A Division of Black diamond Group

CUSTOMER GUIDE to

LEED PROJECT CERTIFICATION

AND HOW IT AFFECTS

YOUR BUDGET AND ENERGY SAVINGS

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I. Why Build GREEN?

- The building industry's impact on the environment.
- Buildings annually consume more than 30% of the total energy in the US.
- Buildings annually consume more than 60% of the electricity used in the US.
- In 2006 the commercial building sector produced more than 1 BILLION metric tons of carbon dioxide.
- Each day 5 BILLION gallons of potable (drinking) water are used to flush toilets.
- Building Green is the responsible thing to do and in the long run will save you money and help the environment.

II. BOXX Modular - LEED and GREEN

BOXX Modular is dedicated to providing buildings with GREEN features that help in LEED Certification.

- Our buildings are built in a factory environment which reduces tons of waste when compared to a site built building.
- Products are installed dry and stay dry, reducing the possibility of mold.
- BOXX Modular Designers use 2-bulb high efficiency T-8 lighting to save energy.
- We use fully shielded exterior lights to stop light pollution.
- BOXX Modular utilizes windows with Low E Glass and better than code required U and SHGC factors.
- BOXX Modular LEED buildings will have occupancy sensors to cut off non-emergency lights when rooms are not occupied.
- Our buildings contain products that are about 25% recycled content by cost.
- We use LOW VOC paints and adhesives.
- We use a white roof with a Solar Reflective Index (SRI) value of 105. LEED only requires SRI=79. What does this mean for you? It means the roof is very reflective and therefore is cooler and helps reduce the heat and that means your HVAC runs less, hence cheaper electric bills.
- BOXX Modular has a LEED AP+ on staff, available to work with your team for certification.
- BOXX Modular has resources for Commissioning and Energy modeling.
- BOXX Modular can design Solar Tubes with dimmers into our buildings for more day light harvesting and energy savings.
- BOXX Modular can also design fluorescent dimmers to lower lights when solar tubes are providing light.
- BOXX Modular includes blinds for windows to prevent light pollution as a standard.
- BOXX Modular will Design R-410A HVAC into LEED projects for the no CFC's requirement.

III. LEED Certification Requirements

There are some fairly expensive costs that are usually not associated with a modular building; however, more and more cities (such as Dallas, TX) are passing GREEN Ordinances that will force you to spend money on items that LEED requires anyway. If you are going to have to spend the money, then you might as well go for LEED Certification.

LEED Certification is a point system; it takes 40 points to be certified, 50 to be Silver, 60 for Gold and 80 for Platinum.

LEED Certification Prerequisites:

- **Construction Activity Pollution Prevention**
  - You need a soil erosion plan, which means you will need to **hire a Civil Engineer.**
- **Water Use Reduction**
  - Must show through LEED online that you have reduced water usage by 20%
    - This can only be accomplished by **changing toilets to low flush type**
      - BOXX Modular meets current code with 1.6 GPF, for LEED, toilets will have to be 1.3 GPF or less to show a reduction.
    - If lavatory sinks are used, they are already at .5 GPM per code.
    - If urinals are in the project, they will have to be .8 GPF or better.
      - BOXX Modular used waterless urinals and 1.3GPF toilets to reduce one of our LEED projects water by 50%.
- **Fundamental Commissioning of Building Energy Systems**
  - This means you will need **to hire a CxA (Commissioning Agent).**
- **Minimum Energy Performance**
  - This requires **hiring an Energy Modeler** and performing a computer simulation and proving the building is at least 10% more energy efficient than other similar buildings.
- **Fundamental Refrigerant Management**
  - This requires HVAC units to have no CFC's.
    - This is accomplished by using R-410A refrigerant. This HVAC is only slightly more expensive than a typical HVAC.
- **Storage and Collection of Recyclables**
  - This will require **you to have a recycling program** for your building. This must continue for as long as building is certified.
    - It must include paper, corrugated cardboard, glass, plastics and metals.
- **Minimum Indoor Air Quality Performance**
  - This will require BOXX Modular to design the Mechanical air to ASHRAE 62.1 standards.
- **Environmental Tobacco Smoke (ETS) Control**
  - Prohibit on site smoking within 25' of doors, windows or air intakes
    - Provide signage to allow smoking in designated areas, prohibit smoking in designated areas, or prohibit smoking on the entire property.

- Or, all the above and prohibit smoking in the building except in designated areas. This requires you to make rooms with negative pressure so smoke cannot exit during door openings.

You, the owner, must provide access to your utility bills to the GBCI so they can monitor the success of your savings.

After you have met the prerequisites, you can begin earning points.

LEED Certification Point Opportunities:

- **Site Selection, 1 point.** Don't construct on the sites below:
  - Prime farmland.
  - Previously undeveloped land whose elevation is lower than 5'above 100 year flood plain.
  - Land identified for endangered species.
  - Wetlands.
  - Undeveloped land that is within 50' of water.
  - Land that prior to acquisition for the project was a public park.
- **Density and Community Connectivity, 5 points.**
  - Your project needs to be in a very dense community with lots of retail activity such as salons, stores, restaurants, etc…within a ½ mile radius.
- **Brownfield Redevelopment, 1 point.**
  - You have to rehabilitate a contaminated site.
- **Public Transportation, 6 points.**
  - Your project has to be within ½ mile radius of a commuter rail, light rail or subway.
  - Or, your project must be within a ¼ mile radius of a bus stop that serves (2) different public, private or campus bus lines and usable by the building occupants.
- **Bicycle Storage and Changing Facilities, 1 point.**
  - Must provide secure bicycle racks and/or storage within 200 yards of the entrance for 5% of all building users.
  - Must also provide shower and changing facilities in the building or within 200 yards for .5% of FTE (Full Time Employees).
- **Low Emitting Fuel Efficient Vehicles, 3 points.**
  - Must provide preferred parking spots for 5% of the total parking site for fuel efficient vehicles. This is for propane, battery, etc…not vehicles such as diesel.
- **Parking Capacity, 2 points.**
  - Provide no new parking spaces.
- **Protect and Restore, 1 point.**
  - Previously developed site- Restore 50% less building foot print with native vegetation.
  - If it's a Greenfield, then you must limit site disturbance to some distances.

- **Maximize Open Space, 1 point.**
  - Basically provide 20% of site area with open vegetated space.
- **Storm Water Quantity Control, 1 point**.
  - Develop and implement a storm water runoff plan.
- **Storm Water Quality Control, 1 point.** This is costly.
  - Requires a plan to treat and reuse 90% of annual rain fall.
- **Heat Island Effect-Non Roof, 1 point.** This can be costly.
  - Must provide shading over 50% of the hardscape.
- **Heat Island Effect-Roof, 1 point.** This is easy for BOXX Modular buildings.
  - Provide roofing material with a SRI greater than 78 (low roof) for 75% of the roof. BOXX Modular roof is SRI=105.
  - Install a vegetated roof for 50%. BOXX Modular does not recommend this.
  - Or a combination of the above. BOXX Modular does not recommend this.
- **Light Pollution Reduction, 1 point.**
  - All interior non-emergency lights turn off automatically between 11pm and 5am.
  - Exterior lights shall be for safety and comfort and shall be fully shielded. Appropriate calculations to be done.
- **Water Efficient Landscaping, 2-4 points.** This should not be too hard to do with the use of native plants, micro irrigation and/or Xeriscaping.
  - Reduce by 50% and get 2 points
  - Eliminate potable water for irrigation and get 4 points.
- **Innovative Waste Water, 2 points.**
  - Reduce potable water for sewage conveyance by 50%. This may require collecting rainwater, storage and use.
  - Treat 50% of waste water to drinkable standards (Tertiary). Must be used onsite.
- **Water Use Reduction, 2-4 points.** Use low flush or waterless fixtures.
  - Reduce water by 30% = 2 points
  - Reduce water by 35% = 3 points
  - Reduce water by 40% = 4 points
- **Optimized Energy Performance, 1-19 points.** The prerequisite we showed earlier required you to do an energy model and show a minimum 10% savings, so whatever you came up with determines the number of points here.
  - You get 1 point for a 12% energy savings and 1 point for every 2% increase up to the maximum 48% for a total of 19 points.
- **Onsite Renewable Energy, 1-7 points.** This is a fairly expensive way to get points.
  - Renewable energy includes windmills, photovoltaic panels, geothermal, etc…
    - 1 point is for 1% savings of building total usage, then 1 point for every 2% increase up to a total of 13% and 7 point maximum.
- **Enhanced Commissioning, 2 points.** This is costly.
  - The Commissioning Agent CxA you hired for your prerequisite can do this for you.

- **Enhanced Refrigerant Management, 2 points.** If using R410A, this should be easy to achieve.
    - Don't use refrigerants. This is not typically feasible.
    - Show in calculations that the ozone depletion and global warming potential is less than 100, per LEED calculations.
- **Measurement and Verification, 3 points.** This requires your CxA to implement and verify.
    - CxA to develop and implement a plan. This must be in place for 1 year after post construction. This also requires a written corrective action if building is not performing as energy plan stipulated.
- **Green Power, 2 points.**
    - Engage in at least a 2 year contract to purchase 35% of your energy from a renewable energy source.
- **Building Reuse-Exterior Shell, 1-3 points.** This is not typically associated with modular.
- **Building Reuse-Interior Non-Structural, 1 point.** This is not typically associated with modular.
- **Construction Waste Management, 1-2 points.** This would require your GC to implement a plan and document all by volume. This is an extra burden on the GC and their superintendent and they may charge extra for this tracking and reporting.
    - A waste management plan that diverts, recycles, and salvages job site waste.
        - 50% = 1 point
        - 75% = 2 points
- **Materials Reuse, 1-2 points.** This is not typically associated with modular.
- **Recycled Content, 1-2 points.** BOXX Modular Buildings have about 25% recycle content.
    - Calculations have to be shown that the entire projects cost has x% of recycled content, so it depends on the projects budget as to what percent you may declare. BOXX Modular buildings give you a big jump start.
        - 10% = 1 point
        - 20% = 2 points
- **Regional Materials, 1-2 Points.** BOXX Modular buildings contain some regional materials, but it requires extensive calculations to select those items and make them a percent of the total project.
    - 10% = 1 point
    - 20% = 2 points
- **Rapidly Renewable Materials, 1 point.** This is not typically feasible.
    - 2.5% of all materials have to be rapidly renewable, such as Bamboo, Wool, Cotton, etc.
- **Certified Wood, 1 point.** This can be done at the factory at an added cost.
    - 50% by cost of all wood products in the project must be made from FSC lumber.
- **Outdoor Air Delivery Monitoring, 1 point.** This is not typically feasible in Modular.
    - Install permanent monitoring equipment to ensure ventilation system maintains Design minimums. Also install CO2 sensors to monitor and alarm at any 10% varies.
    - Also install CO2 sensors in any high density work areas (40sf per person).
- **Increased Ventilation, 1 point.** This is not typically feasible in Modular.
    - Increase outdoor air by 30%. This usually causes higher heat cost in the winter.

- **Construction Indoor Air Quality Management Plan –during Construction, 1 point.** BOXX Modular achieves this for LEED specific buildings.
    - Buildings are built offsite and a MERV 8 filter (high efficiency) ships with LEED buildings.
- **Construction Indoor Air Quality Management Plan –Before occupancy, 1 point.** Recommended
    - Flush out the building or test the indoor air quality prior to occupancy.
- **Low Emitting Materials-Adhesives and Sealants, 1 point.** BOXX Modular buildings meet this.
    - Meet low VOC's as established by SCAQMD
- **Low Emitting Materials-Paints and Coatings, 1 point**. BOXX Modular buildings meet this.
    - Meet low VOC's as established by SCAQMD
- **Low Emitting Materials-Flooring Systems, 1 point.** BOXX Modular buildings can meet this.
    - Must have Green Label carpet, and FloorScore wood material.
- **Low Emitting Materials-Composite Wood and Agrifiber, 1 point.** BOXX Modular buildings meet this.
    - No urea-formaldehyde resins
- **Indoor Chemical and Pollutant Source, 1 point.** We don't recommend this due to the restrictions the MERV 13 filters puts on the HVAC system.
    - Install MERV 13 filters
    - Install mats at entry ways for at least 10' and service weekly.
- **Controllability of Systems-Lighting, 1 point.** This is typically not feasible.
    - Provide individual lighting controls for 90% of the building occupants.
- **Controllability of Systems-Thermal, 1 point.** This is typically not feasible. New system are emerging to make this less expensive than in previous years.
    - Provide individual comfort controls for 50% of building occupants.
- **Thermal Comfort-Design, 1 point.** Must be documented and requires extensive calculations.
    - HVAC systems must be Designed with ASHRAE 55-2004 and documented.
- **Thermal Comfort-Verification, 1 point.** We don't recommend this, due to added cost.
    - Must agree to survey the building occupants within 6-18 months after occupancy and if more than 20% are dissatisfied, implement a corrective plan.
- **Daylight and Views-Daylight, 1 point.** This can be achieved with Solar Tubes and Dimmers.
    - Simulate through computer software that 75% of all regular occupied spaces achieve 25fc of light on a clear sky day September 21 at 9am and 3pm.
- **Daylight and Views-Views, 1 point.** This is harder to do with lots of interior offices.
    - 90% of all building occupants must have a direct line of sight to windows.
    - Large open areas with modular furniture will usually not allow an outside view.

Innovation in Design

There are 6 available points in this area.

- Have a LEED AP on your LEED team and documented online.
- Reduce water usage from 40% to 45%. You would get one point.
- Implement a GREEN Cleaning program

- Use an Integrated Pest Control.

Regional Points

This is based on a zip code system. When we register your project with LEED online and enter the zip code, it will determine what items are allowed for additional points. There are 6 available items, in which you can choose 4. An example might be if you live in a place that rains a lot, you would be given extra point for installing a water collection system.

Score Card

The following 2 pages include the scorecard for a previous job of ours in New Mexico, It outlines the points we achieved for LEED Silver. Look over it and continue reading below.

You can see from the scorecard, that due to the hiring of the Energy Modeler, 6 points were earned in Energy. The buildings showed to be 22% more efficient than the baseline. The importance of this is that it is a $6,000 savings every year on their Electricity bill. **Was the expenditure of 6K on a model worthwhile! Do the math!**

There was also a 50% reduction on the water, another savings on our drinking water supplies.

Costs

BOXX Modular has a LEED AP+ on staff and can be added in as a line item on your bid for a 40 hour minimum. The LEED AP is there as a guide and to help the Integrated Design Process flow smoothly (1 Point.)

These are just some averages.

Item	Notes	Average Hourly Cost	Average Total Cost	Responsible
LEED AP		$100/ hr.	$4-10K	BOXX Modular will include in bidding process. We would figure a minimum 40 man hours.
Civil Engineer	Based on Job/Points		$10-40K	Owner Direct
Commissioning Agent	Based on Job/Extra points		$5-45K	Owner Direct
Energy Modeler	Based on size and complexity. The smallest job will take 30 hours	Average cost is $100-$150/hr.	$5-25K	Owner Direct
Register Project with LEED Online.	Need to be a GBCI member to Register.		$2,000	BOXX Modular will include in bidding process.

Let's look at the rewards of the recent job in New Mexico.

Let's say our LEED AP spent 120 hours, that's $12,000. The Energy Modeler was $8,000, the Commissioning Agent was $15,000, the Civil Engineer was $15,000 and the cost to Register LEED was $2,000. That's $52,000. The outcome of the energy model shows a $6,000 yearly savings in Electricity alone. Over the next 15 years the owner will save $90,000 on a $52,000 investment!!!!!!

Their potable water was also reduced by 50% with use of waterless urinals and low flush toilets.

In closing, we are here to work with you on a more energy efficient building and to enable your building to put money back into your business over the life of your investment.

Rex E Walker

LEED GA, LEED AP BD+C, Member of the USGBC North Texas Chapter.


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