



WEST MICHIGAN

THE BUSINESS CASE FOR  
**GREEN  
BUILDING**

WHY SUSTAINABLE DESIGN IS THE **FUTURE** OF MICHIGAN

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## ABOUT U.S. GREEN BUILDING COUNCIL OF WEST MICHIGAN

The U.S. Green Building Council of West Michigan (USGBC-WM)'s mission is to transform the way buildings and communities are designed, built and operated, in a way that improves the quality of life in West Michigan. We do this with our programs such as Michigan Battle of the Buildings, the Grand Rapids 2030 District, and the Energy Assistance Program as well as advocacy for green building certifications and the promotion of sustainable design in our community.

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*[Green buildings] provide some of the most effective means to achieving a range of global goals, such as addressing climate change, creating sustainable and thriving communities, and driving economic growth.*

**~ World Green Building Council**



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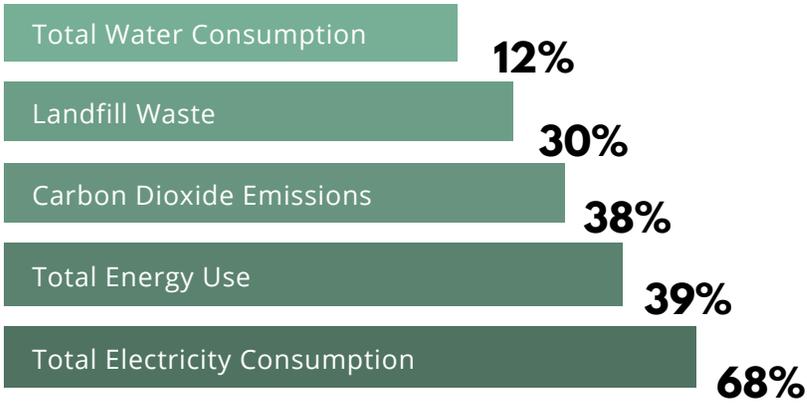


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# INTRODUCTION

According to Green Built Alliance, green building, or sustainable design, is the practice of increasing the efficiency with which buildings and their sites use energy, water, and materials, and of reducing impacts on human health and the environment for the entire lifecycle of a building. Green-building concepts extend beyond the walls of buildings and include site planning, community and land-use planning issues as well.

## IN THE UNITED STATES, BUILDINGS ACCOUNT FOR:



The building sector has a large influence on human, environmental, and economic health. If we start to think about the way we build, operate, and live in buildings, we can create more vibrant communities. Through tools and resources found in this guide, one will be able to make the case for green building design and construction.

Financing green projects can seem like a barrier, however, in this guide it will discuss the many financial benefits of sustainable design. There are also financial incentives for certified projects through local, state, and federal channels. To learn more about these incentives, please visit [www.usgbcwm.org](http://www.usgbcwm.org).

## TOP THREE BENEFITS OF GREEN BUILDING:



*Reductions in energy consumption, greenhouse gas emissions and air pollutants*



*Improvements to occupant wellbeing, satisfaction and productivity*



*Strong financial returns for the companied owning or occupying these buildings*

## TOP TRIGGERS DRIVING FUTURE GREEN BUILDING ACTIVITY IN UNITED STATES IN 2018

- Client Demands (44%)
- Environmental Regulations (28%)
- Right Thing to Do (28%)
- Healthier Buildings (32%)
- Market Transformation (12%)
- Lower Operating Costs (24%)



## TOP SOCIAL REASONS FOR BUILDING GREEN GLOBALLY IN 2018

- Promotes Improved Occupant Health and Well-Being
- Encourages Sustainable Business Practices
- Increases Worker Productivity
- Creates a Sense of Community
- Supports the Domestic Economy



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# LONGEVITY AND LIFECYCLE COST

How much do green buildings cost? That is something that many of us ask, however, there is not one answer to that question. Prices of buildings vary from project to project, but many experts are all in agreement that green buildings don't have to break a budget.

In an in-depth study of 22 United States federal buildings that were considered "green", showed that on average the buildings outperformed traditional buildings when comparing building performance data. The buildings used less energy, water, and maintenance while emitting less CO2 and having more occupant satisfaction than conventional buildings.

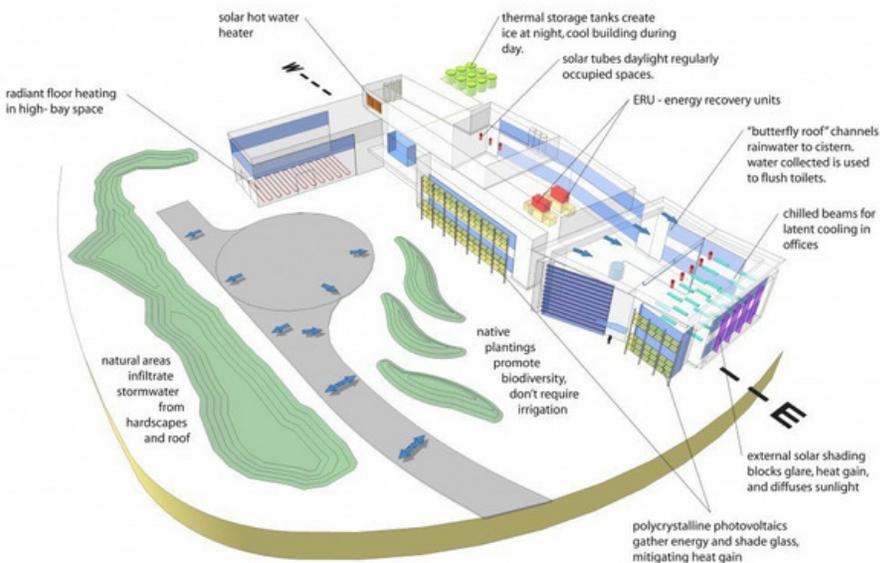
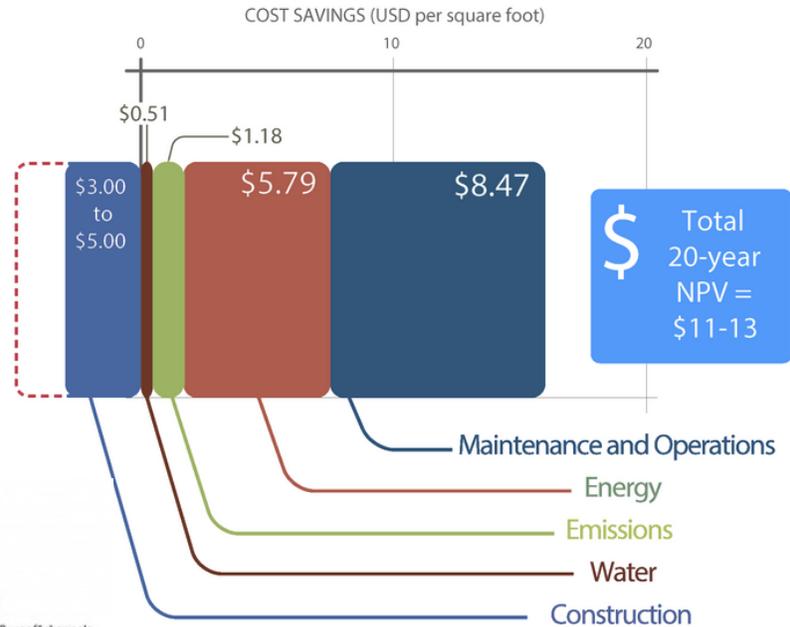


Diagram of Advanced Energy Center, Stone Brook University retrieved from "Green Building and Climate Resilience: Understanding Impacts and Preparing for Changing Conditions"

Adapted from the 2013 World Green Building Council's "Business Case for Green Building Report"

From a life-cycle standpoint, the longer-lasting building's higher economic and environmental costs can usually be justified by its durability. Durability and longevity are aspects that have fallen to the wayside in conventional building. Green buildings are being built to last more than 100 years instead of the typical 50 years we are seeing in common building methods.

"I went from thinking the whole idea of green building was a boutique issue to seeing how it is the leading driver of change. Durability and energy efficiency are the cornerstones of sustainability."

~ Joe Lstiburek, Ph.D, President of Building Science Corporation



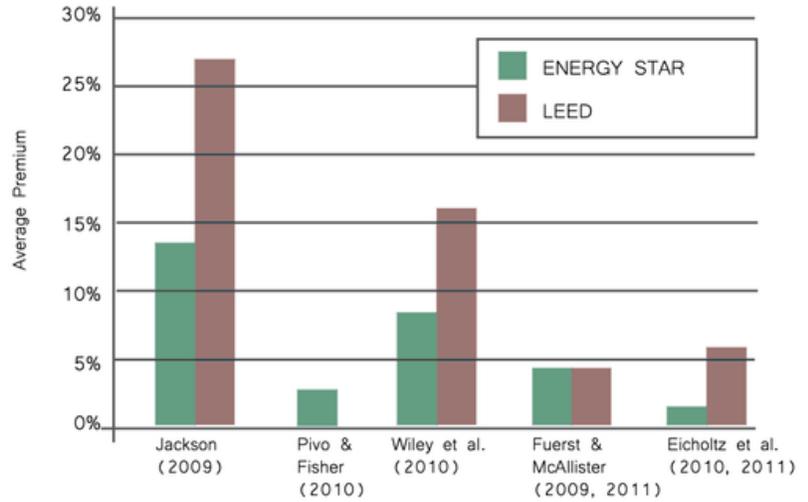
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# PROPERTY & RENTAL VALUE

In many markets, rental premiums are emerging in green buildings as many of today's best tenants are increasingly willing to pay a premium for green spaces. Leasing green space for many, means a way to demonstrate sustainability, attracting the best employees, and improved productivity. In the figure pictured to the right, it shows the rental premiums of commercial buildings in the U.S.

According to findings by the World Green Building Council, a building's asset value increases the greener and healthier it is. For example, Delta Development Group did so well at designing their building that their tenant, Plantronics, elected to buy the building and provided a valuable return for the developer. In Hong Kong, Henderson Land Development created a highly desirable mixed-use community where green certified properties have a 40% higher resale value compared to similar developments.

RENTAL PREMIUMS OF GREEN COMMERCIAL BUILDINGS IN THE U.S.



The most straightforward value of owning a green building is lower utility bills - realized from steadily improving energy codes, green certification requirements like LEED and EnergyStar, and well-executed retrofits. The figure to the left shows how energy savings create value by increasing Net Operating Income (NOI) in commercial buildings.

Operational savings on maintenance and reserves may also provide value. Building owners can have lower operational costs by installing more durable, long-lasting components in a building, such as a high-efficiency furnace or LED lighting.

ENERGY SAVINGS CREATE VALUE BY INCREASING NOI: COMMERCIAL BUILDINGS

Energy Saved (%)	Savings per Square Foot	Value per Square Foot
Baseline	-	-
5%	\$0.13	\$1.56
10%	\$0.25	\$3.13
15%	\$0.38	\$4.69
25%	\$0.63	\$7.81

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# HEALTH & PRODUCTIVITY

**Out of every cost driver for buildings, Employees cost the most at 89%**



Employee cost is 89% of the total building costs and it is roughly 10 times the property related costs

We as humans spend 80-90% of our time in buildings. Because of this, indoor environmental quality (IEQ) is an important building feature. Air quality, ventilation, temperature control, natural lighting, and office furnishings/material quality are some of the building aspects that affect IEQ. Employee discomfort is a direct impact on the work area, which could be symptoms like allergies, sneezing, drowsiness, feeling tired, etc. These symptoms can be caused by low IEQ.



**\$900,000** USD =

Annual energy savings for Akron Childrens Hospital (LEED Gold - NC) completed **\$44k** under budget from reduced staff turnover, absenteeism and presenteeism

Companies can save money by occupying a green building with features that benefit people. A report done by the World Green Building Council in 2018 shows companies realizing economic savings both from resource-efficient building design and operation, and from reduced staff turnover, absenteeism and presenteeism – defined as when an employee is physically present but not working productively. For example, the Akron Children’s Hospital project by HKS achieved over \$900,000 USD of annual energy savings for the owner; while Cundall’s UK office helped them realize over £200,000 in savings a year from lower staff turnover and sickness.



**94.5%**

Staff satisfaction at Floth's zero net carbon (znc) office



**72%**

Of Floth employees that reported better health

Employees prefer green buildings that make them feel healthier and more productive. Every case study here features pre- and post-occupancy surveys showing employees are happier in their new green space. For example, Floth’s net zero carbon office resulted in 94.5% staff satisfaction and better health was reported by 72% of their employees; while at Sherwin-Williams’ Centro América headquarters there was a 68% reduction in reported respiratory problems and staff sick days almost halved.

Examples extracted from the *Doing Right by Planet and People: The Business Case for Health and Wellbeing in Green Building* April 2018





## CLIMATE CHANGE IMPACT ON THE MIDWEST

The two climatic changes that are most prominent in the midwest are an increase in temperature and sporadic precipitation patterns. Now and in the next 100 years, this will create:

- Increasingly frequent and severe heat waves
- Less severe cold during winter
- Increased precipitation during winter and spring, with heavier down pours resulting in more floods
- Reduced Great Lakes water levels
- Increased number of insects due to milder winters
- Decreased air quality

## Incorporating Climate Adaptation into New Buildings and Neighborhoods

- **Understand regional impacts:** Identify climate impacts for the project's region.
- **Modify performance goals:** Incorporate possible impacts into performance goals for the building or neighborhood.
- **Determine the range of effects on the local built environment:** Refine regional impacts to a smaller scale; anticipate how climate changes are likely to manifest in the local environment; present design team with a range of possible scenarios.
- **Select a combination of no-regrets and resilient adaptation strategies:** Choose strategies that enable the project to achieve and maintain performance goals, under all possible futures, for the expected life of the project.

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# CLIMATE RESILIENCE & ADAPTATION

Climate adaptation is necessary in building design. This is because according to experts such as the Intergovernmental Panel on Climate Change (IPCC), The U.S. Global Change Research Program (USGCRP), and the U.S. Environmental Protection Agency (EPA), there will be climate change impacts to the world no matter how quickly greenhouse gas emissions are reduced.

Building professionals need to understand the likely impacts of climate change on the built environment and have the ability to implement adaptation strategies that will be suited for years to come. Climate has always been integral to building design, however climate change requires an update with the best possible information to our codes, standards, and practices.



## Incorporating Climate Adaptation into Existing Buildings and Neighborhoods

- **Understand regional impacts:** Identify climate impacts for the building's region.
- **Evaluate current operation and maintenance targets:** Understand how the maintenance and operations perform under current peak climate conditions.
- **Conduct a scenario analysis:** Analyze how the building will respond to projected climate impacts, modeling different system options under a variety of climatic conditions.
- **Implement adaptation strategies:** Install adaptation strategies that provide passive or efficient responses to more extreme climate events in order to maintain occupant comfort while preventing increased energy use.

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# CASE STUDY 1: DOWNTOWN MARKET

Located in Grand Rapids, Michigan, the Downtown Market is a 126,975-square foot project consisting of an outside market shed, on-site parking, an indoor market hall with prep/support areas for approximately 22 vendors, a 5,000 SF restaurant, and office/wellness use totaling 7,000 SF - all on the grade level. The exterior incorporates approximately 6,500 SF of live green roof and two areas of live green wall, one on the west facade, and one on the south facade. There is an 8,000-gallon rainwater harvesting system that's used to irrigate the green roof, greenhouses, live walls, and the on-site rain garden. The project started with the removal of soil contamination on this Brownfield redevelopment site. The building interior materials are a combination of epoxy flooring and tile in the market hall and food preparation areas, carpet in office and meeting areas, and sealed and polished concrete floors in the market hall.

- 32%** reduction in estimated indoor water use compared to an EPA 1992 baseline
- 21%** reduction of energy cost savings based on ASHRAE 90.1-2007 Appendix G
- 25%** post-development site runoff quantity has been reduced for 2 year, 24-hour design storm
- 83%** reduction in total water use for landscape irrigation
- 88%** construction waste diverted from landfill
- 40%** total building materials content has been manufactured using recycled materials



### LEED Facts Downtown Market

Location.....Grand Rapids, MI  
 Rating System.....LEED-CS v2009  
 Certification Achieved.....Gold  
 Points Achieved.....61/110

Sustainable Sites.....23/28  
 Water Efficiency..... 4/10  
 Energy and Atmosphere.....11/37  
 Materials and Resources..... 6/13  
 Indoor Environmental Quality..... 8/12  
 Innovation and Design.....5/6

Ceilings are a combination of materials, incorporating decorative steel canopies and wood and laminated timber elements. The paints, coatings, adhesives, and sealants are all low-emitting, and the composite woods installed in the project contain no added urea-formaldehyde resins. The project has reduced mercury in lamps with an average mercury content of 31.81 picograms per lumen hour. During construction 88% of the on-site generated construction waste was diverted from landfill. The project also includes recycled content and regionally extracted and manufactured materials. The project team has claimed an energy cost savings of 21%. There are no CFC-based refrigerants in the HVAC systems which serve the LEEDCS project. Indoor water use is calculated to be reduced by 32%. And, the landscaping and irrigation systems have been designed to reduce potable water consumption for irrigation by 83%. The project was awarded LEED Core & Shell Gold certification in April 2011.

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# CASE STUDY 2: FISHBECK, THOMPSON, CARR & HUBER

Fishbeck, Thompson, Carr, & Huber, Inc. (Fishbeck) is a professional civil, environmental, architectural/engineering, and construction management firm headquartered in Grand Rapids, MI. Only 1-3% of the U.S.'s building stock consists of new buildings, making it important to implement sustainable design into existing buildings. Fishbeck recognized this, and in turn embarked on meeting LEED for Building Operations and Maintenance: Existing Buildings (LEED O+M: Existing Buildings) standards for its headquarters. This improved the facility by increasing the building system's energy efficiency and providing a healthier indoor environment for their employees, and also improving the site to have less environmental impact.

- 25%** Energy consumption reduction
- 40%** Indoor water use reduction
- 50%** Site irrigation use reduction
- 100%** Onsite stormwater management with no annual runoff
- 50%** Diversion of waste from facility alteration and additions



<b>LEED Facts</b>	
<b>FTC&amp;H</b>	
Location.....	Grand Rapids, MI
Rating System.....	LEED EB v2.0
Certification Achieved.....	Gold
Points Achieved.....	48/85
<hr/>	
Sustainable Sites.....	8/14
Water Efficiency.....	2/5
Energy and Atmosphere.....	11/23
Materials and Resources.....	12/16
Indoor Environmental Quality.....	10/22
Innovation and Design.....	5/5

To meet LEED standards, Fishbeck made adjustments to many features of the Arboretum Drive building which included optimizing HVAC operation schedules, instituting recycling and green cleaning programs and replacing inefficient lighting lamps and fixtures. The LEED O+M: Existing Buildings process allowed Fishbeck to highlight their professional specializations, which included existing building commissioning, interior design services, low impact site design, sustainable landscaping design, and LEED administration. The 67,000-square foot building was awarded LEED Gold in November 2011 and was recertified in 2017. LEED credits achieved include water efficient landscaping, HVAC system commissioning, and developing a sustainable purchasing plan for office equipment, furniture, supplies and building materials. As a result of implementing these sustainable design features Fishbeck saw employee absenteeism decrease consecutively for 5 years, and energy and water consumption decreased 25 and 40% respectively

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