Furniture

Introduction

This section provides information on currently available furniture options that can help to move the University of Saskatchewan toward its sustainability goals. Living within the boundaries of our sustainability objectives requires us to apply two main strategies:

Dematerialization requires that we reduce the amount of materials as much as possible; and that we continually move toward the use of 100% recycled content.

Substitution requires that we find less harmful materials to replace those that currently damage and are not recyclable.

Sustainable purchasing is about including social, environmental, financial and performance factors in a systematic way. It involves thinking about the reasons for using the product (the service) and assessing how these services could be best met. If a product is needed, sustainable purchasing involves considering how products are made, what they are made of, where they come from and how they will be used and disposed.

Finally, remember that this is an evolving document – it will change with new information as our understanding of sustainability impacts and potential solutions improves.

Wherever possible CHOOSE products that employ a combination of characteristics listed in the left hand column, and AVOID products that demonstrate characteristic in the right-hand column.

<table>
<thead>
<tr>
<th>CHOOSE</th>
<th>AVOID</th>
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<td>• Refurbished furniture</td>
<td>• Plastic foam containing CFCs or HCFCs</td>
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<td>• Eco-Logo Certified</td>
<td>• Formaldehyde and VOC emitting materials</td>
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<td>• Low VOC emitting</td>
<td>• Products with PBDE (polybrominated diphenyl ethers)</td>
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<td>• Locally manufactured and Canadian-made</td>
<td>• Polyurethane foam</td>
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<td>• Synthetic fibres</td>
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<td>• FSC and other certified wood products</td>
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<td>• Latex foam</td>
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<td>• Natural fibres</td>
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Option: Refurbish current furniture stock
Strategy: Dematerialization (SO 1, 2, 3, 4)

Reducing the total amount of new furniture purchased mitigates all related sustainability impacts. On our campus, this option can occur in-house when recommended furniture has been purchased through Facilities Management that can offer services such as re-upholstering and carpentry.

Option: Buying furniture with Eco-Logo certification
Strategy: Substitution and Dematerialization (SO 1, 2, 3, 4)

The EcoLogo® Program certifies a number of furniture products. All of the products outlined have been evaluated and audited to ensure compliance with EcoLogo® criteria. These criteria reflect environmental leadership in the furniture sector and support reduced environmental impacts.

Option: Choose low-emitting materials
Strategy: Substitution (SO 2)

VOCs (Volatile Organic Compounds) are carbon-based chemicals, such as benzene, toluene and formaldehyde that evaporate easily at room temperature, and may cause health problems such as chemical sensitivities. Products such as particle board, paints and adhesives may emit VOCs. Polyurethane foam and synthetic fibres used in upholstered furniture may also produce emissions (see options below).

Furniture made with low emitting materials can be specified. EcoLogo® as well as Green Guard (www.greenguard.org) and Green Seal (www.greenseal.org) provide resources for finding low-emission products.
Option: Buy furniture made locally or in Canada
Strategy: Substitution (SO 1, 2)

Buying locally will lower the GHG emissions and other resources associated with transportation of furniture.

In addition, imported upholstered furnishing may contain toxic chemicals, such as fire retardants. Most Canadian manufacturers of upholstered furniture no longer use polybrominated diphenyl ethers (PBDEs), a group of flame-retardants and stain inhibitors that have been linked to cancer, birth defects and fertility problems; however this is not the case in other countries. Some products made to supply both the U.S. and Canada are made with different fire retardants, known as chlorinated phosphate esters, or TCEP. While not environmentally persistent like PBDEs, they are potentially toxic and the European Union may soon be taking action to regulate them.

Option: Choose latex rather than polyurethane foam
Strategy: Substitution – Nature-like (SO 2)

The manufacture of polyurethane foam, often used in the manufacture of upholstered furniture, involves the reaction of an ingredient called toluene diisocyanate (TDI) with a polyol, an alcohol-based substance that has been created by a prior chemical reaction with methyloxirane (also known as propylene oxide). Both TDI and methyloxirane are carcinogenic chemicals. The best alternative to polyurethane in furniture is natural latex, a renewable resource derived from the rubber tree. It holds its shape well and lasts longer than polyurethane products. However it is more expensive.

Option: Buy products containing FSC and other certified wood products
Strategy: Substitution (SO 3)

There’s a great sustainability opportunity in the purchase of wooden office furniture. Furniture made of wood that has been ecologically harvested can make a strong environmental statement. Look for the Forest Stewardship Certification (FSC) logo to ensure a sustainable forestry commitment from major retailers and supplier of wood products.

Option: Choose natural rather than synthetic fibres
Strategy: Substitution – Nature-like (SO 1, 2)

Synthetic fibres, such as polyester, are commonly used in upholstered furnishings. Many synthetic materials are made of petro-chemicals, a non-renewable resource. Furthermore, synthetic fibres may off-gas chemicals.

Option: Avoid plastic foams using CFCs or HCFCs
Strategy: Substitution (SO 1, 2)

Since the ban of the production of CFC’s (chlorofluorocarbons) by the Montreal Protocol, the use of CFC blowing agents has been largely discontinued. However, products manufactured in countries that were not part of the Protocol (can be found at www.ozone.unep.org) may still continue to use them. HCFCs (hydrochlorofluorocarbons) have largely replaced CFCs and are considered somewhat less destructive in the atmosphere. Many manufacturers are now using carbon dioxide as a blowing agent. Carbon dioxide is implicated in global warming.

Recently, some manufacturers have introduced soy-based polyurethane in an effort to address concerns about toxicity and uses of petroleum-based polyols. While greener than conventional polyurethane, it still poses problems. Soybean oil can only replace 5 to 40 percent of the polyol, so the remainder must still be provided by petroleum-based polyols. Furthermore, TDI is still used to create the final product.

Synthetic latex is also widely used in products. It does not pose a risk to consumers, but workers are exposed to a carcinogen – styrene – in the production process.
Arriving at the currently preferred options

1. Identify the service

Furniture on campus is used for functional purposes, related to the work done on campus, comfort of occupants and aesthetics in campus buildings.

2. Assess the need

The University of Saskatchewan requires furniture for normal business, academic and research activities.

3. Identify the contents

Furniture may be constructed out of wood products (including particle board), plastics (including laminates) and metals. Furniture may also contain adhesives, fire retardants, varnishes and paints. Upholstered furnishings include a variety of materials which may include polyurethane and petroleum-based synthetic fibres, such as polyester.

4. Identify sustainability impacts

i. ...systematically increasing concentrations of substances from the earth’s crust?

• **Fossil fuels** are combusted to provide energy during the extraction of raw materials, transportation, and production of furniture. The combustion of fossil fuels leads to an increase in concentration of substances extracted from the earth’s crust in nature (CO2, CO and SOx). Increasing concentrations of these substances in nature can contribute to a number of negative effects such as climate change and acid rain, as well as to negative human health impacts.

• **Petroleum** is also used as a feedstock for many synthetic fibres, such as polyester, as well as for polyl, a component of polyurethane. Petroleum is a material that is extracted at a rate much greater than it is redeposited back into the earth’s crust. Petroleum is also used in the production of any plastic components, including plastic laminates.

• Most pure **metals** used in the construction of cabinets, furniture frames and mattress springs, come from the Earth’s crust. They are found in solid materials called minerals from which the pure minerals have to be extracted.

ii. ...systematically increasing concentrations of substances produced by society?

• Furniture contains adhesives, fire retardants, varnishes and paints which may contain volatile organic compounds (VOCs), formaldehyde, chlorofluorocarbons (CFCs), and hydrochlorofluorocarbons (HCFCs).

• Particle board, paint and adhesives may emit VOCs or **Volatile Organic Compounds**. These are carbon based chemicals, such as benzene, toluene and formaldehyde that evaporate easily at room temperature, and may cause health problems such as chemical sensitivities.

• Furniture, cabinets and building materials made from particleboard, medium density fibreboard and certain moulded plastics release small amounts of formaldehyde that may be inhaled or absorbed through the skin. The International Agency for Research on Cancer classifies formaldehyde as a probable human carcinogen. It is also suspected that formaldehyde causes allergic reactions in a significant part of the population.

• **CFCs** (Chlorofluorocarbons) were long commonly used as a refrigerant and a propellant for various products including plastic foams. **HCFCs** (hydrochlorofluorocarbons) have replaced CFCs and are considered somewhat less destructive in the atmosphere. However, both contribute to ozone depletion and also contribute to climate change. Since the ban of the production of CFC’s by the Montreal Protocol, the use of CFC blowing agents has been largely discontinued. However, products manufactured in countries that were not part of the Protocol (can be found at www.ozone.unep.org) may still contain CFCs.

• Upholstered furnishings may also contain polybrominated diphenyl ethers (PBDEs), chlorinated phosphate esters (TCEP), Toluene Diisocyanate (TDI) and Methyleneoxirane (Propylene Oxide).

• Until about five years ago, manufacturers of upholstered furniture routinely treated the foam with **polybrominated diphenyl ethers (PBDEs)**, a group of flame-retardants and stain inhibitors that have been linked to cancer, birth defects and fertility problems; Biologists have discovered that PBDEs are persistent in the environment and can be found in the blood and tissue of orcas, grizzly bears and salmon, as well as in human milk. One Vancouver study, for example, found a 15-fold increase in the amount of PBDEs in breast milk over 10 years. PBDE’s are banned from use in manufacturing in...
Canada; however, imported goods may still contain them. Some products made to supply both the U.S. and Canada may be made with fire retardants known as chlorinated phosphate esters, or TCEP. While not environmentally persistent like PBDEs, they are potentially toxic to humans and the European Union may soon be taking action to regulate them.

- The manufacture of flexible polyurethane foam involves reacting an ingredient called toluene diisocyanate (TDI) with a polyol, an alcohol-based substance that has been created by a prior chemical reaction with another ingredient called methyloxirane (also known as propylene oxide). Both TDI and methyloxirane are carcinogenic chemicals to which workers may be exposed in the manufacturing process. Both types of TDI used in foam manufacturing are classified as possible human carcinogens (Group 2B) by the International Agency for Research on Cancer. In January, 2008, Health Canada assessed Methyloxirane under the Challenge Batch of 200 high-priority chemicals and declared it a toxic chemical “that constitutes or may constitute a danger to human life or health.” It’s not expected that consumers are directly exposed to TDI or Methyloxirane in polyurethane furniture or mattresses, although there is evidence that they could cause reactions as the polyurethane breaks down and becomes part of house dust. In addition, because polyurethane poses a fire hazard, fire retardants are often added.

iii …systematically degrading nature by physical means?

- Polyurethane and plastic products, such as plastic laminate, do not break down in landfills, adding to a long term waste problem. This contributes to the physical degradation of nature through increasing amounts of land used for landfill.
- Wood products and production waste often end up in landfills. Construction and demolition waste represented approximately 40% of total land filled content. Ongoing reliance on landfills as a form of waste management will require more and more physical space, displacing and destroying natural areas and ecosystems.
- Wood is a commonly used material in the manufacture of furniture. Forest management practices that remove trees at a greater rate than they can re-grow or weaken local biodiversity and overall ecological health are unsustainable. Examples of these practices include clear-cut harvesting methods and monoculture planting. Clear-cutting has many disruptive effects including the reduction of biodiversity, the destruction of wildlife habitat, severe erosion of soil and increased flooding.
- Mining for metals can be destructive to local ecosystems. Impacts can include deforestation, displacement and disruption of animal populations and chemical pollution.

iv. …systematically undermining people’s ability to meet their basic human needs?

- In some instances, forestry and mining operations have infringed on the ability of local communities and indigenous peoples to meet their needs. Wood and metal are two of the main structural components of furniture.
- A number of the compounds produced by the combustion of fossil fuels and other processes to create upholstery products (e.g. polybrominated diphenyl ethers, chlorinated phosphate esters, or TCEP, formaldehyde, toluene diisocyanate, and methyloxirane) negatively affect human health.

5. Envision sustainable furniture

What would sustainable furniture look like?

Sustainability requires that materials be kept within natural cycles (where materials can be easily assimilated by nature) or tight technical cycles (where materials can be reused indefinitely in processes that do not move us away from our sustainability objectives). Sustainable furniture would not contribute to systematic increases of substances extracted from the earth’s crust, or of human-made substances. Further, sustainably manufactured furniture would (1) not contain any substances that could systematically increase in nature or (2) involve processes so that these substances could be taken back and re-used entirely.

Furniture would be from either bio-based materials that natural ecosystems can easily assimilate, or be 100% recycled. The energy used for extracting raw materials, producing and transporting the furniture would be generated from sustainable renewable sources in a carbon-neutral way, so that no carbon was allowed to systematically increase in the atmosphere and biosphere.

6. Identify and prioritize alternatives

To identify the best options, review the Current Options on page one and choose the most appropriate alternative by using the following three criteria for assessment:

a) Does the product or service move us in the right direction with regards to our four Sustainability Objectives?

b) Does the product or service create a flexible platform for the next step toward sustainability?

c) Is the decision financially viable?
Resources and Additional Information


5. Smartwood Certification and Verification. www.rainforest-alliance.org/forestry.cfm?id=smartwood_program&CFID=42713571&CFTOKEN=69850254

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