C-MORE and LEED

C-MORE’s efforts in understanding microbial energy conservation aptly fits within the larger scheme of this new facility’s leadership in energy conservation as reflected in the LEED system. LEED stands for Leadership in Energy and Environmental Design. LEED is the nation’s leading certification system for green buildings and since 2005, there have been nearly 6000 buildings certified nationally. Hawaii has twenty-four LEED certified projects and C-MORE Hale is the inaugural effort at the University of Hawaii at Manoa. It is the first having LEED certification and first at the highest level -Platinum. This is quite an accomplishment for a “research laboratory” and sets the standard for sustainability for both offices and labs within the UH Campus system.

The LEED version that C-MORE registered for, consisted of achieving 69 possible points in 5 major categories of sustainability. Each category contains measurable ways to show that your project saves resources and helps preserve our environment.

- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality

LEED certification levels are awarded based on the number of points achieved.

- Certified
- Silver
- Gold
- Platinum (Highest Level and the C-MORE award)

The following illustrates the C-MORE LEED credits in the 5 categories:

A. Energy & Atmosphere

Reducing our energy footprint is at the heart of sustainability. This is an immense challenge with laboratories which require 100% fresh air intake and 10 air changes per hour. C-MORE currently incorporates a variety of integrated strategies to reduce the building’s energy consumption by 52.2% over a standard laboratory of similar size and usage and 31.4% savings in energy costs.

1. Glass curtain wall [photo at facade /wall section]
   a. The entire south façade of the building is comprised of a 30 foot high glass curtain wall.
b. The design utilizes light shelves, shade shelves and high performance glass to reflect daylight into the interior spaces and replacing the use of electrical lighting.

2. Light pipes [photo at stair / wall section]
   a. The building utilizes light pipes or light tubes to bring daylight into offices and stairways.
   b. Light pipes function like skylight and are very cost-efficient ways of bringing daylight to typically dark areas of the building and save on energy use.

3. Clerestory glazing & Photovoltaic laminates [photo / section]
   a. A glass clerestory provides indirect north light as well as daylight reflected off of the Biomedical Building tower.
   b. On the Clerestory roof of the building, we have installed an 8.16 KW Photovoltaic (PV) laminates. PV laminates convert sunlight to electricity and fit within the ribs of the metal roofing system.

4. Solar Hot Water [photo]
   a. 4 Solar panels provide ancillary reheat hot water to the building saving energy.

5. Reheat Recovery [diagram]
   a. The laboratory HVAC system is equip with a loop called a run-around-coil that recovers heat from outside air and exhaust heat.
   b. A water-to-water heat pump recovers heat from a Chilled water return to a pre-heat water loop.

6. Nighttime Setback
   a. At night and during the weekends, the laboratory air conditioning system reduces to 5 air changes per hour when unoccupied.

7. Automated Light fixtures [photo]
   a. The primary building lighting is equip with smart controls. These contain occupancy sensors which shut off lights when the room is unoccupied and light sensors which reduce the light levels according to the amount of daylight entering the room.

8. Energy efficient chiller [photo]
   a. Chilled water is provide by an air-cooled frictionless centrifugal chiller, the first of its kind at UH.

9. Enhanced refrigerant management: The air conditioning system uses refrigerant that does not contain CFCs which may be harmful to the environment.

10. Enhanced commissioning: A third party commissioning agent was hired to provide independent review of the mechanical design, observe the installation and startup of systems and facilitate training of the owner’s system operators. [photo of commissioning mtg]
B. Water Efficiency

The building is designed to reduce water consumption by 48% over a standard building of similar size and usage. This is achieved through a variety of strategies.

1. Waterless Urinals [photo]
   a. These urinals use no portable water for flushing, saving 45,000 gals of water annually.

2. Ultra low-flow toilets [photo]
   a. Our toilets utilize a low flush valve.

3. Automated Restroom faucet sensors [photo]
   a. All faucets have automated sensors to control the amount of water utilized.

4. 65% reduction in water use for landscaping: by utilizing native landscaping such as ‘Aki’aki and Naupaka in lieu of turf grass, dry stream beds with river rock, and high efficiency irrigation controls, we were able to reduce the water demand for plants significantly. [photo]

C. Sustainable Sites

1. Green Roof: C-MORE has incorporated the first vegetated roof in the UH system. The system is comprised of modular trays which were grown with plant media in a nursery for 6 months before installation. Vegetated roofs reduce stormwater runoff, reduce the building temperature, increase carbon dioxide removal and provide beautiful eco-habits for insects and birds. This green roof contains a variety of native and adapted plants, including Aloe, ‘Akulikuli, Sedum and Portulaca. [photo / diagram]

2. Bicycle storage and changing rooms: Bike racks and bike storage have been provided to encourage alternative transportation. C-MORE also has a shower and changing room to support bike users. [photo of rack & storage]

3. Reduce Heat Island Effect: The roofing used throughout the project contains a special pigment which reflect heat from the roof surface and reducing the overall heat absorption of the site. [photo of roof]

4. Maximize open space: The project was designed to provide more than 64% open space for landscape and outdoor gathering areas. [site photo]

5. Stormwater: Using underground storage chambers or a storm detention system, the project reduces stormwater pollutants and reduces the quantity of stormwater exiting the site. [photo of storm chamber]

D. Materials & Resources

1. 80% Construction waste management: The project diverted 80% of the construction waste from landfills but donating, recycling, and reusing materials. [photo of recycling bins]
2. **23% Recycled Content**: The materials installed in the building contain 23% recycled content. For example, the ceiling tile contains 82% recycled content and the structural steel contains 98% recycled content. [photos]

3. **22% Regional Materials**: More than 22% of the materials installed in this project are from Hawaii including the landscaping and all of the concrete masonry units which incorporate local Hawaii coral aggregates. [photo]

4. **50% Certified Wood**: A substantial portion of the wood used in this project was harvested sustainably from certified forests. [photo]

**E. Indoor Environmental Quality**

1. **Low emitting materials**: Most products on the market off-gas toxic chemicals. The “new” product smell you have in a new car is actually toxic chemicals. CMORE incorporates materials which have very low levels of off-gassing including carpets, sealant, adhesives and paints. [photo]

2. **IAQ management**: An air flush out period was established prior to occupancy to allow for out gassing of volatiles from the construction products.

3. **78% of the occupied spaces have daylight and 90% of occupied spaces have views to the exterior**: Studies have shown that natural daylight and views improve the productivity of occupants. C-MORE has been designed to provide ample amount of daylighting and views. [photo]

4. **CO2 monitoring devices**: CMORE has incorporated CO2 monitoring devices in the mechanical system. These devices monitor the CO2 levels in the building and will provide an alarm if these levels dip below a set threshold point.

5. **Pollutant control**: Each major entry way has installed an entry mat which is designed to capture dust and pollutants from shoes before entry into the building. Furthermore, we have incorporated MERV 13 filters into the mechanical system to capture pollutants at air intakes.