Masonry can play a major role in attaining LEED certification. Masonry and sustainable building design seem like a natural fit. Masonry – with its durability, local or regional manufacturing, and thermal mass characteristics meets many of the goals inherent in sustainable building design. With the development of the LEED Green Building Rating System, interest in this design concept is increasing daily.

What is LEED?

The Leadership in Energy and Environmental Design (LEED™) Green Building Rating System was developed by the U.S. Green Building Council. It is a national voluntary program to define and measure what constitutes a “green” building. There are LEED™ rating systems for new construction and major renovations (LEED-NC), existing buildings (LEED-EB) and commercial interiors (LEED-CI). Committees are currently developing rating systems for multiple buildings (LEED-MB), core and shell development (LEED-CS), neighborhood development (LEED-ND) and homes (LEED-H).

The goals of the certification process are to improve occupant well-being, environmental performance, and economic returns of facilities. Buildings are certified if they achieve at least 26 points out of a possible 69, which are determined by specific features of the structure. LEED certification levels are awarded for total points on the project as follows:

- Certified -------------------------- 26 – 32 points
- Silver ----------------------------- 33 – 38 points
- Gold ------------------------------- 39 – 51 points
- Platinum -------------------------- 52 – 69 points

The LEED-NC rating system is divided into five environmental categories, each with multiple parts or credits to recognize sustainable building practices, plus a sixth category to recognize innovative design. These categories are:

1. Sustainable Sites ------------------ (14 pts)
2. Water Efficiency ------------------ (5 pts)
3. Energy and Atmosphere ------------ (17 pts)
4. Materials and Resources ----------- (13 pts)
5. Indoor Environmental Quality ------ (15 pts)
6. Innovation and Design Process ----- (5 pts)

Masonry Contributions

There are several credits within each of the categories that can be used to achieve points toward certification. Masonry can play a significant role in achieving credits in the Sustainable Sites, Energy and Atmosphere, Materials and Resources, Indoor Air Quality, and Innovation and Design Process categories.

Sustainable Sites - 14 Points

Masonry can contribute up to 3 points in this category through the use of permeable concrete or brick masonry pavers or open cell concrete masonry pavers. The intent of Sustainable Sites

Credit 6 - Storm water Management

This credit is to limit disruption and pollution of natural water flows by managing or eliminating storm water runoff, increasing onsite infiltration, and eliminating contaminants. One point is awarded for a site with an existing imperviousness less than or equal to 50% if the post-development 15-year, 24-hour peak discharge rate does not exceed the predevelopment rate. Or for a site with an existing imperviousness greater than 50%, one point is awarded if the rate and quantity of storm water runoff are decreased by 25%.

One additional point is awarded for storm water treatment systems designed to remove 80% of the average annual post-development total suspended solids and 40% of the average annual post-development total phosphorous. Recommended best management practices for achieving this credit include the use of porous pavements.

Credit 7 - Heat Island Effect

This credit awards 1 point for the reduction of heat islands. This credit requires that shade be provided and/or light-colored high-albedo materials and/or open grid pavement be used for at least 30% of the site's non-roof impervious surfaces. Or 1 point can be awarded for the use of an open-grid pavement system (less than 50% impervious) for a minimum of 50% of the parking lot area.

Energy and Atmosphere - 17 Points

Credit 1 - Energy and Atmosphere

The intent of this credit is to achieve increasing levels of energy performance above the prerequisite standard. Up to 10 points can be awarded for improvements of 15% – 60% above the standard for new buildings, or 5% – 50% improvement for existing buildings. The baseline standard used is ASHRAE/IESNA 90.1-1999. Improvements in performance are measured using the Energy Cost
Budget Method found in Section 11 of the ASHRAE standard.

Masonry can contribute to achieving points in this category by using passive solar designs in colder climates. Thermal mass, inherent in interior masonry, reduces room temperature swings and stores heat to reduce peak energy loads. Thermal mass also extends run cycle times on heating and cooling equipment, which helps it to run at higher efficiencies and reduce the size of HVAC systems. In hot climates thermal mass can save up to 50% on air conditioning energy use.

Materials and Resources - 13 Points

Masonry can contribute up to 11 points toward certification in this category.

Credit 1 Building Reuse – 3 points

Awards 1 point for 75% reuse of existing walls, floors, and roof; and 1 additional point for maintaining 100% of the existing walls, floors, and roof. Changes are proposed for LEED version 2.2 to lower these thresholds, which will make it easier to qualify. 1 additional point is awarded for reuse of 50% of interior non-structural elements. Non-structural masonry walls and floors can contribute to this point. The durability of masonry supports these three points, if only for future use of new buildings.

Credit 2 Construction Waste Management – 2 Points

The intent of this credit is to divert construction, demolition, and land clearing debris from landfill disposal.

One point is awarded for reusing 50% of the construction, demolition, and land clearing waste. One additional point is awarded for reusing 75%.

Scraps and broken pieces of concrete masonry can be crushed and used for aggregate, contributing to these points. Calculations can be done on a weight or volume basis. Using the weight basis favors credit for recycling masonry.

Credit 3 Resource Reuse – 2 Points

This is intended to reuse salvaged materials and products to reduce the demand for virgin items. Materials salvaged onsite do not apply to this section, but do count toward Credit 1.

Masonry materials such as brick can be salvaged, but the Brick Industry Association recommends caution in re-using brick for mortared applications. Used brick may not meet the requirements of present day specifications and may not bond adequately with mortar. These difficulties could be overcome by testing the properties of salvaged brick and using special cleaning procedures and/or mortar additives to improve bond. Paver brick may also be re-used, especially in sand-set applications and for building interiors to meet the intent of this credit.

1 or 2 points can be earned for using salvaged building materials for 5% and 10% of building materials respectively.

Credit 4 Recycled Content – 2 Points

Awards up to 2 points for using building products that incorporate recycled content materials. Masonry products are ideal candidates for incorporating recycled materials because of their inert nature.

The requirement for 1 point is that materials with the sum of post-consumer recycled content plus 1/2 the post-industrial content constitute at least 5% of the total dollar value of materials in the project. If the sum of post-consumer recycled content plus 1/2 the post-industrial content equals 10% or more, 1 additional point is awarded.

Concrete masonry units often incorporate recycled materials. According to the NCMA, supplementary cementitious materials such as fly ash, silica fume, and slag cement are considered post-industrial materials. Concrete masonry that incorporates glass, slag, recycled concrete masonry, or other recycled materials may qualify.

Clay brick often incorporates recycled units ground and used as grog. Because the firing process burns up most organic materials, even contaminated soil and saw-dust can be used in making brick.

Mortar may contain recycled materials such as fly ash. Steel reinforcing bars used in reinforced masonry may contain post consumer or post-industrial materials.

Credit 5 Regional Materials – 2 Points

Encourages the use of building materials that are extracted and manufactured within the area. This approach supports the regional economy and reduces the environmental impacts resulting from transportation.

Masonry products can contribute 1 point when 20% of the building materials and products are manufactured within a 500-mile radius of the project site. One additional point is earned if the regionally manufactured materials use a minimum 50% of building materials that are extracted, harvested, or recovered within 500 miles of the project site. Masonry products will often qualify for both of these points.

Changes to the specifics of this credit are proposed for LEED 2.2.
**Indoor Air Quality - 15 Points**

Many construction materials contain volatile organic compounds (VOC's) that can be released into the air as the products age. For example, some fiberglass batt insulations and wood products contain binders that release formaldehydes and other compounds into the air that can accumulate to unhealthy levels, especially in building that are tightly sealed for energy conservation. Other materials contain paper, sugars, and other compounds that support mold growth.

Masonry materials do not contain VOC's and cannot contaminate indoor air. They also do not support mold growth and are not damaged by moisture. Other improvements in indoor air quality include reducing the need for paint and carpet (VOC's) with brick, stone, tile and architectural concrete masonry. Masonry construction also reduces the possibility of mold growth. Masonry can contribute up to 5 points in this category.

**Innovation in Design - 5 Points**

The intent of this category is to recognize exceptional performance beyond the requirements in LEED, or reward innovations in categories not specifically addressed by the program. 1 point is awarded for each innovation, up to a total of 4 points. One additional point is awarded for having a LEED Accredited Professional on the design team.

Possible areas where masonry can contribute include acoustic performance, life-cycle cost and durability, efficient use of materials with prestressed or reinforced masonry, and improved comfort and safety of building occupants by capitalizing on the inherent acoustic and fire safety attributes of masonry.

**Adding the numbers**

Total possible points that masonry can contribute toward LEED certification by category are as follows:

- Sustainable Sites------------------ up to  4 pts
- Energy and Atmosphere---------- up to 10 pts
- Materials and Resources--------- up to 11 pts
- Indoor Air Quality-------------- up to  5 pts
- Innovation in Design------------ up to  3 pts

Masonry can contribute up to 33 points toward LEED certification. No other class of materials offers so many desirable qualities that contribute to durable, sustainable buildings.

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Please contact one of the Acme Brick Company's Technical Services Engineers to explore specific ways you can use masonry materials to build quality projects that will save energy, improve the environment, and provide healthy and comfortable places to live, work, shop and assemble:

For further information on the (US Green Building Council ((USGBC), the LEED Green Building Rating System, and LEED certification, visit the (USGBC) Web site, www.usgbc.org. Membership in USGBC is open to individual companies interested in sustainable building design.

The Masonry Society has also formed a Sustainability Subcommittee to support the use of masonry in sustainable design. This is a subcommittee of the Architectural Practices Committee. To participate on these committees or for further information contact The Masonry Society at www.masonrysociety.org

This digest is an edited version of an article written by Christine Subasic, PE for Masonry Construction magazine, "Masonry and Sustainable Building Design", May 2004. We have added the section on Indoor Air Quality and modified the section on Energy and atmosphere. The remainder of the content is hers with minor editing. Used by permission.