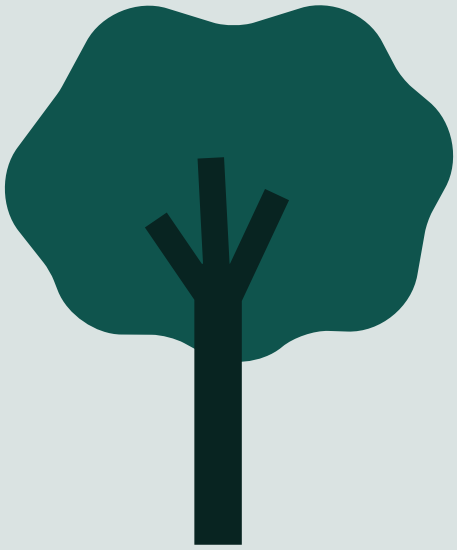
SUSTAINABILITY & GREEN BUILDING

in Commercial Construction

Litchfield Builders, Inc.

Contents

CHAPTER 1



What is Sustainability?

Sustainability is about protecting natural resources and ensuring that nature and humanity work in harmony.

Sustainable practices involve controlling the consumption of natural resources and protecting these resources for future generations. The original concerns of the Environmental Protection Agency (EPA) involved reducing pollution. The focus has expanded to preventing the pollution, controlling waste, and conserving resources.

Commercial construction projects, large or small, have long term environmental, economic, and social consequences. From the national to the state and even county level the incorporation of sustainable practices is a hot topic.

New Haven, Connecticut has a website dedicated to improving energy efficiency and the use of renewable energy for residents, businesses, and municipal projects. The city is one of the region's leaders in Leadership in Energy and Environmental Design (LEED) approved building projects. Homes and businesses can purchase clean energy through the CT Clean Energy Options site.

CHAPTER 2

Negative Effects of New Construction

Construction Waste

From metals and woods to concrete, construction waste comes in many forms. When not recycled properly, it ends up in landfills. In fact, some estimates show that construction waste accounts for several billion tons entering landfills each year.

Storm Water Runoff

Construction often redirects the flow of local bodies of water, frequently in a detrimental way. When a site is cleared for a project, erosion control becomes a concern as it drives runoff and sediment pollution.

Reversing Negative Effects

By incorporating sustainable building and energy efficient practices, the damage incurred by new construction can be mitigated.

Recycling & Reclaimed Materials

At least 50 percent of waste generated on construction sites can be recycled. By recycling you can reduce your waste removal costs, recoup funds, and ensure the availability of raw materials for future green building projects.

In Connecticut, the Department of Energy and Environmental Protection (DEEP) requires contractors to recycle corrugated cardboard; all scrap metals, along with Ni-Cd and lead acid batteries among other items. In Chapter 8, we will dive deeper into this topic.

Storm-Water Mitigation

The best way to protect local ground-water during new construction is to implement an extensive storm-water protocol.

This protocol includes:

- Employee training
- Direct employees and subcontractors
- Site preparation

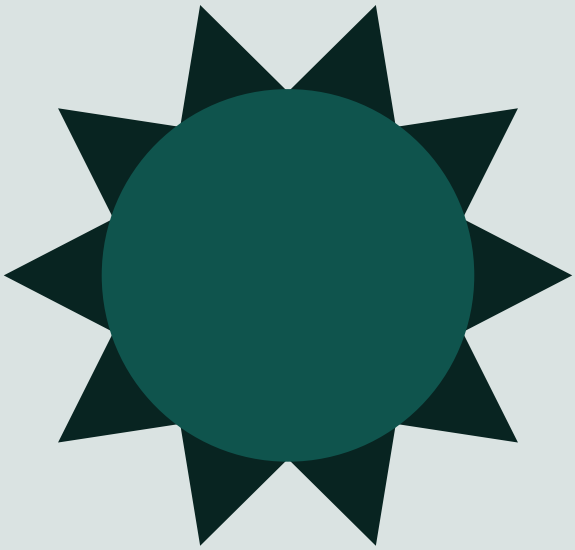
Employee training should include the identification of storm drains, swales, and creeks near the site so that no one dumps pollutants into or near them. Storm drain inlets should be covered if pollutants could runoff into them. Employees should also store all materials under cover and hazardous waste in sealed drums or covered bins for proper disposal.

Site preparation may include the digging of retention ponds and the planned redirection of storm runoff. Other considerations need to include limited removal of trees and natural flora in the area. Leaving old growth in place reduces soil erosion and helps to limit changes in storm-water runoff.

Key Takeaway

By incorporating green building practices, natural resources are conserved and harmful pollution is reduced. New construction projects that incorporate on-site energy production reduce the need for demand placed on the Energy Grid. By using all of the available technology and conservation techniques, new construction may be able to produce more energy than is needed, supplying power back for use.

CHAPTER 3



Sustainable Elements (Site Design)

Green building starts with the architectural and engineering designs. In most situations, operational efficiency and sustainability must be built in from the get-go.

Passive Solar Design

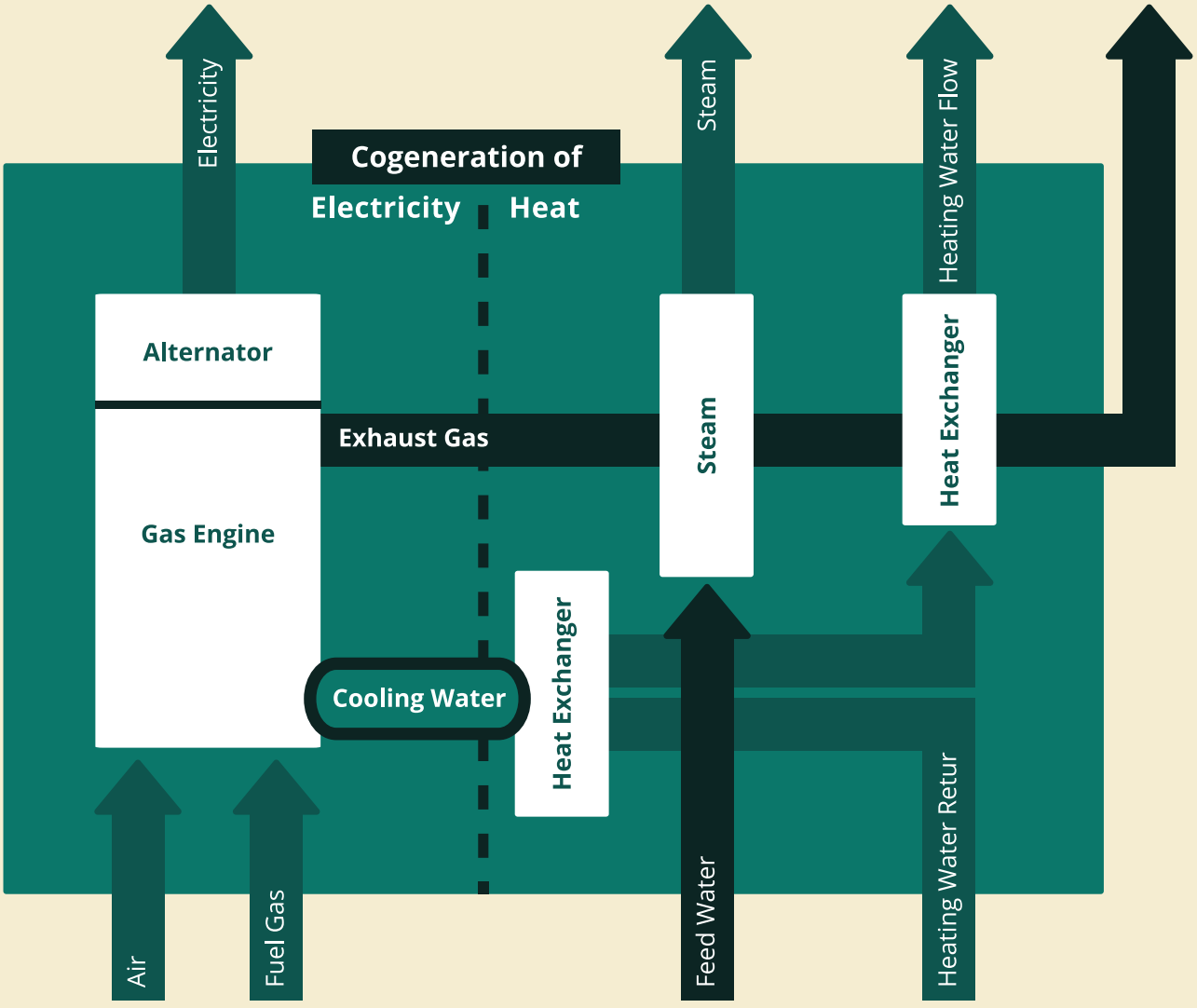
Passive Solar Designs are one of the easiest ways to incorporate sustainability into the design of a building. The cost of incorporating passive designs is normally no higher than regular construction techniques, but can significantly reduce heating, cooling and lighting costs for energy efficiency.

In Passive Solar Design the location of windows, walls, and floors are made to collect, store, and distribute heat produced by solar energy. Along with glazing and proper shading, this reduces the need for electrical lighting while balancing heat gain and loss during the extremes of summer and winter.

Solar Gain, or the increase in temperature in an area or structure that results from solar radiation, can be used for space heating and water heating systems. Solar chimneys, also known as Thermal Chimneys, can be used to increase ventilation and control solar gain.

Co-Generation

Co-Generation can be engineered into a building to obtain two energy forms from one source. The generation of electricity produces heat and instead of dispelling this heat it can be harnessed and stored in water, which can then be used for regular hot water. The heated water, flowing through flooring, can then also become a free source of space heating.



CHAPTER 4

Water and Energy Conservation

Many commercial remodeling projects today are heavily focused on water and energy conservation. Companies and owners of decades old buildings are spending thousands of dollars, if not millions of dollars to upgrade their out-of-date fixtures to contemporary standards. However, these expensive efforts can be avoided in the future by incorporating water and energy conservation from the very start.

Water Reduction

Reducing your water usage is no easy task, but with modern technology and advances, it is becoming easier, especially in the construction of commercial bathrooms.

Waterless urinals are an increasingly popular option in commercial bathroom construction and represent the best of all modern green building practices. As stated in a recent article in the Washington Post, M&T Bank Stadium reduced water usage by 43% after installing waterless urinals in its restrooms, while the Bank of America tower now saves over 3 million gallons per year because of theirs.

In addition to waterless urinals, touch-less bathrooms that run on sensors can help reduce waste by controlling the length of the paper towels, the amount of water used or soap dispensed, and the number of times a toilet is flushed, amongst other things. Thanks to these sensors, water spigots cannot be left on to run indefinitely, and paper towel dispensers are less likely to be used wastefully.

Climate change projections predict that water collection will become increasingly difficult in the years to come, but waterless and automated fixtures of this kind certainly help lessen the strain.

Conserving Energy

Net Zero Energy Building is construction with the goal of energy efficiency. By definition it is construction that does not use more energy than the renewable energy that is created.

Energy Plus Construction actually produces more energy than is needed, allowing the building to supply energy back. This excess energy usually makes its way back to the Energy Grid, which may be used as a source of back-up energy or energy storage. In addition to producing energy, Energy Plus Buildings use highly efficient lighting and HVAC systems.

Lighting

Lighting makes up a significant portion of operational costs for businesses and homes and lighting regulations are revisited fairly regularly.

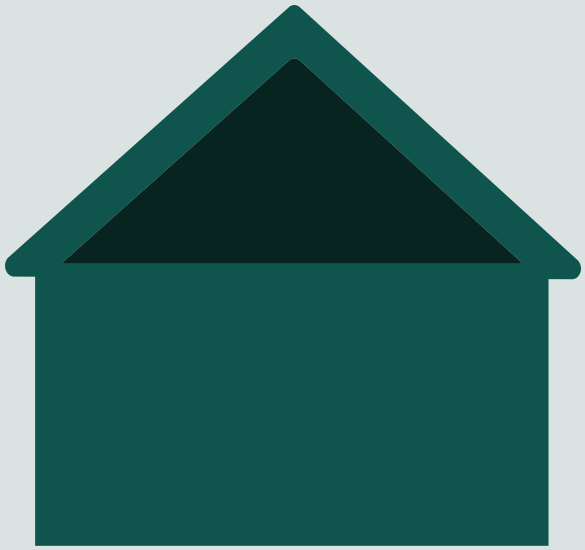
For example, the manufacturing of the traditional incandescent bulbs is being phased out. The regulations do allow for future production of incandescent lighting, but only if the bulbs are able to meet efficiency guidelines.

Compact Fluorescent Lamps (CFL) and Light Emitting Diode (LED) already meet these standards and advancements in the technology have reduced the purchasing costs and increased usefulness of these alternatives.

CFL bulbs use 50-80% less energy than a comparable incandescent bulb. An LED fixture consumes up to 80% less electricity. These bulbs do not produce the heat generated by incandescent, which can become significant in larger operations.

Advances in CFL and LED lighting include three-way bulbs and warm or cool lighting. CFL and LED bulbs also last significantly longer than incandescent versions. The initial cost of the bulbs is more than made up for with energy savings. In addition, the maintenance cost of bulb replacement is also reduced.

CHAPTER 5



Roofing

Even the materials used in roofing can be selected for durability and energy savings.

Sun-reflective materials can provide energy savings, but these materials must be used in the correct environment. In southern climates, a white or reflective roof coating will contribute to energy efficiency with the need for less cooling.

A Stanford University study shows that while reflective coating may be useful in helping cool on a local basis, it may contribute to a net increase in global temperature. Darker roofing materials also reduce the potential for ice dams in colder climates. The building location must be considered to determine the best choice in roofing materials.

CHAPTER 6

Renewable Materials

The materials from which your building are constructed can be an easy aspect to overlook, but a very important one not to. It is important to incorporate renewable materials, or materials that can easily or naturally be replenished, as frequently as possible.

“Renewable materials” may also include items that are available locally, reducing transportation costs, and durable materials that have a long life expectancy. Stone or granite, recycled or found locally, is an excellent example of a sustainable material.

“Upcycling,” or the repurposing of old and reclaimed materials, is another popular green building practice that should be implemented during new construction. It is not uncommon for contractors and carpenters to rework wooden furniture into cabinets, trim, or flooring or to repurpose old metal in industrial settings. Bamboo and cork can also be reused in this manner.

CHAPTER 7

The Future of Sustainability and Green Building Practices

The Global Green Initiative shows no signs of slowing down. In fact, The U.S. Green Building Council (USGBC) and LEED encourage the movement by offering incentives to businesses and commercial construction projects that use resource-conserving technology.
In addition to energy and water, Green building techniques save money with lower overall operating costs. By 2010, green construction practices reduced construction waste by close to 25 million tons. This reduction is expected to reach 800 million tons of total waste reduction by 2030. Productivity benefits were estimated to be $230 to $450 million by 2010. These numbers are expected to increase significantly as technology and green building construction increases.

Trusted commercial construction contractors like Litchfield Builders have the experience and skill to implement green building practices and keep your business compliant and up-to-date with modern standards.

Litchfield Builders is the choice commercial construction company in New Haven, Connecticut and the surrounding areas. Thriving for over two decades, the company has won numerous awards for their sustainable practices and green projects with some of the areas most prominent organizations

For a custom estimate or guidance on your next commercial project, please contact us.

LitchfieldBuilders.com