

## Industrial Green

LEED-CERTIFIED WAREHOUSE FACILITIES POSE UNIQUE CHALLENGES.

**W**hat's a million square feet and green? Why, a LEED-certified warehouse facility, of course! Many people can't see how buildings with such large footprints that disturb so much land can ever be green. But the growing number of LEED-certified warehouse facilities is helping to buck this perception.

I'm not saying that just because a warehouse is LEED certified it doesn't have an intense impact on the environment. But having these facilities all over the country is necessary to easily distribute the products our economy is built around. What I'm saying is: Since they are so necessary, shouldn't we be building these facilities to be as green as possible? Having worked on nearly a half dozen LEED-certified warehouse projects up and down the east coast (ranging in size from 200,000 square feet to nearly a million square feet), I've learned that creating a green warehouse is really easier than it may seem.

Here are a few lessons learned.

### STORMWATER MANAGEMENT

Stormwater management is always a challenge with projects such as warehouses, which have a lot of impervious surfaces. The buildings are huge and low with an enormous amount of surface area. Add parking and truck storage to the mix, and you're talking a hefty amount of water runoff. Many warehouses handle this through onsite detention, which is effective enough. It allows the sediment to settle out of the water, and it slows down the rate of water being dumped offsite.

But this isn't enough from a LEED perspective. Many ponds are designed just to slow the water flowing off the site, not to actually allow for infiltration. The good news is this is often as simple as deepening the pond and allowing for wet retention rather than dry. Simply increasing pond depth typically allows you to meet both the stormwater quantity and quality points for LEED. Another advantage of the wet pond is that it can provide all of your irrigation needs, allowing you to earn all four points under water efficient irrigation. Let's face it, most warehouses don't have the lush plantings of a botanical garden. That's not to say they don't look nice, but their irrigation demand can be significantly reduced. And any irrigation can be met from your wet pond. Two birds killed with one pond! As always, just make sure your civil engineer is aware of the plan from the outset so the pond can be sized accordingly without having to slow down the construction process.

### ENERGY

On the energy side, LEED requires a 10 percent reduction over ASHRAE 90.1-2007. This can be easy to achieve on a warehouse by taking a few simple measures. But first, and

this is very important, how LEED calculates your energy savings can be very different from the real world. For the LEED energy model, it looks at the ASHRAE baseline per the 90.1 code and buildings must be modeled as such. The model will create the baseline around standard conditioned space (heated and cooled).

The challenge for warehouses is they typically only have cooling in the office portion. The storage portion may have heating for freeze prevention. But if you exceed a certain level of heating under ASHRAE, say around 5 btu/sf in the southeast or 14 btu/sf in Philadelphia, the space is considered conditioned. Therefore, you must also model a cooling load even if there isn't one at all! So on a warehouse with just space heaters for 400,000 square feet, you would also have to model the building as if there were a chiller providing cooling! This can really lower your energy savings, which looks at the total modeled consumption. All of a sudden your loads have gone up significantly. This can drop your modeled energy savings from 30 percent to near 15 percent. Having this huge cooling load modeled in can cause the misconception that the building will use more energy. When in reality, that won't be the case. So the first, and by far most important, step for modeling warehouses is make sure your heating design does not exceed the ASHRAE standard to push you from semi-conditioned to conditioned space.

The other energy considerations are pretty straight forward and cost effective. For the storage portion, don't install more lighting than you need. If there is no fine sorting, you can get by with a lot less light.

Also make sure your lighting is on motion sensors. There's no sense in lighting the entire space when you're only operating in one portion. Putting in a string of occupancy sensors is a cheap, efficient way to go that will offer payback in short order.

### ADDITIONAL CONSIDERATIONS

The rest is similar to a regular LEED building. Use water-efficient plumbing fixtures, as I've often written about. For materials, it's easy to ace the category. Since most warehouses are steel and concrete, you're recycling is about as easy as it comes. So are recycled content materials and local/regional materials. Concrete, base and steel alone can easily get you both points for each of those credits.

Indoor environmental quality is streamlined since there are generally far fewer paints, sealants, adhesives and carpets you need to be concerned about, although it can be more challenging depending on how you're looking at specifics for daylighting, thermal comfort and controllability.

So while warehouses do have a large footprint and impact on our environment, we can reduce that impact significantly and easily, and be well on the way to a new generation of greener warehouse facilities. **SF**



**>> TOMMY LINSTROTH,**  
LEED AP, is the principal of Trident Sustainability Group ([www.tridentsustainability.com](http://www.tridentsustainability.com)), a consulting firm focused on sustainable building design, construction and operation. He can be reached at [tommy@tridentsustainability.com](mailto:tommy@tridentsustainability.com).