

BEYOND

SMART CITIES

MATERIALS & RESOURCES - GREEN BUILDING

TECHNOLOGY TRAINING PROGRAM

FOR GREEN BUILDING AND SUSTAINABILITY SPECIALISTS

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP

GREEN BUILDING SPECIALIST CURRICULUM

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MATERIALS & RESOURCES - OVERVIEW

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LEARNING OBJECTIVES

Materials and Resources - Introduction

Materials and Resources - Overview



MATERIALS AND RESOURCES



The Materials and Resources (MR) credit category focuses on minimizing the embodied energy and other impacts associated with the extraction, processing, transport, maintenance, and disposal of building materials. The requirements are designed to support a life-cycle approach that improves performance and promotes resource efficiency. Each requirement identifies a specific action that fits into the larger context of a life-cycle approach to embodied impact reduction.



CRITERIA IN THIS CATEGORY

- MR PR STORAGE AND COLLECTION OF RECYCLABLES
- MR PR CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLANNING
- MR CR BUILDING LIFE-CYCLE IMPACT REDUCTION
- MR CR ENVIRONMENTAL PRODUCT DECLARATIONS
- MR CR SOURCING OF RAW MATERIALS
- MR CR MATERIAL INGREDIENTS
- MR CR CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

**MAXIMUM POSSIBLE CREDITS : 2 P / 13 C**

INTRODUCTION



The Materials and Resources (MR) credit category tries to reduce the amount of energy and other effects that come from getting building materials, processing them, transporting them, maintaining them, and throwing them away.

The requirements are made to work with a life-cycle approach that improves performance and makes better use of resources. Each requirement names a specific action that fits into the bigger picture of a life-cycle approach to reducing the embodied impact.

THE WASTE HIERARCHY



Construction and demolition waste constitutes about 40 percent of the total solid waste stream in the United States¹ and about 25% of the total waste stream in the European Union.² In its solid waste management hierarchy, the U.S. Environmental Protection Agency (EPA) ranks source reduction, reuse, recycling, and waste to energy as the four preferred strategies for reducing waste. The MR section directly addresses each of these recommended strategies.

Source reduction appears at the top of the hierarchy because it avoids environmental harms throughout a material's life cycle, from supply chain and use to recycling and waste disposal. Source reduction encourages the use of innovative construction strategies, such as prefabrication and designing to dimensional construction materials, thereby minimizing material cutoffs and inefficiencies.

THE WASTE HIERARCHY +

Building and material reuse is the next most effective strategy because reusing existing materials avoids the environmental burden of the manufacturing process. Replacing existing materials with new ones would entail production and transportation of new materials, and it would take many years to offset the associated greenhouse gases through increased Efficiency of the building.

LEED has consistently rewarded the reuse of materials. LEED v4 now offers more flexibility and rewards all material reuse achieved by a project—both in situ, as part of a building reuse strategy, and from of site, as part of a salvaging strategy.



THE WASTE HIERARCHY +

Most of the time, recycling is the best way to keep trash out of landfills. Most trash is put in landfills, which is becoming an increasingly unsustainable practice. In cities, landfill space is running out, which means that more land will have to be turned into landfills and that it will cost more to move trash. Recycling technology innovations improve sorting and processing so that raw materials can be sold on secondary markets. This keeps those materials in the production stream longer.

Because secondary markets do not exist for every material, however, the next most beneficial use of waste materials is conversion to energy. Many countries are lessening the burden on landfills through a waste-to-energy solution. In countries such as Sweden and Saudi Arabia, waste-to-energy facilities are far more common than landfills. When strict air quality control measures are enforced, waste-to-energy can be a viable alternative to extracting fossil fuels to produce energy.



THE WASTE HIERARCHY +

In aggregate, LEED projects are responsible for diverting more than 80 million tons (72.6 million metric tons) of waste from landfills, and this volume is expected to grow to 540 million tons (489.9 million metric tons) by 2030. ³ From 2000 to 2011, LEED projects in Seattle diverted an average of 90 percent of their construction waste from landfills, resulting in 175,000 tons (158,757.3 tonnes) of waste diverted. ⁴ If all newly constructed buildings achieved the 90 percent diversion rate demonstrated by Seattle's 102 LEED projects, the result would be staggering. Construction debris is no longer waste; it is a resource.



LIFE-CYCLE ASSESSMENT IN LEED

Through credits in the MR category, LEED has changed the market for building products by starting a cycle of consumers wanting environmentally friendly products and companies making them.

Teams working on LEED projects have made more people want products that are better for the environment, and suppliers, designers, and manufacturers are responding. Over the years that LEED has been around, the supply of sustainable materials has grown. This is because of things like the increa

MR credits are given to people who use products that do well on certain criteria. But it's hard to compare two products that are sustainable in different ways, like cabinets made of wheat husks from all over the country and held together with resin and cabinets made of solid wood from local trees.

LIFE-CYCLE ASSESSMENT IN LEED +

Life-cycle assessment (LCA) gives a more complete picture of materials and products, which helps project teams make better decisions that are better for the environment, human health, and communities as a whole. It also encourages manufacturers to come up with new ways to improve their products.

LCA is a "compilation and evaluation of the inputs and outputs and the potential environmental impacts." of a product system throughout its life cycle." The entire life cycle of a product (or building) is examined, the processes and constituents identified, and their environmental effects assessed—both upstream, from the point of manufacture or raw material extraction, and downstream, including transportation, use, maintenance, and end of life. This approach is sometimes called "cradle to grave." Going even further, "cradle to cradle" emphasizes recycling and reuse at the end of life rather than disposal.

LIFE-CYCLE ASSESSMENT IN LEED +

Life-cycle approaches to materials assessment began in the 1960s with carbon accounting models. Since then, LCA standards and practices have been developed and reinforced. In Europe and a few other parts of the world, manufacturers, regulators, suppliers, and consumers in many fields have been using life-cycle information to improve their product selections and product environmental profiles.

Until relatively recently, however, the data and tools that support LCA were lacking in the U.S. Now, more and more companies are ready to record and share the environmental profiles of their products, and there are programs that can help with this and help users understand the results.

LEED aims to accelerate the use of LCA tools and LCA-based decision making, thereby spurring market transformation and improving the quality of databases. LEED uses different, complementary approaches to LCA in the credits that deal with human health and the effects of raw material extraction on ecosystems. This is because LEED is aware of the limitations of LCA in these areas.


