A Summary of LEED "Green Building" Requirements

Barely a day goes by in the real estate community without someone mentioning "LEED." LEED, which stands for Leadership in Energy and Environmental Design, is a certification program for green buildings administered by the United States Green Building Council (USGBC). Constructing a LEED certified building may not be as onerous as one may think. Recent studies show that LEED buildings barely increase construction costs. At the same time, LEED buildings generally outperform others in key areas such as occupancy, sales price, rents and operating expenditures. Real estate companies should consider LEED certification for all their projects. This article outlines LEED requirements for new buildings.

Eligibility
All commercial buildings, institutional and high-rise buildings (at least four habitable stories) are eligible for LEED certification for new construction, which addresses new buildings and major renovation of existing buildings. LEED has separate certification programs for existing commercial buildings and interiors, as well as new homes, and will soon certify entire neighborhood
developments.

**Procedure**

An applicant must first register its intent to obtain LEED certification on the USGBC website (http://www.usgbc.org). The registration fee for members is $450. Review fees vary based on building size. For instance, the fee for a building less than 50,000 square feet is $1,750 for members, and the fixed price for buildings above 500,000 square feet is $17,500. Once registered, the applicant collects information to satisfy submittal requirements. The applicant can submit all documentation when construction is complete or split the certification application into a design phase and post-construction phase. All submittals for USGBC review are made on-line.

**Levels of Certification**

All LEED certified buildings must meet seven prerequisites. A building achieving at least 26 additional credits (see discussion below) is LEED certified. A building with at least 33 credits is classified as LEED Silver. A building earning at least 39 credits is LEED Gold, and at least 52 credits is LEED Platinum.

**Mandatory Prerequisites**

All LEED certified buildings must meet the following seven prerequisites:
- **Construction Activity Pollution Prevention** - During construction, soil erosion measures must meet EPA stormwater permit requirements or local standards.

- **Commissioning of Building Energy Systems** - The commissioning program must verify that the building's energy related systems are installed, calibrated and perform according to the owner's project requirements, basis of design and construction documents.

- **Minimum Energy Performance** - The project must meet minimum 2004 American Society of Heating and Air-Conditioning Engineers (ASHRAE) levels of energy efficiency.

- **Fundamental Refrigerant Management** - CFC-based refrigerants, which deplete the ozone layer and cause global warming, are not allowed.

- **Storage and Collection of Recyclables** - The building must facilitate recycling of wastes generated by its occupants.

- **Indoor Air Quality** - The building must comply with minimum 2004 ASHRAE ventilation requirements to maximize indoor air quality.

- **Environmental Tobacco Smoke Control** - Smoking must be prohibited or limited to designated areas.

**Credits**

Applicants can achieve a total of 69 possible
credits in five major categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality. Five additional points may be awarded for exceptional efforts at innovation and design. There is no minimum or maximum number of credits that an applicant must earn in any one category. Each credit earns one point unless otherwise indicated.

**Sustainable Sites**

Buildings place a substantial burden on the surrounding environment. The USGBC provides a total of fourteen potential credits for measures to protect the ecosystem.

- **Site Selection** - Building may not be developed on prime farmland, lower than five feet above elevation of 100-year flood event, on habitat for species on endangered or threatened list, within 100 feet of wetlands or local setback requirements, on land within 50 feet of a water body, or land which prior to acquisition was public, unless applicant provides compensatory public land.

- **Development Density/Community Connectivity** - Building must be constructed on previously developed site in a community with a minimum density of 60,000 square feet per acre, or within one-half mile of a residential zone or a
neighborhood with density of 10 units/acre and within one-half mile of at least 10 basic services with pedestrian access to services.

- **Brownfield Development** - Project must be built on previously contaminated site.

Public Transportation Access - Project must be located within one-half mile of existing or planned and funded commuter rail, light rail or subway, or within one-quarter mile of one or more stops for two or more bus lines.

- **Bicycle Storage and Changing Rooms** - Secure bicycle racks and or storage within 200 yards of building entrance for 5% or more of building users and shower and changing facilities for .5% of occupants. For residential buildings, covered storage for 15% of occupants is required in lieu of changing/shower facilities.

- **Low Emission and Fuel-Efficient Vehicles** - Provide fuel efficient vehicles for 3% of occupants, preferred parking for such vehicles for 5% of employees or, install alternative fuel refueling stations for 3% of parking capacity.

- **Parking Capacity** - Do not exceed minimum local zoning requirements for parking capacity and provide preferred parking for 5% of total spaces, or programs to facilitate shared vehicle usage.
- **Protect or restore habitat** - At undeveloped sites, limit disturbance to outlined distances from site structures, or on previously developed or graded sites, restore or protect a minimum of 50% of open site area.

- **Maximize open space** - Exceed by 25% the local open space zoning ordinance, if no zoning ordinance, provide vegetated open space equal to building footprint, or if zoning ordinance exists, but no requirement for open space in zoning ordinance, provide 20% of open space.

- **Stormwater Quantity Control** - Depending on existing imperviousness of site, either do not exceed or reduce imperviousness.

- **Stormwater Quality Control** - Implement stormwater management plan that reduces impervious cover, promotes infiltration, eliminates source of contaminants and removes pollutants.

- **Heat Island Effect - non-roof** - Shade one-half of site or use materials that reflect, rather than absorb, solar rays.

- **Heat Island Effect - roof** - Install high reflectivity roofing materials or vegetated roof for at least 50% of area.

- **Light Pollution Reduction** - Direct interior lighting sources away from windows and illuminate only areas required for safety and comfort at levels below ASHRAE standards.
Water Efficiency

Water use in commercial buildings can be reduced by as much as 30 percent through simple measures relating to landscaping and water fixtures. Applicants can earn up to five credits for water efficiency.

- **Reduce Water for Landscaping by 50%** - Limit or eliminate use of potable water for landscape irrigation by 50% from baseline.
- **Use No Water for Landscaping** - Eliminate potable water use for irrigation entirely.
- **Innovative Wastewater Technologies** - Reduce potable water use for building sewage conveyance by 50% or treat 50% of wastewater on-site.

Energy and Atmosphere

Buildings consume almost 40 percent of the nation’s energy and 70 percent of its electricity. As most domestic electricity results in emission of greenhouse gases, buildings contribute substantially to global warming. LEED awards up to seventeen points for reducing energy use and taking other measures to reduce air pollutants.

- **Reduce energy use below 2004 ASHRAE standards** - Reduction of energy use 14
percent below ASHRAE standards (2 credits) is now mandatory for new buildings. An applicant may achieve up to eight additional credits for each additional 2.5% energy performance reduction.

- Enhanced Commissioning - Enhanced commissioning outlines several additional steps to assure that construction and operations conform with design and operation requirements.
- Enhanced Refrigerant Management - Either eliminate all refrigerants or select HVAC&R that minimize or eliminate emission of compounds that contribute to ozone depletion and global warming.
- Measurement and Verification - Provide for ongoing accountability of building energy consumption for no less than one year of post-construction occupancy.
- Green Power - Provide at least 35% of building's electricity from renewable sources.

Materials and Resources

Construction waste amounts to as much as 40 percent to the total waste stream in the United States. Applicants can earn up to thirteen credits for recycling and other measures to reduce waste.

- Reuse 75% of Walls, Floors, Roof from Existing Building - Maintain at least 75% of existing building structure, including structural floor and roof decking, exterior
skin and framing.
- **Reuse 95% of Walls, Floors, Roof From Existing Building** - Maintain an additional 20% of existing building for total of 95%.
- **Maintain 50% of Interior Non-Structural Elements from Existing Building** - Use existing interior non-structural elements, including interior walls, doors, floor coverings and ceiling systems in at least 50% of the completed building.
- **Divert 50% of Construction Waste Management from Disposal** - Recycle and/or salvage at least 50% (based on weight or volume) of non-hazardous construction and demolition.
- **Divert 75% of Construction Waste Management from Disposal** - Recycle and/or salvage at least 75% of non-hazardous construction and demolition.
- **5% Materials Reuse** - Salvaged, refurbished or reused materials must constitute at least 5%, based on cost, of total value of materials on project.
- **10% Materials Reuse** - Salvaged, refurbished or reused materials must constitute at least 10%, based on cost, of total value of materials on project.
- **10% Recycled Content** - Building products must incorporate 10% of recycled content materials.
- **20% Recycled Content** - Building products must incorporate 20% of recycled content materials.
- **10% Regional Materials** - Ten percent (based on cost) of building materials or products must be extracted, harvested or recovered and manufactured within 500 miles of project site.

- **20% Regional Materials** - Twenty percent (based on cost) of building materials or products must be extracted, harvested or recovered and manufactured within 500 miles of project site.

- **Rapidly Renewable Materials** - 2.5 percent of materials must be constructed from rapidly renewing materials, which are plants typically harvested within a 10-year cycle or shorter.

- **Certified Wood** - Minimum of 50% wood-based materials and products which must be certified in accordance with Forest Stewardship Council's criteria for wood building components.

### Indoor Environmental Quality

Americans spend an average of ninety percent of their time indoors, where they are often exposed to air pollutants as much as 100 times higher than outdoor levels. USGBC offers fifteen points to assure clean indoor air.

- **Outdoor Air Delivery Monitoring** - Install permanent monitoring systems that provide feedback on ventilation system performance.

- **Increased Ventilation** - Provide additional
outdoor air ventilation to improve indoor air quality.

- *Construction Indoor Air Quality (IAQ) Management Plan, During Construction* - Take measures to reduce indoor air pollution during construction/renovation process.

- *Construction IAQ Management Plan, Before Occupancy* - Flush out building, perform air quality testing or take other measures to assure healthful air quality prior to occupancy.

- *Low-Emitting Adhesives and Solvents* - Indoor adhesives and sealants shall comply with published low-emitting requirements, such as Green Seal.

- *Low-Emitting Paints and Coatings* - Interior paints and coatings shall comply with published low-emitting requirements.

- *Low-Emitting Carpet Systems* - Carpets must meet requirements of Carpet and Rug Institutes Green label plus program.

- *Low-Emitting Composite Wood and Agrifiber* - Wood and agrifiber shall have no added urea-formaldehyde resins.

- *Indoor Chemical and Pollutant Source Control* - Minimize exposure of building occupants to potentially hazardous particulates and chemical pollutants.

- *Controllability of Lighting* - Provide individual lighting controls for 90% minimum of building occupants.
- **Controllability of Thermal Comfort** - Provide individual comfort controls for 50% minimum of building occupants.

- **Thermal Comfort Design** - Design HVAC systems and building envelope to meet 2004 ASHRAE standards for thermal comfort.

- **Thermal Comfort Verification** - Implement thermal comfort survey of building occupants within six to eighteen months after occupancy, and develop a plan for corrective action if 20% of occupants are dissatisfied.

- **Daylight Views for 75% of spaces** - Provide daylight views for 75% of building occupants.

- **Daylight Views for 90% of spaces** - Provide daylight views for 90% of building occupants.

**Conclusion**

The USGBC website discusses in detail each of the LEED requirements and prerequisites. For additional information, potential applicants should discuss new construction projects with a LEED Accredited Professional (AP). LEED APs have passed the USGBC exam and understand green building practices and principles and the LEED Rating System.