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 ENVS 664
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LEED PROJECT: GENZYME CENTER

Project Overview

"Rather than being satisfied with today's achievements, we [Genzyme] push on, always driven to do more and do better" ¹.

Stated as one of Genzyme Corporation's core values, the concept of **Innovation** is embraced and expressed not only through their life-saving, life-improving products but in the environment they conduct their work and research as well.

"Dedicated to making a major positive impact on the lives of people" ², it was only common sense for this international biotechnology and pharmaceutical company to "go green" with the construction of their newly relocated headquarters. Standing as leaders who strive to improve the quality of life for people, sustainability in the design of their new building, the Genzyme Center, was unquestionable.

Located in Kendall Square, an area in Cambridge, Massachusetts populated with thriving restaurants and biotechnology and information technology firms, the Genzyme Center occupies a city footprint area of 42,00 square feet on a 10 acre property site ³. With 12 stories, this 350,000 sq



Figure 1: Strategic location of the Genzyme Center in Cambridge, MA

¹ The Genzyme Corporation. Copyright 2002-2005.

² Ibid.

³ "Genzyme Center." The American Institute of Architecture. 2005. www.aiatopten.org.

Source: www.local.live.com

ft building is intentionally situated in a location where it is framed by the Charles River, the East Cambridge neighborhood, and MIT's campus in the South (Figure 1).

With the collaboration of architect company *Behnisch, Behnisch and Partner*, developer *Lyme Properties, LLC*, and Genzyme representatives, the Genzyme Center is not only the first LEED certified buildings of this scale in the United States and the world's largest Platinum LEED rated building⁴, but the building has additionally won numerous awards in recognition of its sustainability including AIA/COTE Top Ten Green Projects Award, NESEA Green Building Award, Environmental Design & Construction Magazine Excellence in Design Award, and Architectural Review MIPIM Future Projects Award.

LEED Categories

Sustainable Site -

Because it met several environmental goals of the LEED credit system, Kendall Square made for an excellent building location. Situated in a dense, urban environment, the Genzyme Center is constructed over a former contaminated industrial, brownfield site, earning the building 2 points in the rating system.

Encouraging the use of public transportation, the site is within half a mile from the MBTA (Massachusetts Bay Transportation Authority) transit stop. Making other smart transportation initiatives, the company also subsidizes public



Figure 2: The Genzyme Center is located in a high density, urban environment.

⁴ U.S. Green Buildings Council. Copyright 2003. www.usgbc.org.

transportation passes for all employees, owns 4 hybrid fuel company vehicles, and provides 40 preferred carpool parking spaces featured in the underground parking garage. These simple strategies aid in the decrease of vehicles on the road, promotes public transportation, and are environmentally beneficial, reducing emissions and issues with runoff.

Indoor Environmental Quality -

The concept of the Genzyme Center was based upon the notion of creating a self-sustaining environment where humans and nature could harmoniously coexist. Understanding the relationship and cycle of the sun, vegetation, and humans in the exchange of energy and air helped to develop a successful “climate oasis” in the building (Figure 3). Rather than solely relying on mechanical systems, this concept is passive and utilizes renewable energy sources, such as the sun, which ultimately save in energy costs.

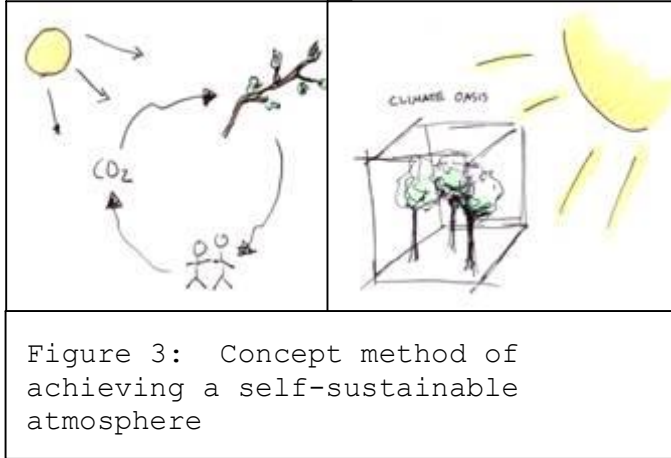
To further enhance the indoor quality, “all paints, sealants, carpets, and composite woods meet standards for volatile organic carbon emissions”⁵. As a result, the amount of pollutants and emitted fumes are reduced in the atmosphere, which is monitored by a series of CO₂ and humidity sensors throughout the building to gauge comfort levels. There are certain health benefits to this especially to those individuals who experience allergy problems as well as the opportunity to boost employee productivity because of the optimum working environment.



Figure 4: Moisture sensors placed in the gardens to detect water levels

Source: www.genzyme.com

⁵ Murphy, Jack. Cambridge Community Develop



Water Efficiency --

Overall, the building uses 34% less water than comparable buildings ⁶. To achieve this, a variety of water-saving technologies were integrated into the building. One of the approaches include an

irrigation system that utilizes collected rainwater from the rooftop that is used for the cooling system and/or recycled back onto the rooftop to water the greenroof vegetation when precipitation levels are low. As for the interior space, sensors in the landscape gardens have been placed in the soil throughout the Genzyme Center to monitor moisture levels (Figure 4). This way, unnecessary plant watering can be voided.

In the bathroom, dual flush toilets and waterless urinals are installed. Though innovative and water efficient, some are skeptical of the waterless urinals, questioning the sanitation and cleaning process of this device. On the contrary, 'Because urine is essentially soft water and does not adhere to these surfaces – and because no water is used in their operation – there are fewer deposits or stains left on the urinals, and therefore, less scrubbing is necessary compared with water-flushed urinals' ⁷. Thus, it is not any more complicated or gruesome to clean these urinals versus the manual flush handle urinals. Plus, with waterless urinals, there are savings in water costs since they do not use any water, and they do not

⁶ The Genzyme Corporation. Copyright 2002-2006. www.genzyme.com.

⁷ Gresham, Jack and Reichardt. "Working with Waterless." Cleaning & Maintenance Management. August 2006.

require the installation of water plumbing but only drainage plumbing.

Energy Efficiency -

By again integrating passive design systems, this has helped the Genzyme Center reduce their electricity costs by 38%. During construction, the orientation of the building was considered and the ultimate design was sensitive to the patterns of sun. As shown in Figure 5, an atrium was added onto the Northern side of the building. This area, because it does not receive as much sunlight as the southern side, is slightly cooler in temperature and is used as a passive space (gardens, reading area, etc). With a dual purpose, it acts as a buffer from heat loss and simultaneously serves as a chimney for convection flows. The double façade walls and operable windows on the building sides allow for natural ventilation and help to cool the building by using convectional forces that drive warm air up and out through the operable roof windows (Figure 6).

A series of unique lighting installments make it possible for 75% of all employees to have working spaces that uses



Figure 5: Orientation: The atrium (red circle) on the Northern side serves as a heat loss buffer. The orange semi circle represents the sun's path

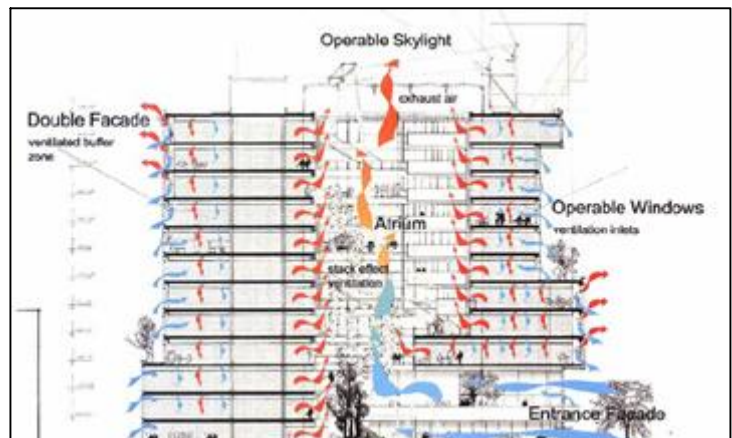


Figure 6: Source: Behnisch, Behnisch &

natural light ⁸. On the roof, heliostats, devices that follow the sun's path, reflect onto mirrors that diffuse light into the atrium. Prismatic skylights, a reflective wall, and a colossal glass-plated chandelier enhance the light, deflecting it into the building interior. Built into the façade to further control and manipulate light are automatic shading devices and lamellars placed inside the window treatment to reflect light into the office spaces.

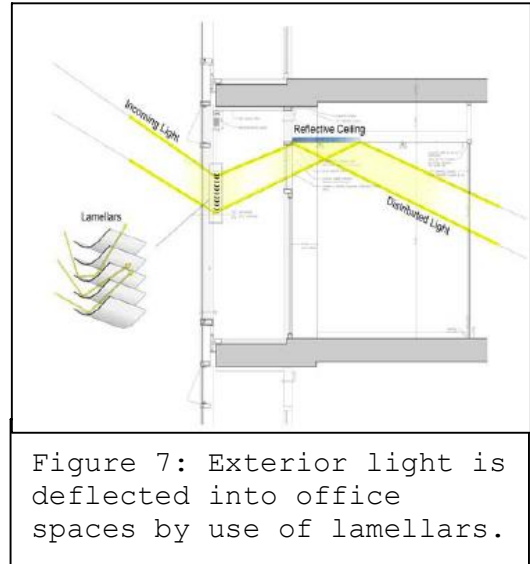


Figure 7: Exterior light is deflected into office spaces by use of lamellars.

Materials and Resources --

Supporting the local economy, over 20% of all building materials were harvested from within a couple hundred miles of the site. What others would consider as waste, Genzyme takes advantage of the waste steam produced from a nearby power plant to cool the building ⁹.

Most of the buildings materials are environmentally friendly, contain recycled materials (75%), and meet VOC emission standards. The waste generated from construction was diverted from landfills and was, in some way, shape, or form, reused for other projects.

Concluding Thoughts

The Genzyme Center is a clear example of how the combination of sustainable innovations and passive systems can create a healthier, perhaps even happier, working atmosphere for employees. Because of reasons like exposure to natural light

⁸ The Genzyme Corporation. Copyright 2002-2006. www.genzyme.com.

⁹ The Genzyme Corporation. Copyright 2002-2006. www.genzyme.com.

and comfortable temperature levels, certain psychological effects are associated with green buildings where workers appreciate the added aesthetics in their surroundings and can enjoy their work, hence increase productivity for the company.

Conversely, many people oppose the idea and/or have criticisms of LEED certified buildings. Many people with a desire to create "greener" buildings simply cannot afford the process. Though LEED buildings are said to save energy costs, many do not realize how much and how lengthy the certification process can be, which "typically adds 1 to 5 percent to the budget"¹⁰. What is meant to serve as an incentive, concurrently acts as a barrier.

Moreover, the distribution of credit system is not weighted fairly. When determining how many points each item on the LEED Rating System is worth, environmental specialists on the different categories like soil and stormwater, lobby for points¹¹. If the specialists feel their subject matter is more important, they will request that that item receive more points. However, one cannot put a price tag on nature nor can one determine the true cost/ benefit. This problem is evident, and people have and will continue to take advantage of this disparity gap between the point system. Developers, to get an "easy" checkmark on their list, will sometimes install the cheaper option for their building to gain a point. If financially pressed, they would opt to incorporate a \$300 bike rack rather than a \$300,000 rainwater management system. Clearly, there are benefits from both, but one is more

¹⁰ Schendler, Auden and Udall. "LEEDing Us Astray?" Grist Magazine. 26 October 2005.

¹¹ Srinivasan, Ravi. Board of Directors, Delaware Valley Green Building Council. Personal interview. 17 October 2006.

influential than the other, yet those two items are worth the same amount of credits.

The motive becomes increasingly blurred. Are developers constructing LEED certified buildings because they are truly concerned with the sustainability of that unit and of the greater surrounding community? Or are they erecting this mega-green structure to showcase as a trophy item so that they are justified to say, 'Yep, I built the biggest, most grandest Platinum LEED building on the planet'? Nonetheless, much "credit" can be given to the whole concept of LEED certified buildings. It has brought environmental awareness to many people once foreign to sustainable issues and even better, has encouraged people to *want* to help make a difference. LEED certification is a great step in the right direction. However, in the future, this system will have to be fine-tuned. There needs to be a better way to weigh and distribute points in the ratings system, stimulation software should be refined to better determine total energy savings, and the certification process needs to be simpler and less expensive so discrimination does not occur. With these changes and among others, we, communities and regions as a whole, are moving that much closer towards creating truly sustainable ecosystems.