

**Defining Sustainable Design**  
**The AIA Committee on the Environment's**  
**Measures of Sustainability and Performance Metrics**

This set of 10 measures (and supporting metrics) is the foundation of the COTE Top Ten Green Projects, an annual awards program in its ninth year, and the basis of the COTE theory of sustainable design.

Top Ten entrants are asked to provide narratives responding to specific categories and indicate an understanding of the connections between them, quantifying features when possible using the suggested metrics. Selection favors well-designed solutions that exhibit an integration of natural systems and appropriate technology, verified through building systems modeling, analysis, and best practices. (Entrants also provide a description, key environmental features, lessons learned, project economics, and details about the process and results.)

**Top Ten Measure 1: Land Use**

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**Narrative:** Describe how the site was selected and evaluated and if the site selection and site planning relates to a master plan and whether the design of any buildings was part of a larger master plan Describe any density or land use assessments and objectives. (<200 words)

**Top Ten Measure 2: Site Ecology**

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**Narrative:** Describe how the design is responsive to the site, regional ecosystems and climate as well as the ecology of the neighborhood. Describe the landscape design, the water management strategy, and the creation, re-creation or preservation of open space and on-site ecosystems. Briefly describe any strategies for habitat creation and regionally appropriate planting. (< 200 words)

**Metrics:** What percentage of precipitation from a typical (regularly occurring in spring/summer/fall) storm event falling on the site is retained and infiltrated/recharged on-site? Naturally occurring stormwater flows due to topography and soils inherent to the pre-development conditions on the site (unaffected by development) can be deducted from this calculation.

Precipitation managed on site: \_\_\_\_\_ %

**Top Ten Measure 3: Community Design & Connection**

**Narrative:** Describe how the design and its approach to land use promotes community, sense of place, efficient transportation alternatives and regional context. Describe public spaces for the community, the transportation strategy, and successful efforts to reduce locally mandated parking requirements. (<200 words)

Metrics: Indicate percentage of the building population traveling to the site by public transit (bus, subway, light-rail or train), carpool, bicycle or on foot. Please indicate in the narrative whether there are company transportation policies and incentives, and efforts made to provide a quality experience for those using transportation alternatives (enhancements to bikeway or pedestrian streets, etc.)

AND: Divide the total number of parking spaces available by the total building population (occupants and visitors). Parking spaces that are dedicated to the building use but not part of the building project must be counted. Please indicate in narrative if project is successful in providing fewer parking spaces than zoning requirements through proactive measures.

Percent of building population using transit options other than the single occupancy vehicle: \_\_\_\_\_ %

Number of parking spaces per person: \_\_\_\_\_

#### **Top Ten Measure 4: Water Use**

**Narrative:** Describe how building and site design strategies conserve water resources and if it uses site supply (precipitation on the site). Describe water conserving landscape design strategies, as well as water conserving fixtures, appliances, and HVAC equipment. Describe water reuse strategies using rainwater, graywater and/or wastewater. (<200 words)

**Metrics:** This calculation must include all water use inside and outside of the building (e.g., plumbing fixtures, appliances, HVAC equipment, landscape irrigation, etc.). Potable water is defined as water that is extracted from municipal supply, wells or irrigation ditches. Reclaimed graywater and harvested rainwater should be deducted for this calculation. Please describe water conserving strategies used and projected water savings in the narrative.

AND: If wastewater is re-used on site, rather than discharged to municipal treatment systems or conventional septic systems, identify the portion of wastewater that is reused on site.

Potable water used indoors: \_\_\_\_\_ gal/yr

Potable water used outdoors: \_\_\_\_\_ gal/yr

Percent wastewater reused on-site: \_\_\_\_\_

#### **Top Ten Measure 5: Energy Performance**

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**Narrative:** Describe how design strategies and systems integration contribute to energy conservation and improved building performance. Discuss simple strategies and energy conserving techniques that reduce or eliminate the need for systems. Describe passive solar design, effective use of controls and technologies, efficient lighting strategies, and

on-site renewable energy systems. (<200 words)

**Metrics:** The preferred method is to compare the energy performance (actual or estimated) of the submitted project to similar building types using the Environmental Protection Agency's (EPA) Energy Performance Rating Scale. Use actual utility meter or billing data whenever possible.

EPA Performance Rating\_\_\_\_\_

OR: Determine percentage of annual energy cost savings achieved with the design, as compared to a minimally code compliant base model. Use ASHRAE 90.1-1999, or the local code/standard, whichever is more stringent. Other, more stringent codes may be used as a baseline. However, the alternate code must be identified (including year of issue), and the calculation method (e.g., DOE-2 energy modeling, utility meter data, etc.) must be described.

Percent total energy savings: \_\_\_\_\_

AND: Provide the requested detailed information to the extent possible. Note that total energy (consumption) includes all purchased and site generated energy, and refers to all related loads including HVAC, lighting, and plug loads. Square footage (sf) refers to gross square footage.

Total energy: \_\_\_\_\_ Btu/sf/yr

Heating: \_\_\_\_\_ Btu/sf/yr

Cooling (If Necessary): \_\_\_\_\_ Btu/sf/yr

Cooling capacity: \_\_\_\_\_ sf/ton

Lighting Load Connected: \_\_\_\_\_ W/sf

Lighting Load after Controls (estimate used in energy model): \_\_\_\_\_ W/sf

Plug Load (estimate used in energy model): \_\_\_\_\_ W/sf

### **Top Ten Measure 6: Energy Security**

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**Narrative:** Describe strategies to reduce peak electrical demand through programming, use patterns, equipment selection, HVAC / lighting controls, and on-site energy generation. Describe renewable energy strategies. Describe how the building or parts of it could function in a blackout (operable windows and daylight / independent power for life-safety etc.)(<200 words)

**Metrics:** Identify peak electrical demand per net square footage of building area (subtract mechanical space and loading docks), and identify the extent to which you

have reduced peak power demands through demand side management and renewable energy generation. Please describe peak load reduction strategies in the narrative.

AND: What percentage of total annual energy usage for the facility is provided by on-site renewable energy sources? Identify the mix from the following list: PV, solar thermal, wind, micro-hydro, biomass (define) electricity, biomass thermal, geothermal, biogas (define) electricity, passive solar, others.

AND: What portion of the total annual energy usage for the facility is generated from grid supplied renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements? Please identify the sources used and the proportion from each source.

Identify watt per net sf peak electricity demand \_\_\_\_\_ W/sf

Percent peak load reduction \_\_\_\_\_

Percent on-site renewable energy generation \_\_\_\_\_

Percent grid-supplied renewable energy \_\_\_\_\_

### **Top Ten Measure 7: Materials & Construction**

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**Narrative:** Describe the materials selected and how they contribute to occupant health, building durability and reductions in maintenance and the impacts of transportation .. Describe materials which are selected because of their life cycle environmental impacts. Describe any materials which are part of a "green lease": program. Describe construction waste reduction, recycling and design strategies to promote recycling during occupancy. (<200 words)

### **Top Ten Measure 8: Light & Air**

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**Narrative:** Describe the quality of the indoor environment and connection the outdoors. Describe strategies that create a healthy and productive indoor environment in terms of daylighting, lighting design, ventilation, indoor air quality, view corridors and personal control systems. (< 200 words)

**Metrics:** Identify the percentage of the total building area uses daylight as the dominant light source during daylight hours (with electric lights off or dimmed below 20%). This calculation should include all areas of the building, including stairways, restrooms, corridors, etc. Identify the percentage of the total building area can be adequately served by natural ventilation (with all HVAC systems shutdown) for all or part of the year.

Percent of total building area that is daylit: \_\_\_\_\_

Percent of building that can be ventilated or cooled with operable windows: \_\_\_\_\_

### **Top Ten Measure 9: Bio Climatic Design**

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**Narrative:** Describe how the building footprint, orientation and massing respond to regional and local climate conditions, the sun path, and seasonal and daily cycles. Describe how local materials and techniques have been employed to respond to local building methods and techniques. Regional "biome"(<200 words)

**Top Ten Measure 10: Long Life, Loose Fit**

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**Narrative:** Describe how this design enhances long-term flexibility and creates enduring social and economic value. Identify the anticipated service life of the project and any components that are designed for disassembly. Describe materials, systems, and occupancy solutions developed to enhance flexibility, durability, and adaptive reuse potential. . (<200 words)