Going LEED at Boardroom Spirits Distillery

This is the first article of a three-part series that will outline and highlight sustainable design, engineering, and building practices that can be applied in the distilled spirits industry. The scope of this series will focus primarily on the Boardroom Spirits expansion to the tasting room space and the existing production space. This article will provide an overview of the project, describe the project site, and define what achieving a LEED Certification means. Part two will provide detailed guidelines to achieve a LEED Certification for a tasting room and distillery production floor and the final installment will focus on outdoor green practices.

Boardroom Spirits is a family owned distillery located in Lansdale, PA and is led by the husband and wife duo of Marat Mamedov and Zsuzsa Palotas, as well as Marat’s brother Vlad. The distillery opened in February 2016, and quickly gained popularity. As a result, the Boardroom Spirits team determined it was necessary to upgrade production capacity as well as the hospitality experience of their current space to a connected, neighboring building. The distillery currently utilizes practices that reduce the impact on the environment with bottle recycling programs and repurposing byproducts of distillation such as spent grain or fruit scraps for livestock feed or compost and repurposing the heads of the distillation process as cleaner. With this expansion project, the owners wanted to extend green practices to the construction of the tasting room as well as capitalize on opportunities to repurpose and reuse the energy and water loss that occurs through the production process. Beyond installing green practices at Boardroom Spirits, the owners wanted to create a simple and standard template for other distilleries that want to apply similar practices with a path to become LEED Certified while reducing the overall impact on the environment. To achieve this goal, Boardroom Spirits distillery partnered up with Drexel University in Philadelphia, PA.

HISTORY OF BOARDROOM SPIRITS DISTILLERY

Distillery and New Tasting Room

Boardroom Spirits currently operated in a 3,225 square foot facility. This space is broken down into office and lab (600 sq. ft.), tasting room (400 sq. ft), manufacturing floor (1,625 sq. ft), and barrel room (600 sq. ft). The new building will provide an additional 2,300 square feet of developed space to help in the everyday activities of the distillery as the space will include a larger bar, seating areas and will house the bottling equipment. The expansion will provide a space that incorporates local materials and energy efficient fixtures. The distillery is the building on the right while the tasting room is the building in the foreground of the below image. Further, Boardroom Spirits is currently upgrading their production still and installing equipment to run a more energy efficient operation.
Sustainability

The purpose for this project is to apply sustainable design methods to the expansion of the Boardroom Spirits Distillery tasting room and distilling process. Sustainability is the physical development and institutional operating practices that meet the needs of users without compromising the ability of future generations to meet their own needs, particularly regarding the use and waste of natural resources. Within this framework, the team would create a comfortable, modern tasting room while staying within the owner’s budget.

To accomplish this goal, a classification system known as Leadership in Energy and Environmental Design or LEED would be used. LEED is a global rating system that was created by the United States Green Building Council (USGBC) that evaluates the environmental performance of a building and encourages market transformation towards sustainable design. Sustainable buildings, according to the USGBC refers to “places that are environmentally responsible, healthful, just, equitable, and profitable.” The most important concept of sustainability for the USGBC is the concept of the “triple bottom line” or measured success through environmental, economic, and social dimensions. LEED has been a leader in sustainable design and construction in the United States and is one of the driving principles of this project.

Why LEED?

LEED offers the springboard for the expansion and renovation projects to become sustainable and green. By following the guidelines and exceeding the baselines established by the USGBC, Boardroom Spirits would implement features that would achieve the triple bottom line. Green technologies and programs would show the community the minimal impact that the buildings would have on their ecosystems and local environment. Proving their significant energy reductions could inspire local businesses to choose the LEED route. This type of community impact is part of the goal of LEED and could create a chain reaction throughout the town. With the distillery going towards LEED Certification, it would have a reduction of the impact on the environment. LED light fixtures, energy efficient HVAC systems, and green materials such as recycled wood and metals are important examples of green design and engineering practices for the new tasting room that will be discussed further in the article. After these implementations, Boardroom Spirits would see an energy reduction of nearly 25% and with that reduction, significantly lower utility costs.

Project Specific LEED

The project team had discussed several options to achieve a LEED v4 Core and Shell Certification, the most recent certification standard offered by LEED. First and foremost, to receive a LEED Certification, the project must meet all LEED requirements and then successfully complete corresponding credits. Each credit is assessed a numerical value and is sectioned under a specific credit category. An example of this would be the credit Indoor Water Use Reduction for a maximum of 6 points in the Water Efficiency credit category. With 12 prerequisite credits and 50 regular credits, the project must obtain at least 40 credits to become LEED Certified. The goal for this project is LEED Silver which is between 50-59 credits.

As of now, through preliminary calculations, the project is looking to have 34 points. Although this is not at the level for certification, it bodes well for more in-depth calculations to determine a more accurate depiction of the final point tally. The preliminary analysis looked at the location of the site including the land it’s on, access to quality transit as well as the surrounding density and diverse uses of the area. These credits wouldn’t change during the project so they can be calculated in the preliminary report.

CORE SUSTAINABLE FEATURES

The expansion to a new tasting room space offers a blank slate to implement sustainable features across different trades (electrical, plumbing, carpentry, etc.). The following section briefly describes these types of features and the energy savings that can be realized.
**Water Efficient Fixtures**

The additional space and existing distillery would install low-flow water fixtures and water closets that would reduce annual water usage. To receive points for indoor water use reduction, Water Efficiency Credit 4, distilleries should select toilets and sinks that use less water per use. Instead of 1.60 gallons per flush, energy efficient toilets would use 1.28 gallons per flush saving 4,000+ gallons of water annually. This is based off of the amount of employees (full-time equivalents) and visitors to the distillery as well as the percent of occupants projected to use the fixture. Other changes include switching bathroom and kitchen faucets to use less water per use as well as using Energy Star labeled appliances and devices. A dishwasher, which is a staple in any bar, would use less water per load while maintaining performance. The switch from a standard dishwasher to an Energy Star dishwasher saves nearly 5,000 gallons of water a year by itself based off of estimations of bar areas from the Environmental Protection Agency. These minor adjustments result in savings after a few months in service and can have a serious impacts to operating costs in areas with high water usage rates as well as on the environment.

**Sustainable Materials**

The new tasting room and existing building would be retrofitted with sustainable materials. These materials would be locally sourced and labeled as environmentally friendly according to Energy Star and the Environmental Protection Agency (EPA). To be considered environmentally friendly materials, the products used in construction must be made from recycled materials, created from natural resources, or be easily recycled products.

In addition to using sustainable materials, LEED evaluates the distance it takes for the product to reach the project site. A longer distance forces the truck, plane or barge to consume more fossil fuels. Reducing this distance lowers the emissions and improves the LEED score. According to the EPA, transportation and deliveries account for nearly 27% of all greenhouse gas emissions, a measure that quantifies impact on the environment.

For this project, the tasting room would aim for a modern, rustic influenced look. For instance, the bar top combines stone with a metallic finish. This combination of materials is a representation of the detail that went in the design of the new expansion. Most of the materials used in the project would be from recycled materials and sourced from within 100 miles of the project site.

For example, Manayunk Timber is an urban sawmill that specializes in locally sourced logs and reclaimed wood. According to a journal published in Pergamon from 2000, when local materials are utilized the energy used in the building process decreases by 215% and the energy used in transportation decreases by over 450%. To the right is an example of how recycled wood add a unique touch to a space!

![Image of sustainable materials](image)

**Efficient MEP Systems**

To accommodate the production expansion of Boardroom Spirits, a 528 Gallon (2,000 Liter) still will replace the existing 119 Gallon (450 Liter) still. Further, a new Trane chiller as well as two Sondex plate and frame heat exchangers would be installed to properly maintain a constant temperature of the water used to cool the reflux column and condenser during the distilling process. This will allow for the closed loop system to utilize the water used to cool the stills in order to optimize the energy usage by the building. The goal of redesigning the mechanical system is to allow the energy output to equal or exceed the energy being generated by the system. A cooling tower is being installed to capture and condition water to feed the distilling process which completes the closed system. The heat discharged from the distilling process can be utilized to supply hot water to fixtures or
can be sent to the new heat exchanger, ultimately lowering the energy usage. The unit below is an example of a cooling tower which can transfer heat energy to other systems in the building such as hydronic floor heating. Heating and cooling systems would be energy star certified, ensuring savings to energy and cost without sacrifices in performance.

**Site Location**

Boardroom Spirits is located in an industrial complex near a residential neighborhood in Lansdale, PA. The site yields sustainability opportunities as it is located a quarter-mile from the SEPTA Regional Rail Lansdale Train Station and is in a densely populated area. Lansdale is a suburb of Philadelphia with an estimated population of 16,500 people. LEED gives credits to projects if the site is close to mass public transportation and meet certain density thresholds. This is quantified by analyzing the types of buildings and infrastructure in the ½ mile radius from the site. Therefore, points were already achieved solely based on the site’s advantageous location.

**Greywater Reuse from Distilling Process**

The major sustainable implementation of the project would be to reuse the greywater from the distilling process. This would significantly reduce the load to the drainage system and annual utility demands needed for the distilling process. Boardroom Spirits uses a reflux column still and as a result requires a large amount of water to cool both the reflux column and the condenser to make different types of spirits. Further, water is used to clean additional equipment such as fermentation tanks, storage tanks, etc. The water that is used is subject to minimal contamination because of the stainless-steel cooling elements. The water is then run through a filter and then reused throughout the facility. At the capacity that Boardroom Spirits produces spirits, this proves to be a major waste of energy and an operating cost. For example, a 119 gallon (450 liter) still could run anywhere from 30-125 gallons per hour of cooling through the reflux columns, depending on the product and how aggressively the distiller is cooling the column. This does not factor in the flow rate of cooling for the condenser during the distillation. A 4-10 hour distillation can result in significant operating costs for distilleries operating in locations where water is expensive due to local rules and regulations.

Instead of wasting the water and dumping it, the greywater can be used for different systems around the distillery. The captured greywater would be used for surrounding irrigation for landscape, water fixtures or with proper conditioning, for a geothermal heating system to heat the space in the cooler months. The Drexel Team is in the middle of conducting analyses to determine the most cost and energy efficient option for the expansion project. The reuse of wastewater is a key component of the sustainable goal and LEED certification. The Boardroom Spirits expansion lends itself to this type of sustainable design with the vision and ambition of the owner.

**IMPLEMENTATION CHALLENGES**

There are certain limitations that exist because of both the site of the project and size of the space allocated. Boardroom Spirits is in the residential area of Lansdale. Because of the business’ proximity to residents, there are certain civil ordinances that need to be abided to. These things can include noise pollution, unwanted traffic, and digging. The project must be designed and constructed with community’s wellbeing in mind because these people are the patrons that help support Boardroom Spirits. Because the project is a renovation of an existing space, there is a space confinement. Designer and engineers are forced to work within the four walls of the space, thus restricting the different types of design concepts that can be implemented.

**THE FUTURE OF LEED IN DISTILLING**

Due to the low amount of exposure to distilleries in the United States, the market for LEED distilleries is relatively untapped. Thus, drafting a guide that explains the positive ideals that correspond to designing with the society and planet in mind can help your
company organically achieve a gradual profit. Incorporating a closed loop will create a system which is driven by renewable resources. Lowering the energy output will reduce the strain on the energy grid during peak hours and will help foster a sustainable environment for generations to come. As a rising market, there has been a higher demand for distilleries to create an achievable precedent for future businesses to grow sustainably.

Since the distilling industry is relatively new to green design, previously developed sustainable technologies can be integrated inside various facilities. Examples of these technologies include but aren’t limited to geothermal heating, radiant flooring, passive cooling, green stormwater management systems and solar panels. Including these technologies will also yield a future profit for the companies due to the reduction of resources. By creating a closed loop system, energy will be conserved and reused throughout the manufacturing area and new expansion for Boardroom Spirits.

INSPIRATION

While the Drexel team was researching sustainable design, we discovered that green design isn’t a groundbreaking concept for distilleries. Big Spring Spirits is located in Bellefonte, PA recently became the second distillery in the United States to achieve a LEED certification through a combination of site location and recycling of greywater. For example, by working in a closed looped system, they were able to reuse the heating energy from the distilling process and put it back into their building. This design is what inspired the team to consider hydronic floor heating options to reuse wasted energy from the distilling process. Big Spring Spirits integrated a HVAC system that enhanced the energy saving of the tenant space to perform 30% better than the ASHRAE standard 90.1. Strategies were included that reduced the water usage by the tenants by 30%, not including the irrigation methods for the outdoor garden.

Sustainable design yields many advantages; the buildings use less energy which in turn cost less to operate. Sustainable buildings have the possibility to earn tax benefits as well. According to the new tax laws businesses can get up to 30% tax credit if they were implement alternative energy sources such as solar and wind power. Section 179D, also known as the Energy Efficient Commercial Deduction, rewards businesses for going green and incorporating things high efficiency HVAC systems and tightening up building envelopes. It is estimated that businesses can get up to $1.80 per square foot reduction if the building can achieve an energy reduction of 50% or more.

The lingering question still standing is why do more distilleries build to be LEED certified? Or why isn’t green design more popular in the industry? The upcoming articles will address the various challenges companies face while achieving LEED certification. Being able to perform adequate cost analyses to provide a realistic payback period for a company is important to sway the owner to use sustainable design.

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