emission associated with each product across its life cycle based on the model outlined above. Further data provided by Haworth on their Zody chair provides comparative analysis of production in North America relative to that in China, demonstrating that foreign production in China is relatively inefficient from an environmental perspective.

Distance Impact

	Component Weight (kg)	Prod'n Distance (km)	Production kgkm	System Weight (kg)	Distribution Distance (km)	Distribution kgkm	Total kgkm	GWP (kgCO ₂ e)	Waste (kg)	Energy (MJ)
Airtouch										
Particleboard	15.01	1,598.08								
Column	10.52	3,830.24								
Tube Support	6.33	na								
Curved Plate	4.06	na								
Mounting Plates	5.38	2,903.26								
Total	30.92	8,331.57	257,586.07	52.53	1,076.33	56,535.27	314,121.34	220	79.5	3290
Siento										
Aluminum Base	2.72	14,033.48								
Total	2.72	14,033.48	38,192.88	29.30	1,373.00	40,231.61	78,424.49	114	40	1350
Garland										
Particleboard	72.26	3,862.43								
Veneer	6.49	965.61								
Plywood drawers	18.23	na								
Total	78.74	4,828.03	380,176.79	122.06	1,526.96	186,383.55	566,560.34	218	160	3452

Table 4 Comparative analysis of distance on overall system carbon footprint

Results using the SimaPro program suggests that the CO₂e generated from transportation does not have significant relevance to the overall carbon footprint; it is not the decisive factor in determining whether the weight and distance is a material consideration when deciding between local versus non-local procurement. As noted per table 8, although the Garland system has 80% higher weight to distance ratio, its carbon footprint is essentially the same as the AirTouch system. It is also be noted that the Siento system's total weight-distance is only 25% of the AirTouch system and 14% of the Garland system, yet its total CO₂e footprint is 52% of both the AirTouch and Garland systems.

The Think and Zody systems were not used in this analysis as we do not have available information on the parts and sales distribution channels.

Pricing Carbon

According to David Suzuki Foundation's "Pricing Carbon: Saving Green" report¹⁰, in order to maintain 1990 carbon emission levels, carbon needs to be priced at \$40/t in 2010 and increase to \$100/t CO₂e by 2020. This report will use targeted carbon pricing levels projected from 2010 to 2020. The

¹⁰ Rivers, Nic, and Dave Sawyers. *Pricing Carbon: Saving Green*. Publication. Vancouver: David Suzuki Foundation, 2008. Print.

pricing schedule used in this report uses a reduced version of the CIMS model to minimize GDP loss for a given target in 2020. It should be noted that due to modelling limitations, the carbon price path outlined in this report does not take into account any complementary measures or the purchase of international carbon credits. Thus the prices used will likely be higher than might be require in practice, however it does provide a conservative analysis for the purpose of this paper.

Based on the price of \$40 to \$100/t of CO₂e, total costs to offset the carbon emissions for the respective sample products are listed in the table below:

	GWP (kg CO ₂ e)	Cost of Carbon Offset (2010)	Cost of Carbon Offset (2015)	Cost of Carbon Offset (2020)	Conversion Rate: 1kg= 0.0001t	
Siento	114	\$4.56	\$7.41	\$11.40	\$/t CO ₂ e (2010):	40
Garland	218	\$8.72	\$14.17	\$21.80	\$/t CO ₂ e (2015):	65
AirTouch	220	\$8.80	\$14.30	\$22.00	\$/t CO ₂ e (2020):	100
Zody (NA)	62	\$2.48	\$4.03	\$6.20		
Zody (China)	75	\$3.00	\$4.88	\$7.50		
Think	103	\$4.12	\$6.70	\$10.30		

Table 5 Sensitivity analysis of carbon offset costs of sample systems

	Retail Price	2010 Offset Cost	% Cost	2015 Offset Cost	% of Cost	2020 Offset Cost	% of Cost
Zody	\$537.00	\$2.48	0.46%	\$4.03	0.75%	\$6.20	1.15%
Siento	\$1,829.00	\$4.56	0.42%	\$7.41	0.69%	\$11.40	2.12%
Garland	unavailable						
AirTouch	\$1,399.00	\$8.80	0.63%	\$14.30	1.02%	\$22.00	1.57%
Think	\$500.00	\$4.12	0.82%	\$6.70	1.34%	\$10.30	2.06%

Table 6 Relative cost of carbon offset for sample systems¹¹¹²¹³¹⁴

The Haworth Zody product system demonstrates that the overall carbon footprint difference between production in China and North America remains significant at approximately 21%. The Zody system has a lower footprint as it does not include the CO₂e footprint of sales distribution. According to

¹¹¹¹ "Steelcase Chair Think - Compare Prices, Reviews and Buy at Nextag - Price - Review." *Nextag - Compare Prices Before You Buy*. Web. 25 Mar. 2011. <<http://www.nextag.com/steelcase-chair-think/stores-html>>.

¹¹² "Steelcase AirTouch - Compare Prices, Reviews and Buy at Nextag - Price - Review." *Nextag - Compare Prices Before You Buy*. Web. 25 Mar. 2011. <<http://www.nextag.com/steelcase-AirTouch/stores-html>>.

¹¹³ "Steelcase Siento Mid-Back Leather Chair." *Welcome to Ergonomic Chair Pro - Chairs Professionally Selected by Certified Ergonomists*. Web. 25 Mar. 2011. <http://www.ergonomicchairpro.com/Steelcase-Siento-Mid-Back-Leather-Chair_p_184-1224.html>.

¹¹⁴ "Haworth Zody Chair - Mid Back Mesh Chairs - Officesight.com." *Office Furniture*. Web. 25 Mar. 2011. <<http://www.officesight.com/hazomech.html>>.

the Haworth and Steelcase websites, all systems are BIFMA e3 certified which provides a furniture sustainability standard that is an open consensus based method to evaluate the sustainable attributes of furniture products. It includes criteria for evaluation materials selection and usage; energy; human and ecosystem health; and social responsibility impacts¹⁵. Thus we can assume that cradle to cradle life cycle of these systems are equally efficient and key processes are standardized based on the criteria set forth by BIFMA.

Table 10, based on suggested retail price obtained from online sources show that the environmental impact quantified in dollars is nominal relative to the overall cost of the product itself. Even at today's price using 2020's projected cost of carbon at \$100/t, carbon offset for each system is consistently at around 1-2% of the retail price. Assuming UBC is able to obtain bulk pricing discounts of 20-30% off retail price, the carbon offset cost remains nominal at 2-3% of direct purchasing costs.

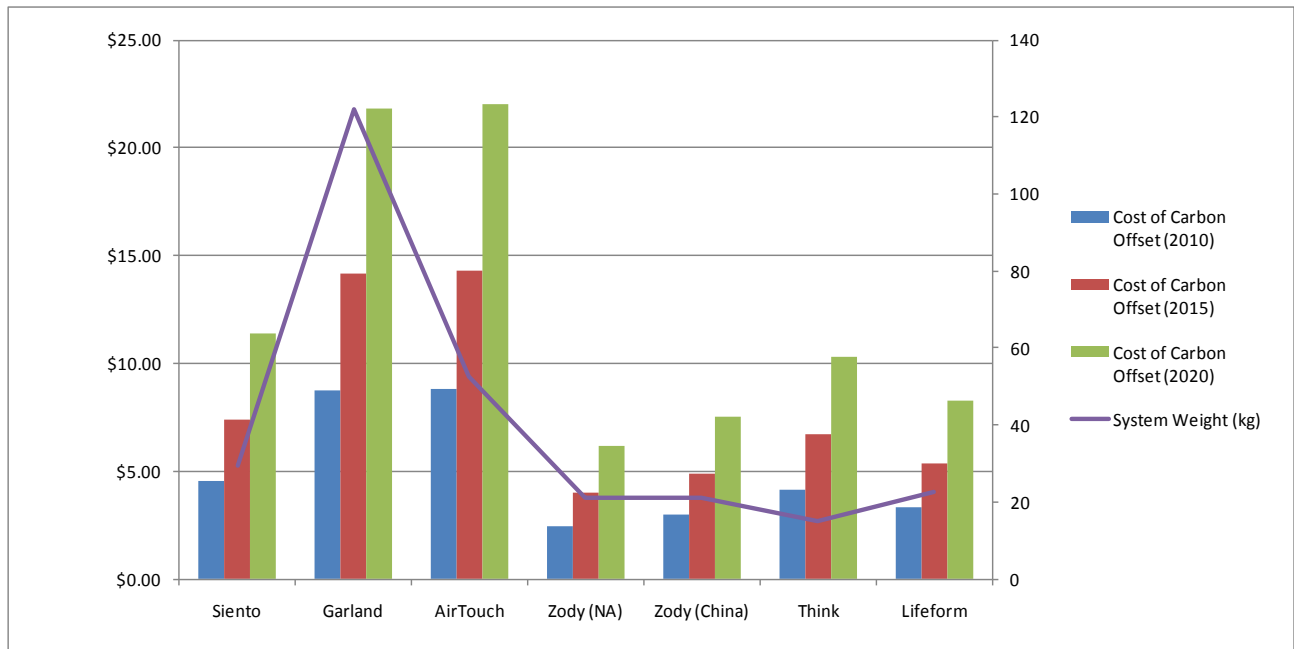


Figure 3 Sensitivity analysis of carbon offset costs of sample systems relative to system weight

¹⁵ Panning, Dave. "BIFMA: Standards." *BIFMA: The Industry Voice for Workplace Solutions*. Web. 24 Mar. 2011. <<http://www.bifma.org/standards/index.html>>.

Figure 2 shows significant correlation between system weight and overall carbon footprint. With the exception of the AirTouch system, all other sample systems show a uniform consistency of weight to carbon ratio. This result shows that consideration of product weight (in combination of other modelling criteria) is relevant in minimizing environmental impact of the product system.

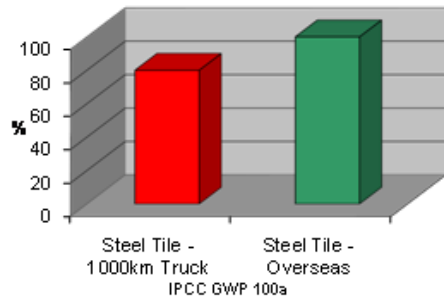


Figure 4 Steel tile transportation; GWP comparison of land versus overseas transport

Additional data provided by Haworth’s Steven Kooy, shows that- on average- land transportation has a CO₂e footprint 20% less than that of overseas transport. This supports local procurement which not only minimizes overall distance but will most likely utilize land transport rather than sea transport. Further data provided by Steelcase Think chair EPD shows that transport contributes 3.62% to the overall CO₂e footprint of the system life cycle. Figure 4 below shows the breakdown of the relative contribution of each stage of the lifecycle relative to the overall carbon footprint.

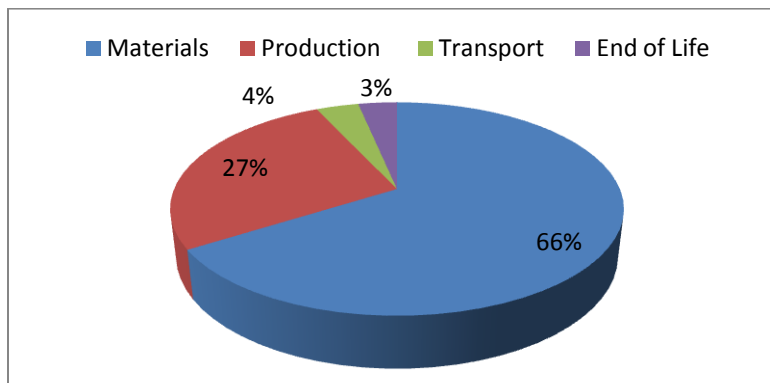


Figure 5 Breakdown of lifecycle contribution to overall carbon footprint for the Think chair system¹⁶

¹⁶ Environmental Product Declaration A Presentation of Quantified Environmental Life Cycle Product Information for the Think Work Chair in North America. Tech. Grand Rapids: Steelcase, 2004. Print.

With transport accounting for less than 4% of overall carbon footprint, this further reduces the significance of local versus non-local procurement policies. As per tables 9 and 10, the cost of carbon offset is already nominal relative to total direct costs, with transport costs representing such a nominal contributor to the overall environmental impact, this reduces the argument for local procurement due environmental costs from transport.

3.9 Conclusion

From research results on the environmental impact of the five product systems, it can be concluded that the overall difference in the environmental impact of local and non-local procurement practices is nominal at best and does not play a key decision factor establishing procurement policies. Although we see from the Zody system data that local (North American) production is approximately 20% more environmentally efficient and land transport of materials provides a further 20% reduction in environmental impact, due to the relatively insignificant impact of environmental costs in relation to overall direct costs, it is impractical to choose local procurement based on environmental considerations. Choosing local procurement policies based on presented data will reduce approximately 3% of total environmental costs with additional benefits of greater efficient production reducing environmental costs by a further 20% of 3% when compared to production facilities in countries such as China. Based on carbon offset costs of \$10 for the Think chair system, this means an environmental savings of approximately \$0.40 per chair to source locally rather than procuring from China.

4. Social Analysis

4.1 Background

Social purchasing looks at the multiple social impacts purchasing has, such as employment opportunities, social inclusion and community economic development. To create social value from purchasing decisions UBC must be proactive, not reactive. The challenge is to move to the next level and

become "corporate social opportunity companies"¹⁷ - where organizations not only seek to minimize their risks but actually recognize profit opportunities and embrace socially conscious sustainable purchasing aggressively. By incorporating a social component, sustainable purchasing can move beyond simply "not causing harm" and negative screening to generating social opportunities. However these decisions and policies must be deliberate and generate net positive social returns which would not have otherwise been created had we not chosen to engage in these practices. In order to do so we must also analyse purchasing from an economic perspective.

Within the context of international trade and macroeconomics, *terms of trade* (TOT) which is the $(\text{price of exports})/(\text{price of imports})$ can be used to analyze proposed recommendations. Terms of Trade is a measure of the level of imports which can be purchased through the sale of exports, and is sometimes used as a proxy for the relative social welfare of a country as it essentially denotes the relative level of state wealth. As states are able to create higher value goods and services, they can then purchase lower value goods from other states generating higher level of social welfare, providing the basis for comparative advantages. Thus although local procurement may generate immediate and quantifiable social benefits through employment and possibly community economic development, this paper will include additional analysis in consideration of economic theories.

There are also numerous arguments which also support local procurement that will be used to weigh the pros and cons of this procurement option. In discussion with Jim Brander, Asia-Pacific Professor of International Trade, several arguments for local procurement were noted and should be considered in UBC's procurement policies.

The aim of this section is not to provide a framework which will quantify the level of local social benefit created from local or non-local procurement practices, but will assess the relative validity of

¹⁷ Grayson, David and Hodges, Adrian. "Seven Steps to Make Corporate Social Responsibility Work for your Business" (Introduction), Greenleaf Publishing, 2004, <http://www.greenleaf-publishing.com/content/pdfs/csointro.pdf>

arguments which may impact the decision making process. Both micro as well as macro implications will be discussed in order to broaden the level of consideration for purchasing managers with regards to social impact. Given the scope of this paper is to provide relevant considerations for local versus non-local procurement practices, our social analysis needs to be considerate of the scope and objectives relevant to UBC. Analysis and recommendations will be based on estimated degree in which UBC is able to effectively influence its supply chain within a reasonable breadth and scope. To support a thorough and exhaustive list of objectives would reduce UBC's effectiveness in core objectives and will reduce its ability to engage in new objectives effectively. The challenge is to define the scope in meeting the social objectives while questioning whether it is a relevant policy and if sourcing is the right mechanism to achieve these objectives.

4.2 Industry Analysis

Manufacturing industries in the province engage in both primary and secondary processing activities. Primary activity usually only includes limited transformation of raw materials into finished goods whereas as secondary manufacturing produces goods such as doors and baked goods require substantial transformation of the raw material from their original state. The manufacturing of office furniture qualifies under secondary manufacturing which accounts for 47% of the manufacturing sector's real GDP; the remaining is generated by primary activities. Tertiary activities related to furniture generally are related to consulting, management and sales & service roles.

According to Stats Canada 2008 Annual Survey on Manufacturers, manufacturing revenues per production worker for the furniture subsector increased from \$133.1 thousand in 1999 to \$174.0 thousand in 2008, or at an average compound annual rate of 2.7% per year. If administrative workers are included, manufacturing revenues grew 1.9% per year on average between 1999 and 2008, with a

2.1% increase observed in the most recent year¹⁸. The province of B.C. currently accounts for approximately 10% of Canada's total office furniture manufacturing as of December 2009, with the majority of the manufacturing activity residing in Ontario and Quebec.

Province or Territory	Employers	Non-Employers/ Indeterminate	Total	% of Canada
Source: Statistics Canada, Canadian Business Patterns Database, December 2009.				
Alberta	47	23	70	7.00%
British Columbia	63	40	103	10.30%
Manitoba	17	6	23	2.30%
New Brunswick	6	4	10	1.00%
Newfoundland and Labrador	3	1	4	0.40%
Northwest Territories	0	0	0	0.00%
Nova Scotia	4	5	9	0.90%
Nunavut	0	0	0	0.00%
Ontario	381	147	528	52.80%
Prince Edward Island	0	1	1	0.10%
Quebec	181	61	242	24.20%
Saskatchewan	5	4	9	0.90%
Yukon Territory	1	0	1	0.10%
CANADA	708	292	1,000	100%
Percent Distribution	70.80%	29.20%	100%	

Table 7 Breakdown of office furniture manufacturers (NAICS 3372) by province and territory

Regional Employment Distribution

Manufacturing is the main source of jobs in many British Columbia communities, and this is reflected in the regional distribution of the workforce. Thompson-Okanagan, Cariboo, Kootenay and North Coast/Nechako all account for a larger share of manufacturing jobs than their share of total employment in the province. Given that these communities in particular have a high mixture of visible minorities, particular those of First Nations descent, manufacturing can play a key role in ensuring social inclusion of this minority group.

The 2006 Aboriginal Community Data Initiative shows that for Aboriginal populations on reserve in British Columbia aged 15 and over the participation rate decreased from 58.8% to 57.1% from 1996 to 2006. In that same period for the total population in British Columbia aged 15 and over, the

¹⁸ Statistics Canada, special tabulation, unpublished data, Annual Survey of Manufactures, 1998 to 2003; Annual Survey of Manufactures and Logging, 2004 to 2008.

participation rate decreased from 66.4% to 65.6%¹⁹. The 2010 Aboriginals Labour Force Survey shows that this discrepancy has continued as Aboriginals employment rate is 56.7% in 2010, compared to 71.2% for non-aboriginal people.²⁰ Not only are employment rates substantially higher for the non-aboriginal populations, the average income (per hour) is also 19.2% higher. Given the high discrepancy between Aboriginal and Non-Aboriginal groups, social benefits would be higher in terms of social inclusion and additional employment opportunities, if UBC's procurement practices can stimulate additional employment activity in these communities.

For the Office Furniture (except Wood) Manufacturing national industry, the percentage of employees that are production workers decreased from 82.7% in 1999 to 77.4% in 2008. As a result, there was a relative increase in the proportion of administrative workers.

Aside from cyclical economic fluctuations, several factors may contribute to changes in the composition of an industry segment's workforce. In an increasingly knowledge-based economy, the administrative component of the workforce (including business administrators, managers and professionals such as engineers and computer and research scientists) may be growing in significance. Technological advances may result in lower demand for production workers, which can in turn have a proportional impact on requirements for managers and support staff. At the same time, the trend of outsourcing work for contract rather than performing it in-house can have an impact on employment levels for both production and administrative staff.

¹⁹ Aboriginal Community Data Initiative – 2006 Census. (2009). *2006 Aboriginal Community*. Victoria: Statistics Canada.

²⁰ BC Statistics. (2010). *Aboriginal Peoples Labour Force Survey 2010*. Victoria: BC Statistics.

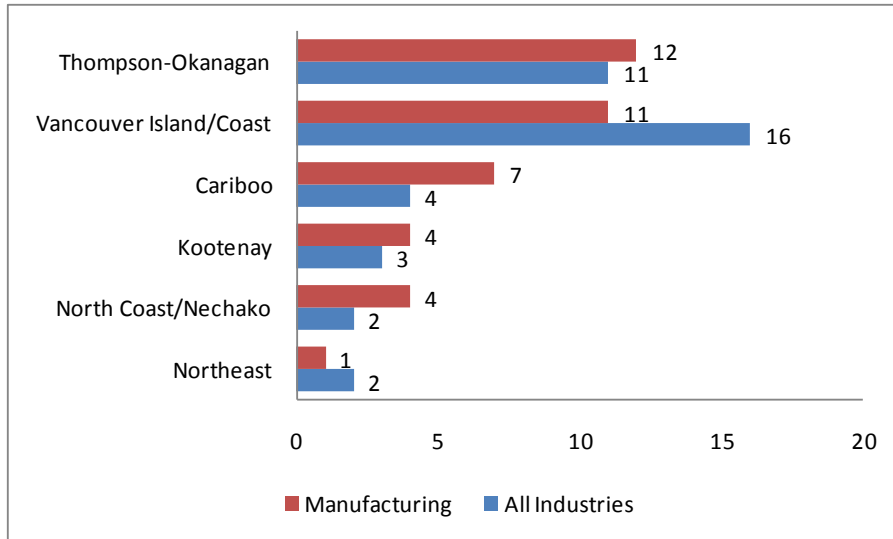


Figure 6 Regional employment as a % of total employment, 2002

Reasons for continued weakness in the sector

Capital expenditure within this sector reflects further dampening of activity, dropping over \$1.0 billion (in current dollars) in 2002, and it decreased over the past two decades. Investors have scaled back their investment plans and shifted to other production plants. Of particular note is that Haworth Ltd., a key provider of office furniture during the 2010 Vancouver Olympic Games, has since moved their primary North American plant to Michigan. There continue to be uncertainties around external economic environment and geopolitical events that have negatively influenced investor confidence. This results in lower productivity levels and reduced ability for this sector to effectively compete in the global market. Labour productivity in the province’s manufacturing sector remains well below the Canadian average. The national average is approximately 10% higher than in B.C.²¹. This gap continues to widen between B.C. and the national average, in particular to provinces such as Ontario and Quebec. Internationally, countries such as China and Mexico continue to further erode the trade balance within this sector as local manufacturers are unable to compete on the global stage.

²¹ BC Ministry of Management Services. *BC Opportunities Profile, Manufacturing*. Publication. Victoria: Western Economic Diversification Canada, 2004. Print.

Office Furniture Sector

According to Statscan, Canadian GDP attributed to the production of office furniture (excluding fixtures) decreased from \$2.3 billion in 2001 to \$1.3 billion in 2009. The drop represents a compound annual rate decrease of 6.3%. In addition, the value-added of the office furniture manufacturing industry group decreased by 3.4% between 2008 and 2009. Assuming B.C. represents 10% of the national market, this represents a \$100 million decrease in local B.C. GDP decrease from this specific manufacturing group.

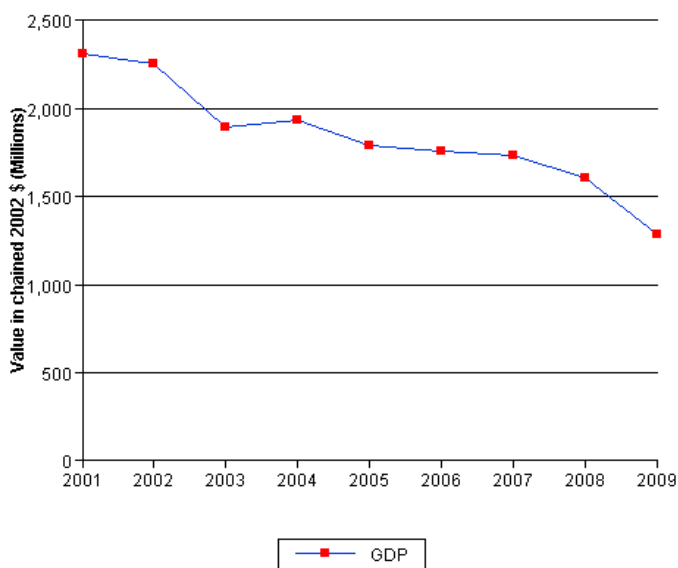


Figure 7 Gross Domestic Product (GDP): 2001-2009 of Office Furniture Manufacturing (NAICS 3372)

However despite substantial year-over-year within the B.C. manufacturing industry, employment data shows no corresponding trends in employment statistics. Per figure 9 below, employment rate, participation rate and unemployment rates have all stayed relatively stable over the last 30 years. Statistical analysis per figure 12 supports a consistent and stable trending labour force within the province. Significant variations are due to systematic volatilities corresponding to boom and bust cycles over the last three decades. It is commonly assumed that local procurement will increase local employment. For a number of reasons which will be discussed below, there are theoretical reasons why this might not be so. In addition it is important to note that labour shed from the manufacturing

sector has been effectively absorbed by other industries, although in some cases the pay scales may be somewhat lower.

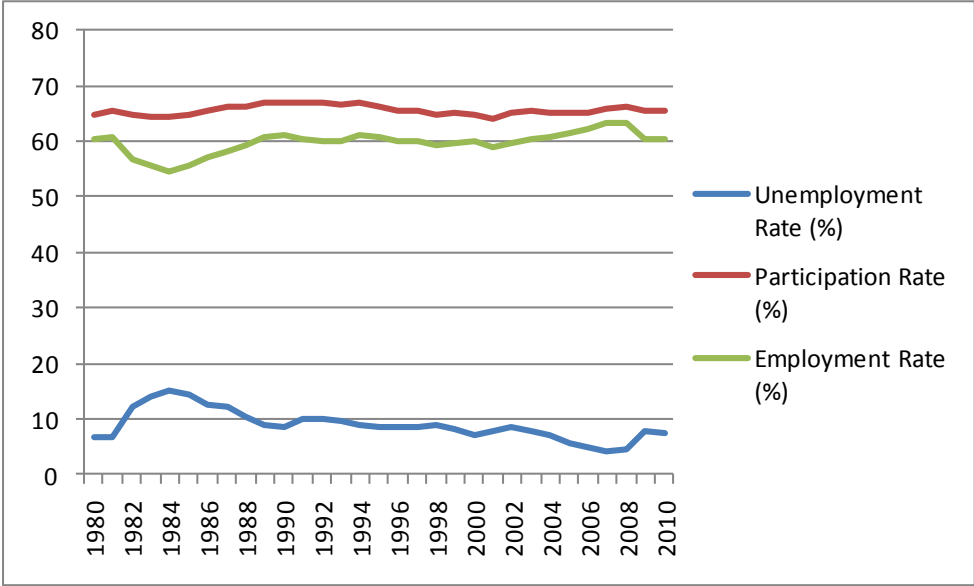


Figure 8 B.C. employment statistics 1980 to 2010

	Unemployment Rate (%)	Participation Rate (%)	Employment Rate (%)
Average	8.92	65.59	59.75
STD DEV	2.70	0.86	2.04
Variance	7.30	0.74	4.17

Table 8 Statistical analysis of B.C. employment trends from 1980 to 2010

4.3 Qualitative discussion on possible direct benefits from local sourcing may include:

1. Induced innovation: Fostering capital and technological improvements that increase value of locally produced goods. Helping move manufacturing within the sector up the value chain, especially with high ethical and sustainable standards which can be effectively monitored.
2. Labour market externalities: Helping local labour markets develop skills that are transferable to other sectors and helping support specific local industries that over time can be competitive in global markets. This is especially relevant to minorities and first nation communities where building marketable skill sets provides strong social value.

3. Market distortions: If cheaper goods produced abroad are done unethically or unsustainably then there is social value in procuring locally. However, UBC's ability to influence its supply chain to influence positive change in non-local sources which may have a broader and more widespread social benefit from non-local procurement.

4.4 Conclusion

From the data presented it is evident that the furniture manufacturing sector will continue to witness a decline in its level of contribution to the provincial GDP. The lack of capital infrastructure investment to maintain competitive levels of productivity will reduce the sector's ability to compete not only against foreign competitors but domestic manufacturing powerhouses in Ontario and Quebec. Employment data further shows that although this sector as well as the furniture manufacturing subsector continues to represent a significant portion of the B.C. economy, its decline has not had a significant impact on overall labour trends. Labour statistics shows consistent and level trends over the last 30 years, with only systematic market shocks having any substantial impact on the labour market. This shows that reduction in employment within this sectors can (and is) absorbed to other industries, or to functions which captures the value of transferable skills, although average wages may decline.

It should be noted however that furniture manufacturing represents a high proportion of employment in B.C. communities which has a higher percentage of visible minorities. If employment can be generated at competitive productivity levels in such regions, social benefits created from social inclusion and community involvement by such a minority group may generate net positive social benefits. Particularly given the employment gap between Aboriginal and Non-Aboriginal populations, increased local sourcing is directly used to support the employment, skill development and value-add for these communities. Local sourcing has also been identified as a positive way to induce innovation for production of high-value goods, especially if manufacturing process can be done at social and environmental standards above that of non-local suppliers.

Although this paper does not provide a model to quantify social benefits created from the employment of First Nations individuals, the relative social welfare generated can be assumed higher and mitigate lower productivity levels benchmarked against non-local firms.

5. Final Assessment of Environmental and Social Impact of Local Procurement

The difference in the environmental impact between local and non-local sourcing is negligible based on analysis completed in section three. We can see that non-local sourcing of sample product systems represent less than \$1 in cost savings when compared to local procurement options. The cost to offset the carbon footprint due to non-local procurement represent less then 1-2% of total retail cost of the product, even at projected 2020 carbon prices and assuming no inflation in direct purchasing costs.

From conversation with Linda Tommasini, Associate Director, Facilities Operations and Administration for UBC Sauder School of Business, sourcing from countries such as China or Mexico can often represent 30-40% in cost savings, even when taxes, shipping costs and transaction fees are considered. However local suppliers often win RFP bids as benefits associated with local suppliers also include the ability to establish closer relationships, better after sales service, ability to customize orders, and as a form of risk diversification by having multiple suppliers from a diverse range of geographies.

Social analysis shows that benefits can be gained if increased welfare can be targeted to Aboriginals communities who lag in employment levels as well as ability to command average wage rates. However despite significant decline in manufacturing within the province of B.C. no correlating decline in overall employment was observed. Although as a sector, B.C.'s manufacturing employment has suffered, social welfare and employment as a whole has only shifted from one sector to another. From an economist perspective, social welfare would not have had a significant decline even if production has been shifted abroad as more Canadian dollars abroad would generate the increased purchase of Canadian goods in other sectors, thus no social benefit is materially lost in sourcing non-

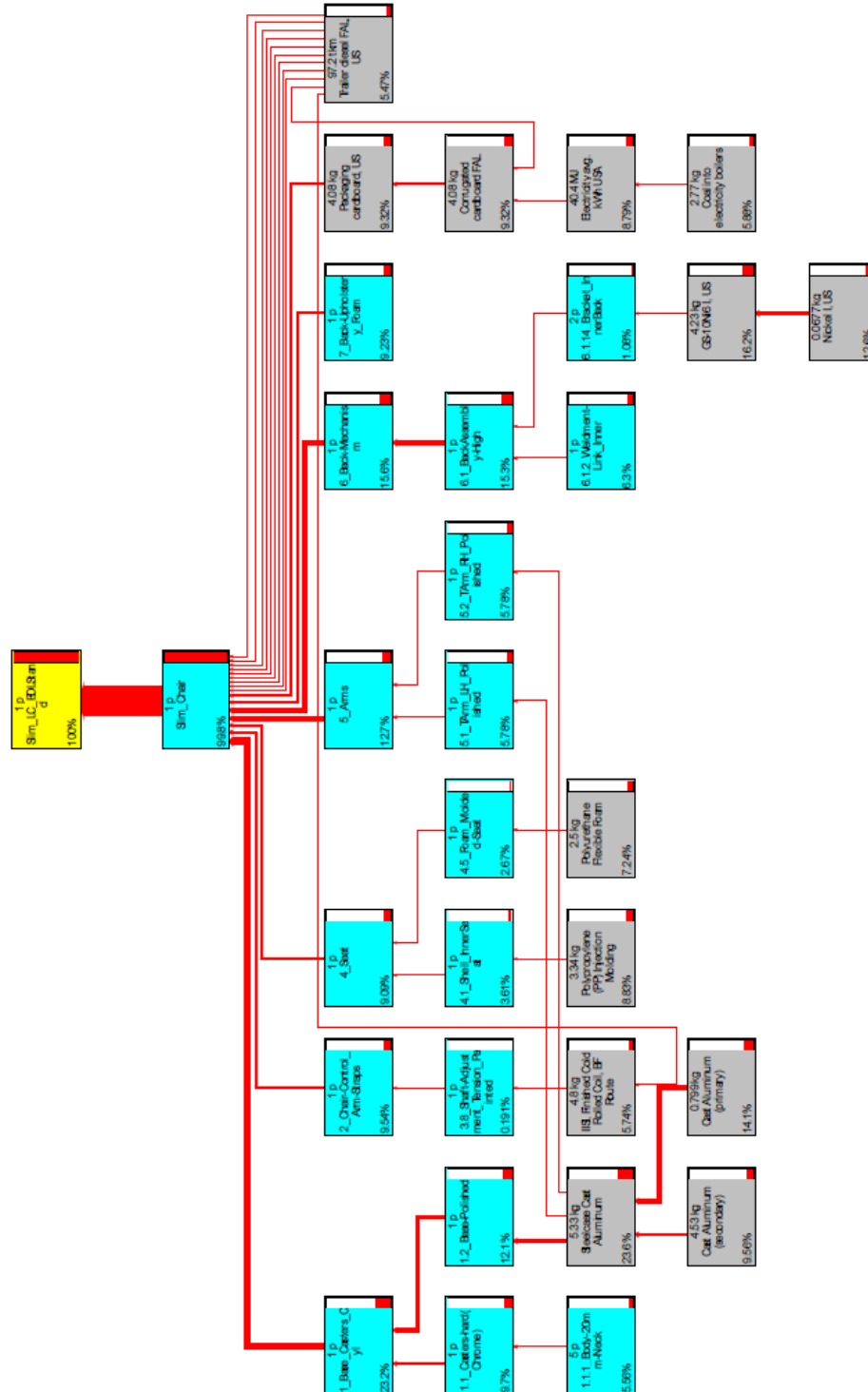
locally. The province of British Columbia clearly does not have a comparative advantage in manufacturing, particularly in secondary goods such as furniture given the high cost of labour, limited infrastructure, land constraints and lack of capital investment over time to support productivity.

However given this exercise, in order for local sourcing to make economic sense, the social benefit generated from this policy would need to generate social welfare equivalent to nearly 30-40% of the cost of the product itself. In the example of the Siento product system, this means a social benefit of at least \$500 must be generated per unit. As this is highly unlikely even in the most optimistic scenario, it is the conclusion of this report that UBC should not purposefully engage in additional local sourcing unless a specific and substantial gain can be obtained.

Appendix

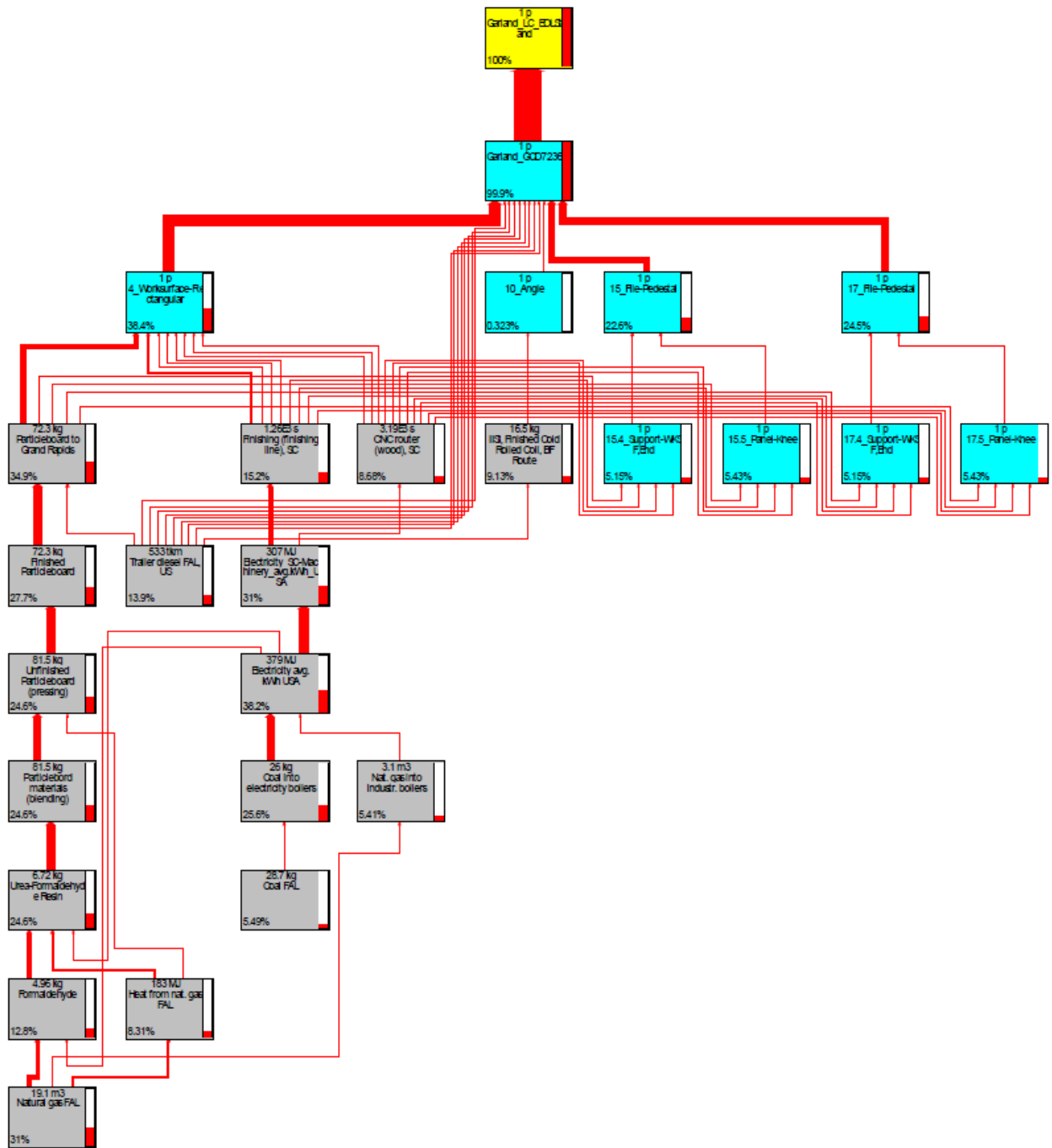
Appendix 1

Relative contribution of individual processes to the overall life-cycle impacts of the Siento product system in the category of human health criteria



Appendix 2

Relative contribution of individual processes to the overall life-cycle impacts of the Garland product system in the category of human health criteria.



Appendix 3

Relative contribution of individual processes to the overall life-cycle impacts of the AirTouch product system in the category of human health criteria

