

Easy on the Green: Architectural Sustainable Design Ideas for Food and Beverage Facilities

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For the past several years, companies throughout the United States have been steadily adding sustainability to their list of goals for new construction and renovation projects. Factors such as pressure from customers, the need to reduce construction and energy costs and a desire to be a good corporate citizen are helping to bring sustainability to the forefront, causing many food and beverage facilities to begin to seek out sustainability initiatives that will still deliver the performance demands required in a processing and production environment.

The architecture of these facilities plays a large part in this concern, with factors such as fork truck traffic, environmental control, durability, cleanability, corrosion resistance, and even the choices for coatings and sealants influencing and dictating the selection of building materials and detailing. Also at issue is the lack of time, resources, funding, and/or interest in, securing Leadership in Energy and Environmental Design (LEED) certification – the reigning sustainability standard.

However, not every construction or renovation project has to be LEED-certified to be good for the company, good for the project *and* good for the environment. In addition to ideas driven by engineering disciplines, there are architecturally based ideas that require little to no extra investment – which may, in fact, already be part of daily operations. These can be a realistic and low-effort way to make a difference while contributing to LEED certification – if that is indeed a goal. Some key areas to check include:

Roofing

Roofs on food and beverage facilities typically receive a lot of maintenance traffic for servicing rooftop process area equipment. Single-ply membrane roofing systems can provide a cost-effective and highly reflective roofing system, which is LEED compliant. However, some single-ply systems can deteriorate from exposure to process exhausts, and other single-ply systems may pose the risk of slips and falls due to exhaust residues settling on the surface. Plus, exposed single-ply systems are susceptible to damage from traffic, maintenance activities, tools, fasteners, etc.

To eliminate these concerns, many companies have established their own roof system standards over the years, often through the use of built-up roofing systems. While these systems provide a long-lived, serviceable roof, they may not meet the Solar Reflectance Index (SRI) value required to earn LEED credit. For those facilities which have a standard roof system that is not LEED-compliant, options to consider include:

- Some manufacturers offer coatings that can be applied over their built-up roof system to increase the SRI value. These coatings do not reduce the performance of the base roof system, but will require recoating within five to seven years to maintain their reflective value.
- Built-up roof systems are available with synthetic granular cap sheets that meet the SRI rating. In addition, an alternative high performance system of equal or greater performance may be possible, depending on the manufacturer.
- Consider using a less expensive, highly reflective, single-ply system above the less traveled office and/or warehouse areas and use the standard built-up system in critical areas above the processing and utility areas. The average reflective value of these combined roof systems over the facility may get a LEED credit and save money as well.



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In addition, vegetated roofs are often one of the first suggestions to be made when it comes to sustainability and can serve as a natural habitat for insects, animals and birds. This, however, tends to conflict with the desire to keep creatures away from a food and beverage facility through proper construction and detailing. Therefore, it is improbable that this would be a feasible alternative for a sustainable site credit with LEED.

Wall Panels

In many facilities, the use of foam-insulated metal wall panels for exterior and interior walls is becoming much more commonplace because of their cost-effective, clean and durable design. In most cases, the metal used in these insulated panels is made from steel. Because most steel today contains some recycled content, wall panels made with steel may be considered sustainable. (Note that LEED points may also be gained for this use. The value of recycled material is computed and compared to a certain percentage of the facility. If that percentage is met and/or exceeded, LEED points may be achieved.)

Foam-insulated metal panels also offer a variety of other benefits. They:

- Are lightweight, strong and can span greater distances between steel supports, keeping the building weight down. This in turn reduces foundation and structural steel costs and quantities, which is an environmentally friendly way of reducing the need for raw materials.
- Can be erected quickly, reducing schedule impacts and labor costs.
- Offer insulation values that far exceed the values of other typical wall construction, thus reducing the heat and cooling load impacts on the HVAC equipment systems, helping minimize their size.
- Come in a variety of colors and finishes on galvanized steel, stainless steel and with anti-microbial coatings.
- May have steel faces, which can be up to 100% recyclable. (One manufacturer indicates that their galvanized steel faces are 23% to 26% post-consumer and industrial-recycled content. They also indicate that their panels and sealing tapes contain no Volatile Organic Compounds (VOCs).) In addition, existing panels can be disassembled, moved and reused – a key tenet for sustainability.
- Are manufactured in plants around the country, reducing transportation needs and costs.
- Can often be installed over existing construction with little or no additional support required, thus saving the integrity and reuse of more of the existing facility.

All of these factors can help contribute to LEED credits, but also greater sustainability in general.

Paints and Coatings, Adhesives and Sealants

Cleanability and durability are again the name of the game when it comes to coating and sealing surfaces within a food and beverage facility.

However, coatings and sealants can have a high environmental impact depending on the formulation. Achieving sustainability requires selecting products that have low levels of VOCs. This is not nearly as difficult in office and welfare-type spaces where the selection of finishes is more in line with the wide selection of sustainable products now available for office and commercial facilities. Field-applied paints and coatings are typically not recommended in processing spaces due to the risk of peeling, flaking, and contaminating product, but if used in industrial production facility spaces, where higher-grade, solvent-based, more durable products have been the norm for years, it can be more difficult – but not impossible – to achieve. Perhaps surprisingly, companies that have established, long-standing standards for coatings and sealant standards may already be incorporating low VOC coatings and sealants in the mix.



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Take, for example, the case of one Hixson food processing client. Over the years, the company performed significant research on and tested coatings and sealants and developed a list of product standards that met their goals for durability, chemical-resistance and performance. When the idea of sustainability and LEED certification was first considered, the company was not certain that these same coatings and sealants would be considered LEED-compliant or even sustainable. After a thorough review from Hixson, we discovered that indeed, most of the coatings and sealants already in the company's standards also met sustainability goals. After contact with the local product representative, an alternative system for one non-compliant paint system was recommended and steps are in place to test this new system in the plant environment to verify it will meet their performance requirements.

One key caution: Be sure VOC-compliance requirements are specified throughout all work, including plumbing, fire protection, HVAC, electrical, etc. Doing so will help avoid the risk of losing LEED points and incurring additional costs to replace non-compliant products with ones that are compliant.

Flooring

Flooring may pose one of the bigger challenges to meeting compliance requirements for attaining some LEED credits. The need for durable, chemical-resistant, cleanable floor systems such as brick, tile and resinous monolithic coatings have resulted in system components that are less likely to conform to LEED requirements. To receive LEED points for Paints & Coatings and Adhesives & Sealants, all products used under these categories must meet VOC-compliance requirements. Facilities need to verify whether the use of their standard adhesive mortars and grouts in chemical-resistant brick and tile flooring systems or the use of standard resinous flooring systems will prohibit compliance with these VOC limitations.

At the same time, many manufacturers of resinous flooring systems now offer LEED-compliant systems and at least a few compliant mortars and grouts are available for use in brick and tile systems. While this, perhaps, means trying some less familiar systems and products, this fact will need to be weighed against the potential to gain LEED points, if obtaining points is critical. The performance and history of these new systems and products should be evaluated to determine whether they will meet facility requirements and to understand what, if anything, is being sacrificed. As more and more compliant products continue to be developed, make sure to review these issues with the architect and product manufacturer before purchasing flooring.

First Step to Sustainability: Know What You Have

It is advisable that companies must determine a level of sustainable design that is appropriate for the organization, taking into account factors such as company goals, desired financial payback and more. From there, the whole facility should be considered, with a baseline of the standards that would typically be followed established. This baseline would then be improved upon, as budget and time allowed, to meet the level of sustainability desired. As mentioned earlier, initiatives driven through other disciplines such as those in engineering should also be part of any sustainability goal to create a comprehensive approach to the design.

Finally, if LEED certification is a goal for the facility, it must be attempted during future construction projects – past sustainability initiatives will not necessarily count. However, if your company wants to know its current level of sustainability, it is possible to go back and assess how many LEED points may have been earned without even trying. This assessment can provide a feel-good level of knowledge that the facility is making some progress on the path to sustainability – progress that was made without significant effort, budget, time or resources devoted specifically to sustainability initiatives.

