ENERGY AND ENVIRONMENT

The University has committed to approaching new building construction and major renovations with an emphasis on Life Cycle Cost (LCC). Part of this approach is a focus on maximizing energy efficiency and providing cost effective sustainable design. This approach to energy efficiency and cost effective sustainable design begins at the project conception and continues throughout the construction and operating life of the building. These design standards approach this issue of energy and environment on multiple levels during project design process.

The first goal is that the project meets minimum requirements set by the Energy Conservation Design Standard for New State Buildings, meaning that for the majority of campus facilities (all non-residential facilities) the minimum requirements set forth in current adopted version ASHRAE 90.1 are met, and all supporting documentation is completed and provided for approval in conjunction with the Texas Design Standard Compliance Form as required by the State Energy Conservation Office.

In additional to meeting ASHRAE 90.1, an alternative energy feasibility assessment shall be conducted. This requirement is outlined by Section 2166.403, Title 10, of the Texas Government Code which requires that a governing body undertaking construction of a new state building verify the economic feasibility of incorporating into the building's design alternative energy devices for space heating and cooling, water heating, electrical loads, and interior lighting. Requirements for this analysis can be obtained from University Staff and the State Energy Conservation Office website and will be completed by the project architect/engineer. Support documentation for this analysis and a letter describing the analysis process should be provided with the submission of the Texas Design Standard Compliance Form.

To further address the issue of energy and environment, the University has established a goal of achieving a minimum "Silver" rating as established in the current adopted version of the LEED (Leadership in Energy and Environmental Design) Green Building Rating System for New Construction and Major Renovations. At times, certification or even adjustments to the level of rating may be required; this will be determined on a project by project basis with the approval of the University. However, as a rule every project is expected to incorporate measures that would allow it to be certified at the "Silver" level. Each project should endeavor to incorporate the maximum number of credits possible within the constraints of the project program and budget.

An effort has been made during the development of the design standards to provide University accepted options to standards in order to obtain various LEED points. Additional options will need to be presented to the University in order to obtain project LEED objectives. The designer should utilize the LEED checklist and work closely with the University to develop a design approach during the programming phase to meet the University LEED objectives established at the beginning of the project. As required, in order to obtain various points, deviation from the requirements outlined in these design standards may be necessary. At a minimum, these deviations must be approved by University Staff in writing. When necessary and at the request of the University, a life cycle cost analysis must be completed to determine the economic viability of obtaining various points. Requirements and guidelines for the life cycle cost analysis are provided with these design standards.

SPECIAL MECHANICAL, ELECTRICAL, AND PLUMBING CONSIDERATIONS WITH LEED CREDITS

When considering which points will be required to obtain University LEED objectives, the designer should be aware of the potential design impacts carried across the major design disciplines. At the time of this revision for these standards, the following list was compiled of potential design issues that may carry over to the Mechanical, Electrical, and Plumbing disciplines and is based on the potential LEED credit categories defined in LEED-NC version 2.2. While these issues may not apply to all projects and there are obviously more coordination and design issues involved with a LEED design, the following list is provided to spur awareness of design elements and coordination effort that may be required. In addition, the following list is not intended to limit the designer's responsibility or creativity in providing a successful and functional LEED design.

SUSTAINABLE SITES

Credit 4.2 – Alternate Transportation: Bicycle Storage & Changing Rooms:

1) Consider need for area drains and lighting for bicycle storage areas/racks.
2) Consider special requirements for changing rooms:
    a. Showers
    b. Lavatories, urinals, water closets,
    c. Domestic water heater,
    d. Toilet room and shower exhaust

Credit 6.1 – Stormwater Design: Quantity Design

1) Consider stormwater collection for non-potable uses
    a. Landscape irrigation, flushing urinals and/or toilets, cooling tower makeup (incorporate with existing fin water recovery system).
2) Consider volume of water collection and storage location
3) If multiple tanks are utilized, special consideration of the following will be required:
    a. Inlet pipe size,
    b. Tank arrangement,
    c. Pipe materials,
    d. Tank equalization
    e. Access for cleaning
4) Consider required treatment:
    a. Settling area to remove heavy solids
    b. Cyclone filters to remove lighter solids
    c. UV lights to prevent bacterial growth.

Credit 7.2 – Heat Island Effect: Roof

1) Coordinate with project Architect to establish roof requirements. Material/product selection should be accounted for in load and energy models. Material/product selection may place limitations on equipment locations and roof penetrations.

Credit 8 – Light Pollution Reduction

1) Consider public safety requirements
2) Consider requirements for unexpected lighting fixture layouts in perimeter areas within the building
3) Lighting layout within the building may affect layout of air distribution

WATER EFFICIENCY

Credit 1.1 – Water Efficient Landscaping: Reduce by 50%

1) Coordinate with Landscape Architect to verify water quantities (impact to water service)
2) Consider use of captured rainwater or gray water

Credit 1.2 – Water Efficient Landscaping: No Potable Water Use or No Irrigation

1) Coordinate with Landscape Architect to verify water quantities (impact to water service)
2) Captured rainwater system will be required, potentially great volume that established by Credit 1.1.
3) Consider impact to storm water collection system
4) May require other "recycled" water sources

Credit 2 – Innovative Wasterwater Technologies

1) Consider use of high efficiency fixtures
2) Consider use of "recycled" water sources—fin (condensate water), lav and shower drainage (onsite greywater)
    a. Consideration of treatment, storage, and separate waste piping.

Credit 3.1 – Water Use Reduction: 20% Reduction

1) Integrally related to Credit 2
2) Should be obtainable with high efficiency fixtures

Credit 3.2 – Water Use Reduction: 30% Reduction

1) Integrally related to Credit 2
2) Will typically require more than just high efficiency fixtures

ENERGY & ATMOSPHERE

Prerequisite 1 – Fundamental Commissioning of the Building Energy Systems

1) Coordinate closely with the Commissioning Agent
2) Commissioning Agent will require assistance with developing the Basis of Design Document
3) The Commissioning Agent will provide specifications to incorporate in the Construction Documents and will be involved in design reviews.

Prerequisite 2 – Minimum Energy Performance

1) Must comply with both mandatory and the prescriptive requirements of ASHRAE 90.1
2) Proof of compliance will be based on data output from LEED approved computer load/energy estimating programs only

Prerequisite 3 – Fundamental Refrigerant Management

1) No use of CFC refrigerants

Credit 1 – Optimize Energy Performance

1) 20 % Improvement in building performance beyond ASHRAE 90.1 requirement is the preferred minimum level for new University facilities
2) Additional improvements may be required based on LEED objectives.

Credit 2 – Onsite Renewable Energy

1) Consider impact to electrical distribution/service
2) Consider impacts to mechanical systems
3) Consider impacts to roofing system (e.g. installation of solar heat collectors)

Credit 3 – Enhances Commissioning

1) Coordination required for additional design document reviews by Commissioning Agent
2) Coordination required for additional reviews by Commissioning Agent of submittals, RFI's, change orders
3) Commissioning Agent may also require assistance with development of a Systems Manual.

Credit 4 – Enhanced Refrigerant Management

1) Select refrigerants that do not deplete ozone or increase global warming
2) Perform maximum threshold calculation

MATERIALS & RESOURCES

Prerequisite 1 – Storage & Collection of Recyclables

1) Specialized equipment may be implements such as crushers/compactors, consider requirements for water and waste services for area washdown and power requirements.

Credit 4 – Recycled Content & Credit 6 – Rapidly Renewable Materials

1) Material U-values may not be readily available
2) Consult with University prior to incorporating organic insulation materials for approval. Treatment and prevention of mold growth in and on organic insulating materials will need to be provided.

INDOOR ENVIRONMENTAL QUALITY

Prerequisite 1 – Minimum IAQ Performance

1) ASHRAE 62.1 minimum requirements must be met.
2) Requires system percentage of outside air high enough to meet requirements of the "critical" zone.

Credit 1 – Outdoor Air Delivery Monitoring

1) Requires direct measurement of outdoor air quantities serving non-densely populated spaces, AND requires monitoring of CO2 concentrations within densely populated spaces.
2) Control system must be capable of taking corrective action when necessary.

Credit 2 – Increase Ventilation

1) Requires 30% more outside air compared to ASHRAE 62.1 minimums.
2) Consider impact to energy savings (and E&A Credit 1) before implementation of this measure.

Credit 3.1 – Construction IAQ Management Plan: During Construction

1) Will required specification revision compared to standard projects to direct the contractor regarding specific construction practice:
    a. Proper storage and packaging of absorptive MEP materials
    b. Sealing duct systems during construction

c. Utilizing MERV 8 filters on AHU's during construction

Credit 3.2 – Construction IAQ Management Plan: Before Occupancy

1) Requires flush of building (14,000 cf per sf), or baseline air testing
2) HVAC system must be designed to accomplish the flushing (via air economizer cycle)
3) Either flushing or air testing requires schedule time for the contractor

Credit 4.1 – Low-Emitting Materials: Adhesives & Sealants

1) Consider use of alternate adhesive & sealant products for items such as ductwork, insulation, pipe dope, etc.

Credit 4.2 – Low-Emitting Materials: Paints & Coatings

1) Consider alternates for paints and coating utilized with mechanical and electrical equipment, piping, insulation, etc.

Credit 5 – Indoor Chemical & Pollutant Source Control

1) Requires isolation of pollutant rooms: laundry rooms, janitor's closets, printer rooms, etc.
    a. Negative pressure (exhaust) will be required in such spaces
    b. Will required printers to be in dedicated rooms
2) MERV 13 filters will be required

Credit 6.1 – Controllability of Systems: Lighting

1) Consider special requirements for controllability for all shared multi-occupant spaces
2) HVAC zoning coordination required for commonality of control interface locations (alignment of HVAC zones with lighting zones preferred).

Credit 6.2 – Controllability of Systems: Thermal Comfort

1) Requires individual HVAC controls for minimum of 50% of the occupants
    a. Consider impact to HVAC system zoning (e.g. terminal box placement for VAV systems)
    b. Credit will difficult to achieve for most campus facilities

Credit 7.1 – Thermal Comfort: Design

1) Meet requirements of ASHRAE 55 Thermal Comfort Conditions for Human occupancy and demonstrate design compliance

Credit 7.2 – Thermal Comfort: Verification

1) Building comfort must be assess over time
2) Requires a survey over time and corrective action if great than 20% of the occupants are dissatisfied

Credit 8.1 – Daylight & Views: Daylight 75% of Spaces & Credit 8.2 – Daylight & Views: Views for 90% of Spaces

1) Will required coordination with HVAC air distribution layout, light fixture placement and lighting controls.