Differences in Environmentally Preferable Products

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SUMMARY

Whether it's simply to "do the right thing" or to comply with an agency mandate or company policy, designers often find themselves trying to assess which products are good for the environment. Adding this criterion to the standard list of cost, performance, and aesthetics introduces many issues and considerations outside the expertise of most architects. Five different categories of environmentally preferable products and their green characteristics are presented.

WHAT ARE ENVIRONMENTALLY PREFERABLE PRODUCTS?

Environmentally preferable products (EPPs) are the products and materials that represent a better choice than most others from an ecological perspective. The U.S. Environmental Protection Agency, per Executive Order 13101 (1998), defines EPPs as "products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. "

In theory, use of these products in a building will result in the lowest ecological burden and/or the highest ecological benefit. In practice, however, the web of relationships between the built and natural environments is so complex that it is not possible to determine with certainty what all those burdens and benefits will be. Despite this uncertainty, there are indications, based on what we do know, as to which products and materials are better from an environmental perspective.

GREEN ATTRIBUTES OF PRODUCTS AND MATERIALS

Most existing EPP programs—including purchasing mandates from government agencies and voluntary programs such as the U.S. Green Building Council's LEED® Green Building Rating System™—are based on specific green characteristics. Sometimes these attributes are targeted as part of explicit societal agendas. In such cases, the term EPP is applied as a way of broadening the appeal of what is fundamentally a narrowly focused initiative. In other instances, an agency or organization may actually intend to promote the use of products that are environmentally preferable in a broader sense but, for practical purposes, specifies a single green attribute as an indicator of this preferability.

Recycled content. Promoting recycled content as an indicator of overall environmental preferability is an example of using a specific societal agenda to make particular products attractive. The recycled-content agenda was developed as a direct response to this problem: an accumulation of collected material without a viable end use.

Nearly all recycled-content programs distinguish between postconsumer recycled materials, which have been discarded after fulfilling their intended use, and pre-consumer recycled materials. Pre-consumer materials are those that have entered a waste stream before reaching their intended end use, such as paper trimmings at a printing plant.

Bio-based. In theory, building materials derived directly from plants are infinitely renewable and, as such, represent a solution to the problem of products whose manufacture adds to the depletion of finite mineral resources. Plant-based materials tend to be less manufacturing-intensive than materials synthesized from petrochemicals. Their structural qualities are typically provided by the cellular structures of the plants from which they are made.

The U.S. government has long promoted the use of agricultural materials to support farms—most recently in the 2002 Farm Bill, which mandates that federal agencies establish preferential purchasing programs for certain types of bio-based materials.

Low in chemical emissions. In response to concerns about indoor air quality in buildings, the off-gassing of chemicals from building materials and furnishings has been increasingly scrutinized. The off-gassing of these volatile organic compounds (VOCs) is currently measured by placing a sample of the product or material in a stainless steel testing chamber and collecting and then analyzing the gases emitted into that chamber. The Carpet and Rug Institute began using this process in the early

1990s as the basis of its “Green Label” program, which certifies that emissions of total VOCs and certain specific compounds from carpets do not exceed specified thresholds.

In 2001 Air Quality Sciences Inc. of Atlanta spawned the Greenguard Environmental Institute (GEI), a nonprofit organization that establishes allowable chemical emission thresholds for a wide range of materials used indoors. The GEI also certifies products that do not exceed those thresholds.

Naturally and minimally processed. Although there are few formal ways to reference or certify natural materials, designers and their clients generally consider natural or minimally processed products to be environmentally preferable—including natural-fiber carpets and fabrics, natural stone floors, cork, linoleum, and bamboo. An exception to this mind-set, at least in North America, is the use of wood. While in Europe wood is generally considered an ecologically sound material choice, in the United States concerns about the destruction of domestic old-growth forests and deforestation in tropical rainforests have discouraged some designers from embracing wood as a green material.

Low embodied energy. Another indicator used to measure environmental impact is the amount of energy used to create a product. This metric is sometimes called “embodied energy,” “embedded energy,” or simply the “energy intensity” of a product. Measures of embodied energy include the quantity of fuels and electricity used to mine or harvest raw materials, transport them, and process them into a product ready for delivery to a construction site.

LIFE-CYCLE ASSESSMENT

The product characteristics described previously are widely referenced as indicators of environmental preferability, in part because they are often based on relatively accessible information. It is widely acknowledged, however, that they are merely indicators and do not accurately reflect the full environmental performance of a product.

Ideally, EPP claims would be based on comparisons of overall environmental performance. The most common approach to determining the environmental performance of a product is through life-cycle assessment—a science that attempts to quantify the resource and material input, and product and pollution output, over the entire life cycle of a product, thereby quantifying the overall environmental burdens of a product.

The LEED® Green Building Rating System™ is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. LEED programs can be downloaded at no cost by visiting the Web site at www.usgbc.org

ABOUT THE CONTRIBUTOR

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More Best Practices

The following AIA Best Practices provide additional information related to this topic:

16.02.06	Going Green: Where to Find Green Product Info
16.02.09	Energy Modeling and Daylighting Analysis
16.01.02	Green Roof Design

RESOURCES

For More Information on This Topic

See “Energy Analysis and Design” by Donald Prowler, FAIA, *The Architect’s Handbook of Professional Practice, 13th edition*, Chapter 18, page 616. Also see “Selecting Environmentally Preferable Products” by Nadav Malin, LEED AP, *The Architect’s Handbook of Professional Practice Update 2005*.

See also the 14th edition of the *Handbook*, which can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by email at bookstore@aia.org.

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- Building performance
- Research and development
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