SITES v2
Reference Guide

For Sustainable Land Design and Development






SITES Credit 5.9 Materials. For full Reference Guide, go to:
https://www.usgbc.org/resources/sites-reference-guide-pdf

Sustainable
SITES
Initiative™

IMAGE CREDITS:

Front cover, clockwise from upper left:
American University School of International Service, Washington D.C.
Green roof, *photo by Paul Davis*

The Woodland Discovery Playground at Shelby Farms, Memphis, Tennessee
Net and tree house adventure nest, *photo courtesy of James Corner Field Operations*

National Renewable Energy Lab (NREL) Research Support Facility, Golden, Colorado
Access bridges over bioswales within eastern plaza, *photo by Robb Williamson courtesy of RNL*

Blue Hole Regional Park, Wimberley, Texas
Blue Hole swimming area, *photo by Tim Campbell, Design Workshop*

George 'Doc' Cavalliere Park, Scottsdale, Arizona
Seating area with LED lights at dusk, *photo by Bill Timmerman, Timmerman Photography*

Cornell University's Mann Library Entrance, Ithaca, New York
New seating area outside Mann Library, *photo by Nina Bassuk*

Back cover, clockwise from upper left:
Charlotte Brody Discovery Garden at Sarah P. Duke Gardens, Duke University, Durham, North Carolina
Pergola in the Charlotte Brody Discovery Garden, *photo by Rick Fisher's Photography*

Mesa Verde Visitor and Research Center, Mesa Verde National Park, Colorado
View toward Visitor and Research Center, *photo by National Park Service*

Novus International Headquarters Campus, St. Charles, Missouri
The pavilion overlooking the improved aquatic habitat, *photo by SWT Design*

Center for Sustainable Landscapes at Phipps Conservatory and Botanical Gardens, Pittsburgh, Pennsylvania
Center for Sustainable Landscapes with lagoon, boardwalk, and terraced gardens, *photo by Denmarsh Photography, Inc.*

Taylor Residence, Kennett Square, Pennsylvania
Meditative garden labyrinth, *photo by Mark Gormel*

Cover flap, clockwise from upper left:
Grand Valley State University (GVSU) Student Recreation Fields, Allendale, Michigan
Wildlife inhabiting the established stormwater bay, *photo by Andy Schwallier, FTC&H*

SWT Design Campus, St. Louis, Missouri
Green roof garden showcasing many native Missouri plants, *photo by SWT Design*

The Green at College Park at The University of Texas at Arlington, Arlington, Texas
Shade structures and muhly grass garden, *photo by Amar Thakkar*

Scenic Hudson's Long Dock Park, Beacon, New York
Sunset at Trakas' Beacon Point, *photo by Robert Rodriguez, Jr.*

Credit 5.9: Support sustainability in materials manufacturing

1–5 points

INTENT

Support sustainability in materials manufacturing by specifying and using materials from manufacturers whose practices increase energy efficiency, reduce resource consumption and waste, and minimize negative effects on human health and the environment.

REQUIREMENTS

The requirements apply to manufacturers of new products purchased for use on site. Rocks, plants, soils, salvaged or reused, or refurbished materials are covered in other credits and are excluded from the calculations for this credit.

Option 1: Advocate for sustainable materials manufacturing **1 point**

Submit a letter to all materials manufacturers asking them to perform, track, and disclose sustainable practices.

Option 2: Support manufacturers that disclose data on sustainable practices **3 points**

Obtain 25 percent of the total applicable materials cost from businesses that complete one of the following actions:

- Report annual environmental performance via the Global Reporting Initiative (GRI) or equivalent
- Conduct and publish a peer-reviewed full life-cycle assessment (LCA) or an environmental product declaration (EPD) for the product
- Set and publicly announce specific goals to reduce, by at least 25 percent (per unit product or equivalent basis) over a five-year period, the company's performance metrics in the following areas:
    - Use of energy, water, and toxics
    - Releases of key pollutants to air and water
    - Disposal of hazardous and non-hazardous wastes

Option 3: Support manufacturers that achieve significant improvements in sustainable practices **5 points**

Obtain 25 percent of the total applicable materials cost from businesses that employ and document at least three of the five achievements below. Percentages are based on cost. If multiple manufacturers are involved in the development of a product, the requirements apply to the manufacturer responsible for producing or assembling the final product.

Sustainable manufacturing achievements:

1. *Reduce emissions:*
   - In at least two of the following three categories, document at least 50 percent reduction (normalized, per unit product or equivalent basis) in the company's direct environmental impacts over the most recent 10-year period where data are available.
     - Emission of hazardous air pollutants (per U.S. Clean Air Act or local equivalent for projects outside the United States)
     - Emission of toxic water pollutants (per U.S. Clean Water Act or local equivalent for projects outside the United States)
     - Generation of hazardous and non-hazardous waste (per U.S. Resource Conservation and Recovery Act or local equivalent for projects outside the United States).
2. *Reduce or offset greenhouse gas emissions:*
   - The product manufacturer demonstrates that the three lowest years for carbon emissions (or global warming potential equivalent, per unit of product) in the previous 10 years are at least 25 percent better than its corresponding 10-year average (per unit of product) OR the product manufacturer purchases carbon offsets from a legally binding trading system that provides independent third-party verification for 25 percent of its carbon emissions (or global warming potential equivalent).
3. *Reduce energy consumption:*
   - Demonstrate that the manufacturing process per unit of product consumes 25 percent less energy than the industry average. Consult the National Institute of Standards and Technology Building for Environmental and Economic Sustainability (BEES), National Renewable Energy Laboratory (NREL) U.S. Life-Cycle Inventory Database, or Commercial Buildings Energy Consumption Survey for industry-specific data (see Resources section).
4. *Use renewable energy sources:*
   - Use on-site renewable energy sources to meet 10 percent of electricity demands OR engage in at least a four-year contract for the purchase of 20 percent of electricity from renewable sources for the facility at which the product is made.
5. *Reduce use of potable water:*
   - Use potable or other natural surface or subsurface water resources for less than 25 percent of total water consumption during manufacturing for the product line specified (i.e., non-potable sources are used to meet 75 percent of water consumption).

SUBMITTAL DOCUMENTATION

Option 1: Advocate for sustainable materials manufacturing

- *Materials Worksheet* listing all materials, products, and product assemblies; their costs; and the manufacturer for each
- Copies of the letters sent to all materials manufacturers, noting if any response is received for each

Option 2: Support manufacturers that disclose data on sustainable practices

- *Materials Worksheet* listing all materials, products, and product assemblies; their costs; and the manufacturer for each and demonstrating that 25 percent of purchased materials (excluding rocks, plants, soils, salvaged or reused, and refurbished materials) are from businesses that disclose and provide transparency of manufacturing practices
- Documentation from materials manufacturers meeting disclosure requirements, including:
  - Global Reporting Initiative (GRI) reports, or equivalent
  - Life-cycle assessments (LCAs) or environmental product declarations (EPDs)
- Copies of public announcement regarding (or website links to) future environmental impact reduction goals

Option 3: Support manufacturers that achieve significant improvements in sustainable practices

Materials Worksheet listing all materials, products, and product assemblies; their costs; and the manufacturer for each and demonstrating that 25 percent of purchased materials (excluding rocks, plants, soils, salvaged or reused, and refurbished materials) are from businesses that meet at least three of the five following sustainable achievements:

1. *Reduce emissions:*
   - Emissions reports from the manufacturer demonstrating reductions of at least 50 percent overall or per unit of product in at least two of the three categories listed above
2. *Reduce or offset greenhouse gas emissions:*
   - Emissions reports from the manufacturer demonstrating that the three lowest years for carbon emissions in the previous 10 years are at least 25 percent better than its corresponding 10-year average (per unit of product) OR receipts for purchased carbon offsets from a legally binding trading system that provides independent third-party verification for 25 percent of carbon emissions
3. *Reduce energy consumption:*
   - Documentation from the manufacturer demonstrating that the manufacturing process per unit of product consumes 25 percent less energy than the industry average. Consult the National Institute of Standards and Technology Building for Environmental and Economic Sustainability (BEES), National Renewable Energy Laboratory U.S. Life-Cycle Inventory Database, or Commercial Buildings Energy Consumption Survey for industry-specific data (see Resources section below).
4. *Use renewable energy sources:*
   - Letter from the plant provider describing renewable energy sources and the percent of annual energy use generated or purchased from each renewable source, including contracts with utility company if applicable
5. *Reduce use of potable water*:
   - Calculations from the manufacturer showing the total water volume consumed for manufacturing for the specified product line and the total volume of non-potable sources. The calculations should also include a brief description of available sources of non-potable water used for manufacturing processes.

DOCUMENTATION GUIDANCE

LCA and EPD documentation used for products should be made public in references such as a peer-reviewed journal or the National Renewable Energy Laboratory (NREL) U.S. Life-Cycle Inventory Database. The LCA must follow the ISO 21930 or 14044 methodologies or ASTM E1991-05. The EPD must be consistent with ISO 14025 and ISO 21930 (see Resources section).

RECOMMENDED STRATEGIES

- Identify and select materials from manufacturers that actively implement better business practices to reduce negative impacts to human health and the environment. For example, a site could meet the low point requirements for this credit by selecting wooden benches (for 10 percent of total costs) from a manufacturer that meets the requirements for reduced potable water and energy use, and selecting concrete (for 15 percent of total costs) from a manufacturer that has conducted a LCA and uses at least 10 percent renewable energy.

ECONOMIC AND SOCIAL BENEFITS

Manufacturers can save money by reducing resource consumption and increasing energy and water efficiency. Greater disclosure of environmental performance achievements and targets increases knowledge about and among marketplace players.[1]

1. R Kashmanian, R Wells, and C. Keenan, "Corporate Environmental Sustainability Strategy: Key Elements," *Journal of Corporate Citizenship*, Vol. 44, Winter 2012, pp. 107-130.

DEFINITIONS

- An ***environmental product declaration (EPD)*** is a manufacturer declaration "providing quantified environmental data [based on an ISO 14040 LCA] using pre-defined parameters, and, where relevant, additional environmental information" (ISO 14025, 2006a).
- ***Life-cycle assessment (LCA)*** is a "cradle-to-grave" approach for assessing industrial systems. "Cradle-to-grave" begins with the gathering of raw materials from the earth to create a product and ends at the point when all materials are returned to the earth. Specifically, it is a technique to assess the environmental aspects and potential impacts associated with a product, process, or service, by:
  - Compiling an inventory of relevant energy and material inputs and environmental releases
  - Evaluating the potential environmental impacts associated with identified inputs and releases
  - Interpreting the results to help you make a more informed decision
- ***Potable water*** is municipally treated water or well water that is suitable for drinking.
- A ***renewable energy source*** includes nonpolluting renewable energy generation methods, such as solar, wind, geothermal, small-scale or micro hydroelectric, and biomass. Purchased renewables must meet the Center for Resource Solutions (CRS) Green-e products certification requirements. Other sources of renewable energy are eligible if they satisfy the Green-e program's technical requirements.
- ***Reuse*** is a process of utilizing a used product or material in a manner that generally retains its original form and identity with minor refurbishments. Materials reusable in whole form might include sand-set pavers, segmental retaining walls, or mechanical fasteners, connections, or joinery (e.g., avoidance of adhesives and mortar).
- A ***salvaged or reused material*** is recovered from an existing building or site and employed on site without change to its condition. Structures, materials, plants, and rocks preserved in situ and new materials with recycled content do not qualify.

RESOURCES

- Components of this credit were adapted from the U.S. Green Building Council's LEED credit: LEED BD+C v4 *MR Credit 2: Building product disclosure and optimization—environmental product declarations*.
- For information about international reporting standards, read more from these sources:
  - Global Reporting Initiative, *www.globalreporting.org*
  - *International Organization for Standards, www.iso.org*
- For more information about renewable energy, consult the National Renewable Energy Laboratory (NREL) U.S. Life-Cycle Inventory Database, *www.lcacommons.gov/nrel/search*
- For a green toolkit for smaller manufacturers, consult the Organisation for Economic Co-operation and Development (OCED), *www.oecd.org/innovation/green/toolkit.*
- For more information on the National Institute of Standards and Technology Building for Environmental and Economic Sustainability (BEES) software, go to *www.nist.gov/el/economics/BEESSoftware.cfm.*
- For information about software that may be helpful in analyzing environmental performance, see these organizations:
  - Simapro, GaBi, *www.gabi-software.com*
  - Umberto, *www.umberto.de/en*
  - Open LCA, *www.openlca.org*
- For more information on hazardous air pollutants included in the U.S. Clean Air Act, see the Code of Federal Regulations at 40 CFR 61.01, *ecfr.gpoaccess.gov.*
- For more information on toxic water pollutants included in the U.S. Clean Water Act, see the Code of Federal Regulations at 40 CFR 401.15, *ecfr.gpoaccess.gov*.
- For more information on hazardous and non-hazardous waste according to the U.S. Resource Conservation and Recovery Act (RCRA), consult these resources:
  - Code of Federal Regulations at 40 CFR 261, *ecfr.gpoaccess.gov*
  - The U.S. EPA RCRA Frequent Questions Database, *www.epa.gov/waste/inforesources/online/index.htm*

LINKS TO OTHER SITES PREREQUISITES AND CREDITS