NEWYORK ENGINEERS

THE TOP 10 INVENTIVE GREEN ENGINEERING TRENDS FOR 2017

ABOUT THE AUTHOR

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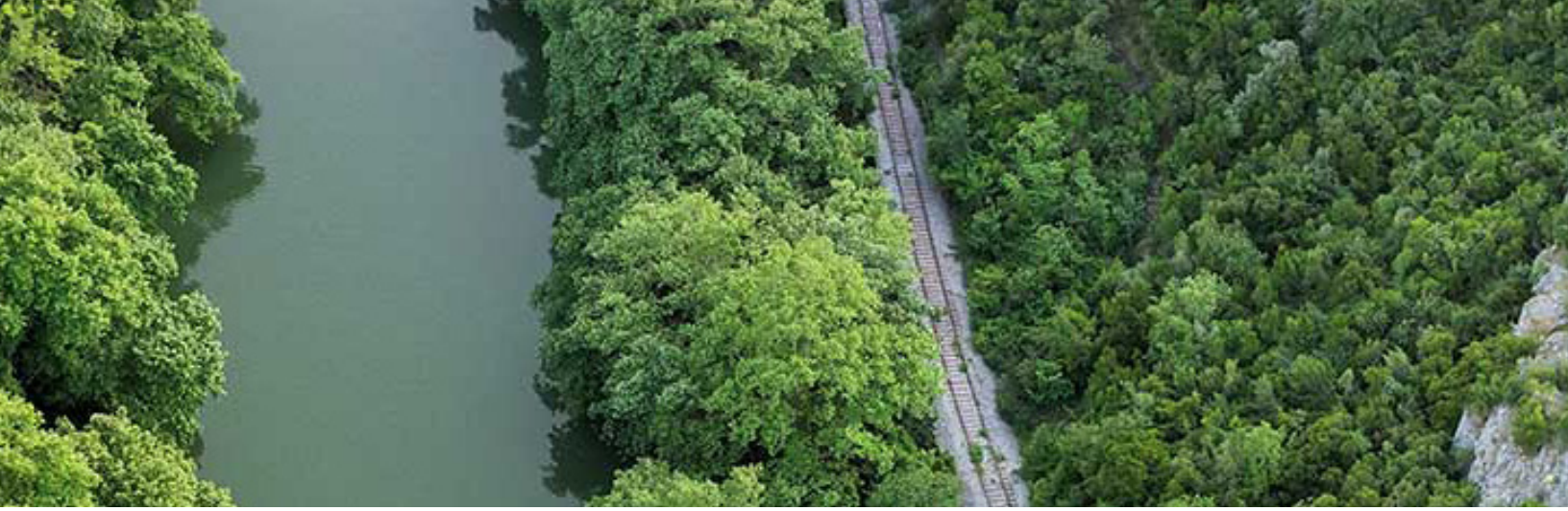
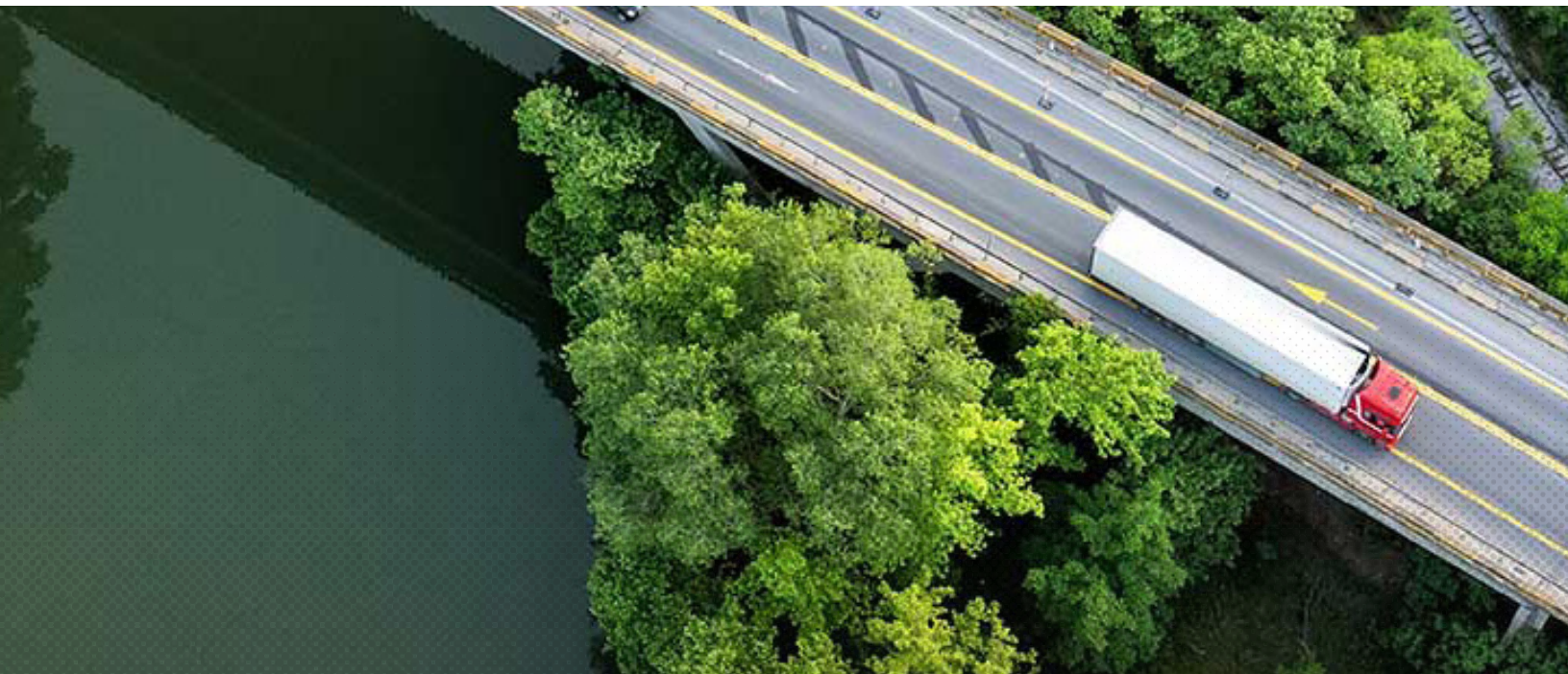


INTRODUCTION

Green buildings are fueling the necessity for new product design and technologies. New enhancements are already preparing to enter the marketplace as 2017 begins its new season of green building.

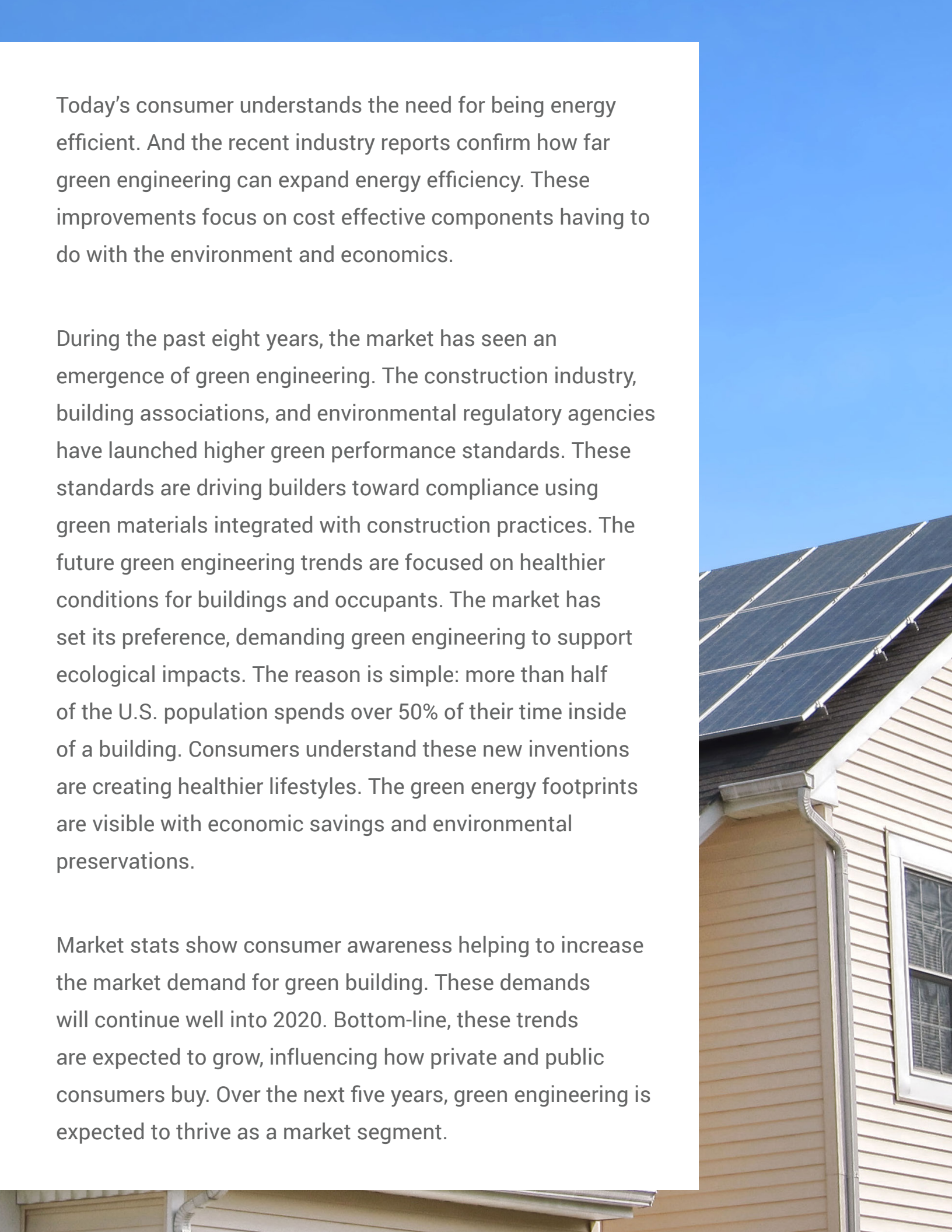
Innovative engineering trends are the key solutions for constructing sustainable structures. The solutions are designed to respond to the environmental challenges, while sustaining the quality of life. More important, advanced green engineering is built to adapt to the anticipated conservation concerns in 2017.



Today's consumer understands the need for being energy efficient. And the recent industry reports confirm how far green engineering can expand energy efficiency. These improvements focus on cost effective components having to do with the environment and economics.

During the past eight years, the market has seen an emergence of green engineering. The construction industry, building associations, and environmental regulatory agencies have launched higher green performance standards. These standards are driving builders toward compliance using green materials integrated with construction practices. The future green engineering trends are focused on healthier conditions for buildings and occupants. The market has set its preference, demanding green engineering to support ecological impacts. The reason is simple: more than half of the U.S. population spends over 50% of their time inside of a building. Consumers understand these new inventions are creating healthier lifestyles. The green energy footprints are visible with economic savings and environmental preservations.

Market stats show consumer awareness helping to increase the market demand for green building. These demands will continue well into 2020. Bottom-line, these trends are expected to grow, influencing how private and public consumers buy. Over the next five years, green engineering is expected to thrive as a market segment.



2017 FORECASTS

Future developments of sustainable materials for the construction of homes, buildings, and structures will continue in 2017. States, cities, and counties have tightened the building codes on energy efficient products. Following guidelines, the building codes are adamant on the controls for chemical emissions, recycling, durability, and moisture resistance. Technology and engineering have joined forces to improve the performance and cost of the new systems. It's no surprise the top green engineering trends are based on improving building practices. Engineering is capturing sunlight, managing thermal products to enhance comfort, and utilizing open spaces under the same roof. In 2013, McGraw-Hill Construction Smart Market Report noted 30% of the market specified green furnishings. 2017 is expecting to see an increase to 40% with at least 60% of the industry firms installing green systems and enhanced management products.

TREND ONE:

SUSTAINABLE CONSTRUCTION MATERIALS

McGraw-Hill's 2016 Smart Market Report projected the green building market to reach $234 billion dollars by 2019. In the U.S. alone, green building materials is expected to reach revenues over $86 billion in 2017. The construction of buildings in 2017 will consume the largest volume of resources for new, retrofits, and renovations. One of the largest recyclable products is steel, which is used for structural building materials. Advanced engineering concepts are expected to lower construction costs without loss to its durability and maintenance. The steel industry remains a leader of recycled structural steel with a recovery rate of 98%. Plastics, concrete, and stone have been added to the list of recyclable materials. It's a slow process, yet sustainable, bio-degradable, and recycled materials have slowed the depletion of the earth's natural elements.

TREND TWO

SOLAR ENERGY

Green engineering involves some basic principles of science to produce energy efficient enhancements. Energy is the largest uncontrollable operating cost in most buildings. This increased awareness has spurred the demand for developing advanced energy efficiency applications. Solar energy continues to be the first choice when using natural power resources. Our understandings of social responsibility and the need for government intervention have prompted states like New York, Texas, and California. These states are seeking total renewable power production by 2020. Utility companies have long considered building central solar power stations to generate renewable energy. The future is looking greener for the potential of using micro-grids and energy efficiency centers. Competition between the cost of traditional energy resources and solar systems is rising. From a business perspective, the potential loss of revenue is supporting the change. During the next five years, expectations of decentralized systems could become a reality.

TREND THREE

ZERO-ENERGY BUILDINGS

Zero-energy or Net Zero buildings operate entirely on renewable sources of energy. The three most popular sources are solar, wind, or hydro. The buildings are designed to independently use renewable energy for the building's electricity and HVAC needs. Net Zero buildings are able to generate the exact amount of energy needed for the site. Because Zero-energy buildings manage the use of renewable energy, there is no waste. The long-term benefits of energy-saving are surpassing the initial setup costs. The greatest value is a result of independence from traditional electrical grids. Federal agencies and state and local government offices have already moved towards green energy savings. The concept is a response to tighter budgets. Today, interest from the private sectors and corporations has increased. Local neighborhoods are now incorporating green engineering. In spring of 2017, a Net Zero residential community in Arizona will complete the first phase.

TREND FOUR

RETROFIT AND RENOVATIONS

Green retrofits and renovations of existing buildings and houses are a strong trend for 2017. It's estimated the innovations will recoup the initial costs in fewer than five years. The green engineering advancements are speeding up the returns of natural resource investments. And the asset values are higher compared to traditional retrofitting or renovations. Depending on the variables, green solution properties can expect a 20% increase in value. Resilient proof buildings are becoming more prominent. Along with energy savings, better interior features have increased the quality of intangible values. There's more natural lighting, and a decreased amount of toxins improving the indoor air quality. This market is expecting a considerable increase during 2017 as consumers gain a better understanding of the long-term value of green buildings. The basic green upgrades consist of electrical, mechanical, and thermal systems, followed by moisture protection.

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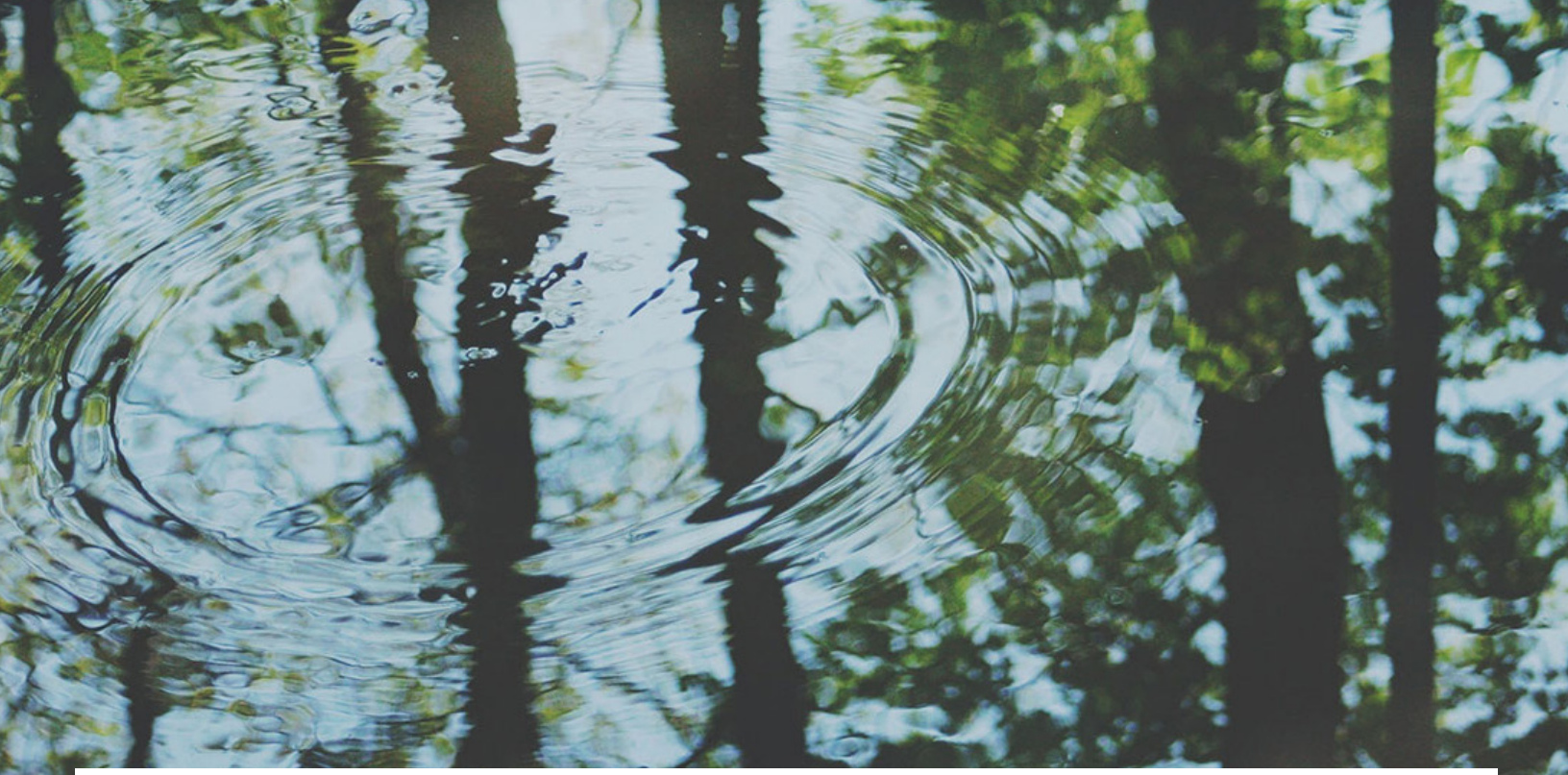
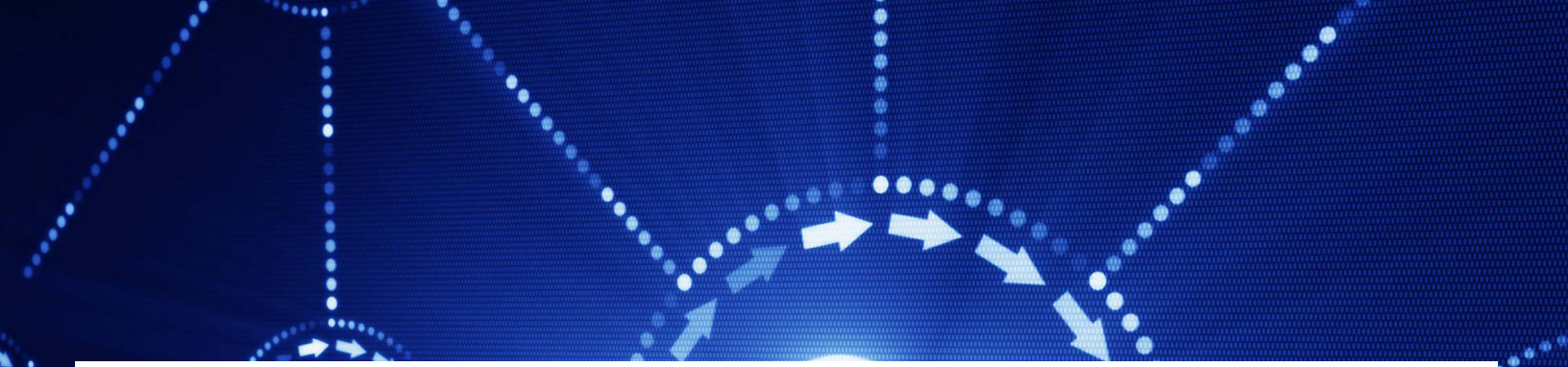


TREND FIVE

WATER PROTECTION AND CONSERVATION

Fresh water is a scarce resource. Sustainable building solutions have responded to the concern. Today, the demands for water are increasing faster than it can replenish itself. Science and engineering have come together to ensure adequate water supply for future generations. Green engineering designers and developers work on protecting and conserving water in all build-outs. Design efficiencies are maximizing water supply by decreasing the need for more water. It's done by minimizing the treatment and transport methods on site. Natural energy resources collect, pump, heat, and store clean water. These water-saving features are reducing the use of water by 35% percent. It translates into a savings of more than 44,000 gallons of water per year per household.



TREND SIX

PLATFORMS OF AUTOMATION

Technology, science, and engineering continue to develop software platforms for management. The programs provide a 24/7 performance monitoring, data analysis, and imaging. Regular maintenance provides valuable information on fault detection and diagnostics for portfolio energy management. Communications are virtual and include text messaging with immediate alert notices. Technology has joined the green market with a few enhancements. Cloud's become a part of the environmental trend. It offers facility management wireless control and accessibility for building services and information management.

Over the next two years, these systems will support 57% of new commercial buildings, 56% of retrofit projects, and 52% of schools and hospitals. Contractors and developers are partnering to share best practices. Decisions on products and procedures are taking shape. The past and current evidence of green building efficiencies are fueling tomorrow's growth. The value-added data will continue to lower costs, conserve energy, and fulfill the market demands. The combination of built-in paybacks are expected to accelerate in 2017. The need for smarter systems to sustain the environment will prompt further automated developments.

TREND SEVEN

LEED CERTIFICATIONS

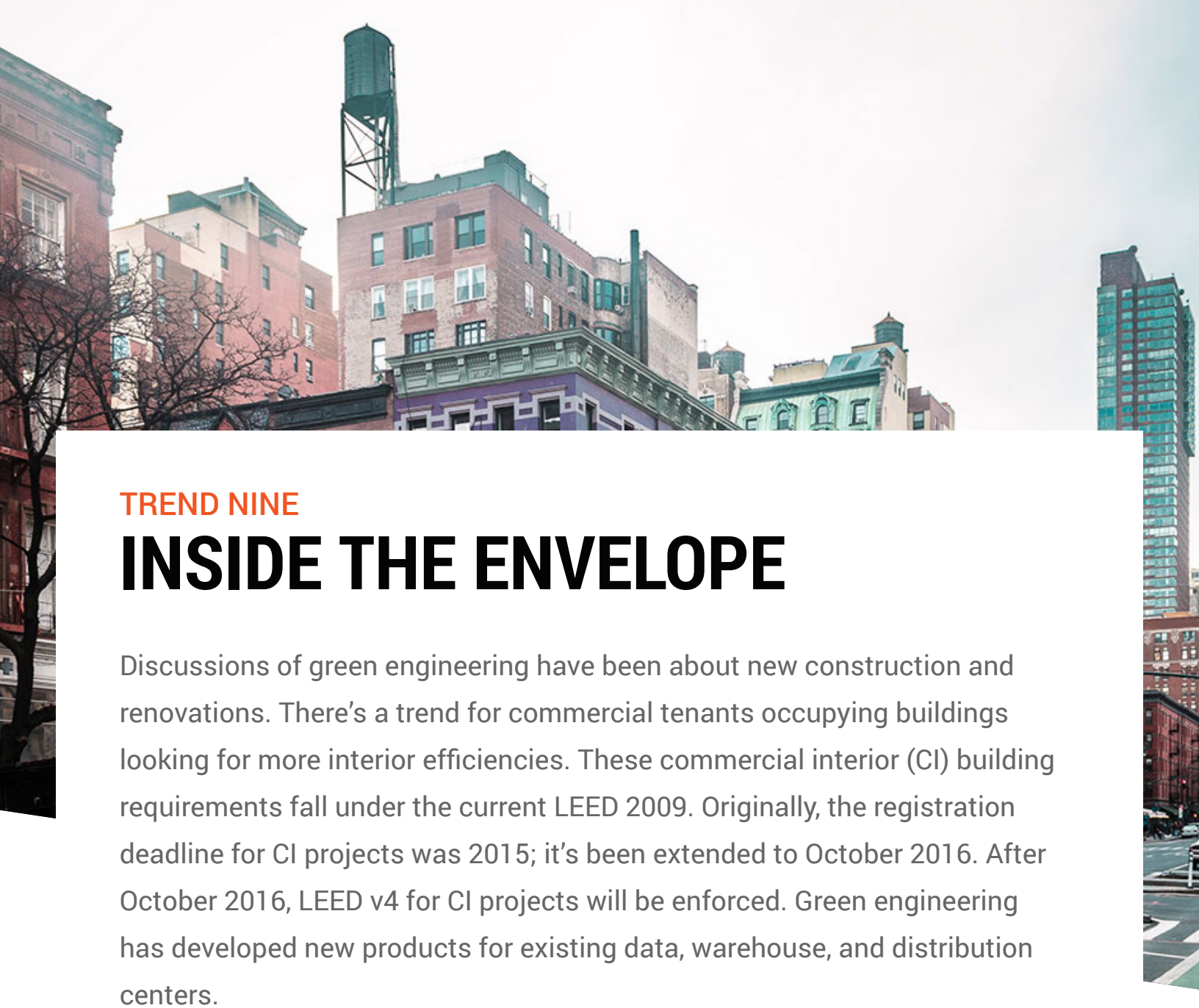
Leadership in Energy and Environmental Design (LEED) standards is a rating system created by the United States Green Building Council (USGBC). As of May 2016, globally more than 15 billion square feet of building space is LEED certified. That's an increase of 851 million square feet representing a 10% expansion from 2014. The largest groups of U.S. LEED professionals live in the states of New York, California, and Texas. New York City is preparing to take New York to the next level of green efficiency. By 2018, U.S. LEED certified buildings will generate $1.2 billion in energy savings. Water savings will accumulate $149 million. During the same period, green engineering will prompt less maintenance, saving over $715 million dollars.

TREND EIGHT

BUILDING PERFORMANCE RATINGS

There are several green building rating organizations. They all share the same goal of creating an environment sustained by natural resources. LEED is the most recognized. Although all of the ratings are based on performance, they each have certification perquisites. LEED involves more paperwork, requiring information as part of the building plans and specifications. The reason is the durability verification and contents of materials and products being used for construction.

Federal, state, and local offices now have LEED certified facilities. In 2010, the U.S. General Services Administration (GSA) upgraded building requirements. New construction, renovations codes, and ordinances have mandated all government buildings to meet LEED certifications. LEED Gold certifications are now a minimum for new construction and substantial renovation projects. As of June 2016, GSA LEED certifications include 49 Gold and 10 Platinum ratings. More than 30% of GSA LEED buildings are historic sites. A total 44 million square feet was renovated. All LEED certification projects earn points supporting environmental impacts during design and construction. Recent LEED points for GSA include 71 in new construction and 60 in existing buildings. Commercial interior furnishings earned 20 with three for the building's core and shell.



TREND NINE

INSIDE THE ENVELOPE

Discussions of green engineering have been about new construction and renovations. There's a trend for commercial tenants occupying buildings looking for more interior efficiencies. These commercial interior (CI) building requirements fall under the current LEED 2009. Originally, the registration deadline for CI projects was 2015; it's been extended to October 2016. After October 2016, LEED v4 for CI projects will be enforced. Green engineering has developed new products for existing data, warehouse, and distribution centers.

Hotels, motels, schools, retail, and mid-rise residential buildings must be compliant to LEED v4. EPA's Energy Star program is driving the conservation, helping to promote and identify product for CI projects. One of the most noticeable changes for CI projects is a 20% site water reduction. A major shift in product design has already started with commercial toilets processing 1.6 gallons per flush. Other processing equipment includes cooling towers, evaporative condensers, and appliances like ice machines.

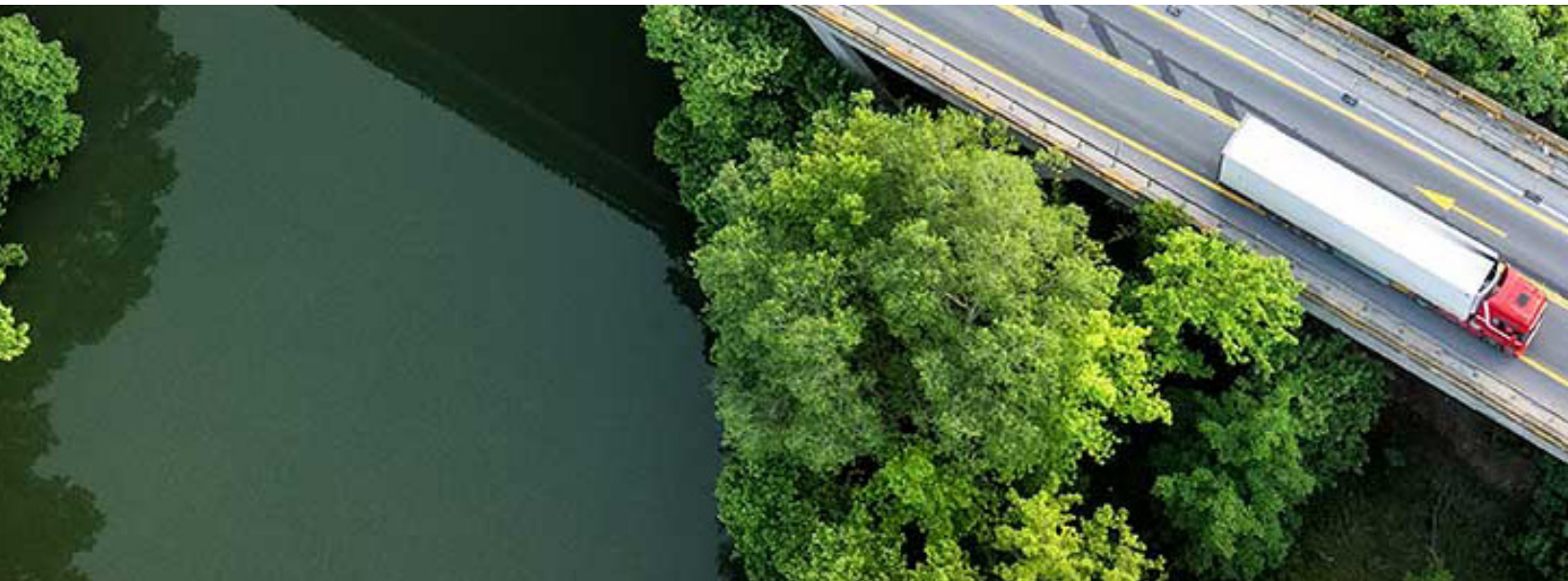
TREND TEN

PRODUCT DECLARATIONS

New green concepts for 2017 include Environmental Product Declarations (EPDs) and Health Product Declarations (HPDs). Product content declarations and lifecycles are critical factors impacting environmental and health concerns. Manufacturers are required to disclose all ingredients used in building materials according to EPD and HPD regulations. Consumers must be informed of the potential hazards or exposure factors of building materials. There are several components that make up the building's shell, interior, and furnishings. Currently, LEED v4 is accountable for HPD of commercial interiors. Officially, HPD is an emerging practice with several industry product libraries available online. EPD has an office established in the state with red lists accessible to builders and the public.

SUMMARY

2017 is set to expand the use of green engineering innovations, and there's no doubt all building sectors will feel the surge. As building regulatory agencies continue to support the development of green initiatives, more buildings will offer modern conveniences without any loss of quality. Builders, designers, architects, and manufacturers will select materials matched to sustainable project specifications. The U.S. has already moved towards expanding clean energy used in sustainable building practices and enhanced manufacturing processes for our homes, buildings, and industry. Technology development and high performance will continue to protect human health and the environment. The emphasis will be on management of materials and engineering processes to improve energy efficiency and renewable power generation.



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