

## Sustainable Materials

### What are Sustainable Materials?

Sustainable materials are evaluated by the impact they have on the environment and on occupants over the life of the material and generally incorporate characteristics that contribute to:<sup>1</sup>

- Resource efficiency
- Indoor air quality
- Energy efficiency
- Water conservation
- Affordability



Figure 1 – Recycled carpet  
(Source: Rutgers University)

Sustainable materials can be either natural or synthetic. In both cases, there is a cost involved throughout the life cycle of the material that includes extracting resources, processing, producing, shipping, installation and use, and discarding. Choosing the best materials for a project and the anticipated activities in a space can have a positive impact on the environment and building occupants while also costing less. Renovating and retrofitting existing buildings is generally more sustainable than constructing a new building, as fewer new materials are consumed. Choosing sustainable materials ensures that a building is not only constructed with but also furnished and maintained with sustainable materials and products.

### How to Integrate Sustainable Materials

Sustainable material management (SMM) refers to the process of researching the system-wide impacts of the life cycle of materials.<sup>2</sup> A comprehensive approach that incorporates social, environmental, and economic factors relies on the use of research, innovation, and technology to support decisions about appropriate material selection and use. A one-size-fits-all approach is abandoned for a more project-responsive evaluation of pros and cons in decisions about material use.<sup>3</sup>

There are five main characteristics of sustainable materials:<sup>4</sup>

- They conserve resources and energy (i.e. are more efficient, use less)
- They contribute to healthy and comfortable interior space for occupants due to positive indoor air quality and spatial design features

<sup>1</sup> CalRecycle. <http://www.calrecycle.ca.gov/Greenbuilding/Materials/> (accessed February 5, 2011).

<sup>2</sup> US EPA. Sustainable Materials Management. The Road Ahead. <http://www.epa.gov/osw/inforesources/pubs/vision2.pdf> (accessed May 8, 2011).

<sup>3</sup> BIAC. The Voice of OECD Business. Key Business Messages. Sustainable Materials Management. <http://www.oecd.org/dataoecd/35/18/46235661.pdf> (accessed May 8, 2011).

<sup>4</sup> CalRecycle. <http://www.calrecycle.ca.gov/Greenbuilding/Materials/> (accessed February 5, 2011).

- They reduce maintenance and replacement costs over the life of the building
- They reduce waste and costs for configuration due to greater flexibility built into the use of the space

Materials most commonly considered in existing buildings are sealants, adhesives, finishes (e.g., paints, flooring/carpets), furnishings, lighting, millwork, and cleaning products. When choosing materials, consider the following list of sustainable options:

- Recycled content and recyclability
- Rapidly renewable materials
- Certified wood (such as [Forest Stewardship Council](#)-certified products)
- Locally/regionally produced products
- Salvaged materials
- Low-emitting materials (no Volatile Organic Compounds)
- Low- or nontoxic ingredients or components
- ENERGY STAR equipment
- Fair Trade food, beverages, and textiles
- Sustainable purchasing policy

There are a number of certification programs, standards and criteria available to help provide guidance in selecting and evaluating sustainable materials such as [GREENGUARD](#) (indoor air quality certification), [Green Label Plus](#) (carpets/rugs), [Green Seal](#), [Scientific Certification Systems](#), and [Forest Stewardship Council Certification](#). In addition, life cycle assessment tools such as those offered by the [Athena Institute](#) and [National Institute of Standards and Technology Building for Economic and Environmental Sustainability \(BEES\)](#) are useful in helping assess the cost and impact of a material.

### **Example**

#### The Willow School

The classroom building of the Willow School in Gladstone, NJ achieved LEED Gold certification and incorporated a wide palette of sustainable materials.

[http://www.state.nj.us/dep/opsc/docs/Green\\_Building\\_Materials.pdf](http://www.state.nj.us/dep/opsc/docs/Green_Building_Materials.pdf)

### **Benefits**

- Conserves resources
- Reduces greenhouse gas emissions (in extraction, production, and shipping)
- Supports local businesses
- Helps ensure safer air quality indoor (also overall regional air quality)

## Costs

There is a perception that sustainable products always cost more than conventional products. There are some materials that do have a higher first cost; however, the first cost is often made up within the overall life cycle cost of the material. There are also many sustainable materials available that are comparable in price to conventional materials.<sup>5</sup> Furthermore, many costs (often referred to as “externalities”), such as expenses associated with cleaning up contamination and losses due to human health and illness are not considered in the costs of producing non-sustainable materials.

## Resources

NJ DEP Office of Planning and Sustainable Communities

<http://www.state.nj.us/dep/opsc/sdtguide.html>

NIST Engineering Laboratory

<http://www.nist.gov/el/>

Philadelphia Green Guidelines

<http://www.phila.gov/pdfs/PhiladelphiaGreenGuidelines.pdf>

US EPA – Environmentally Preferable Purchasing Program

<http://www.epa.gov/epp/>

Whole Building Design Guide – Evaluating and Selecting Green Products

<http://www.wbdg.org/resources/greenproducts.php>

CalRecycle

<http://www.calrecycle.ca.gov/greenbuilding/Materials/>

Minnesota Building Materials Database

<http://www.buildingmaterials.umn.edu/>

The Carpet and Rug Institute

<http://www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-label-plus/>

GREENGUARD

<http://www.greenguard.org/en/index.aspx>

---

<sup>5</sup> CalRecycle. [www.calrecycle.ca.gov/Greenbuilding/Training/StateManual/Materials.doc](http://www.calrecycle.ca.gov/Greenbuilding/Training/StateManual/Materials.doc) (accessed February 5, 2011).

Green Seal

<http://www.greenseal.org/home.aspx>

Forest Stewardship Council

<http://info.fsc.org/>

Building Materials Reuse Association

<http://www.bmra.org/>