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CONSTRUCTION
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Green Construction: A Growing Global Trend

How to build green today and what to expect tomorrow





Introduction

Buildings and the process of constructing them accounts for over 30% of total global energy use.¹ This isn't necessarily a black mark on construction, though—in fact, it highlights a great opportunity for the industry to make positive changes. It's an opportunity that many in the construction industry have noted and are acting on. Green building is no longer just a trend; it is a revolution that is here to stay. Construction firms that ignore this are at risk of getting left behind.

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Understanding Green Construction

Green construction refers to optimising the building process to minimise negative impacts on the environment and its inhabitants while maximising the positive aspects of the finished structure. This doesn't end when construction wraps up. Proper planning and design can help a structure qualify as green while it's in use and even during the eventual demolition of the structure.²

Construction's Environmental Impact

The process of constructing anything from a simple single-family home to the biggest infrastructure megaproject can impact the environment in multiple ways, including:

- Direct destruction of ecosystems due to mining, logging and other techniques for extracting raw materials
- Air pollution through the use of heavy machinery that runs on emissions-producing diesel or gasoline engines
- Waste, water and air pollution and high energy use required for building material manufacturing processes, with estimates that anywhere from 5% to 8% of global CO2 emissions come from cement production alone³
- High levels of CO2 emissions when materials and equipment are transported long distances
- Erosion and runoff on the construction site that can damage local waterways and affect plant life
- Spills or other accidents that directly contaminate soil, air and water with toxic chemicals

These issues can threaten the bottom line of every part of the supply chain. Building material manufacturers who reduce waste don't just help the environment; they're also likely to see increased profits by taking advantage of every last scrap of raw material.



Essential Components of Green Construction

The hundreds of methods that make construction more environmentally friendly can be summed up in six major categories.

- 1. Energy efficiency:** Structures built with green methods require less energy during construction and during occupation. Layout adjustments, insulation amounts, land siting and alignment and even the color of the exterior materials can all improve energy efficiency.
- 2. Reduction of waste:** With better planning, constructing a new structure can generate practically no wasted materials at all.
- 3. Low-impact building materials:** On-site waste reduction directives matched with the use of building materials that produce less waste during manufacturing significantly reduces the impact of construction. Not all of these low-impact building materials are new and unfamiliar; many are the same standard materials (such as dimensional lumber for framing) simply manufactured to tighter standards.
- 4. Indoor air quality:** Careful material selection does more than just reduce waste and improve the profit margins on a project. Interior finishing materials that release little to no volatile organic compounds (VOCs) result in healthier environments for their residents.
- 5. Site impact:** Placement of a structure on the site can be optimised to take advantage of natural light and passive heating and cooling opportunities to reduce energy use. Proper placement and preparation of the raw land also reduces the chances of erosion, water damage to the foundation and many related problems. Careful siting that saves existing trees doesn't just enrich the local environment, it can also keep the building cooler thanks to shading.
- 6. Water use:** Minimising water waste and controlling excess water outside the building can be achieved with green construction techniques. Buildings use 14% of all potable water consumed globally, but a few small adjustments can make a big difference in saving safe drinking water for more important uses than flushing and washing.⁴

Moving toward Standardisation

Green construction initiatives started in the 1980s and 1990s, but early attempts at optimising building techniques and materials were piecemeal and suffered from a lack of standardisation.⁵ Standards for green construction are essential, so different techniques can be selected based on their proven merits. The Leadership in Energy and Environmental Design (LEED) rating system developed in the late 1990s was an early attempt at standardising the green construction process, but now there are multiple choices in most countries for quantifying the efficiency of any particular structural design.



Best Practices for Implementing Green Construction

A commitment to embracing green construction practices is just the start. In order to get good results and attract new environmentally minded clients, construction firms need to follow the best practices for implementation of green construction concepts. Here are five of the best practices for going green as a construction firm, regardless of the size of the business or the sector of the construction industry served.

1. Going Green Internally

Turn a critical eye to internal business practices. From paperless office filing systems to energy-efficient lighting and low-flow water fixtures, going green internally demonstrates a construction firm's commitment to the process goes beyond lip service.

2. Staying on Top of Local and Global Developments

Construction practices considered to be the pinnacle of green building today can quickly go out of style, be replaced, or be proven ineffective. Keeping abreast of green construction techniques takes a lot of work but is essential to stay competitive. Designate a team within the firm that is responsible for tracking the latest developments and determining which are right for the company. If an entire team of green specialists is impracticable, find at least one member of each major department who can determine which green construction innovations are right to embrace.



3. Choosing a Rating System

Trying to appeal to all clients looking for green construction is simply too much for even the biggest and most experienced companies. Firms that are still expanding into green construction should start with a popular rating system or design modality and build their familiarity with it before moving on to a new one. Globally, LEED is one of the most popular green building evaluation systems, with over 90,000 commercial buildings participating in the program as of 2018 and is a good starting point for most firms.⁶ Training to meet the specific requirements of a popular rating system helps fill in any gaps in existing approaches.

4. Investing in Training

Green construction often requires hundreds or even thousands of small adjustments to the building process to reach the goals of the finished structure. As a result, construction workers may need comprehensive training to become familiar with current techniques. Simply specifying the use of the new methods and not training the workers on them will only lead to low rates of adoption and a return to the familiar work processes. All the design improvements in the world can't make a structure green if the workers constructing it are failing to follow the specifications due to a lack of belief in its value.

In our industry wide Northern Europe report, Digital Sustainability: The Path to Net Zero for Design & Manufacturing and Architecture, Engineering & Construction (AEC) industries, we found that construction companies see material alternatives and lean construction as promising areas for increasing their sustainability over the next two years. With this, training and skills development on identifying and embedding new ways of working to create more sustainable outcomes will be vital.

5. Embracing Construction Technology

Green building methodologies significantly increase the complexity of every stage from planning to construction, so powerful construction technology is vital. Cloud-based apps, like PlanGrid Build, offer seamless sharing of the latest drawings and plans. Now everyone from the project manager down to individual workers can stay abreast of project information, including the green techniques currently in use on a project. Modelling software is also essential for creating designs and building plans that perform as promised after construction wraps up.



The Future of Green Building

The global market for green construction is projected to reach \$364.6 billion USD by 2022.⁷ Not only will demand for this kind of low-impact building grow over the next 25 years, it will also change dramatically. Looking ahead into the future of green construction will help construction firms plan their next moves.

Smart Cities and Integrated Buildings

For millennia, cities have developed organically and haphazardly, but tomorrow's cities will be smart and designed carefully from the bottom up. Smart cities integrate the Internet of Things to make urban environments responsive to the needs of their residents. As buildings integrate more and more advanced technology, demand for improved green construction methods will accelerate.

New and Stricter Certifications

Green construction remains primarily optional on a global level, but many regions already require some kind of green certification for new construction. The EU's nearly zero-energy buildings (NZEB) require that new buildings have high energy performance which comes mostly from renewable sources. The Energy Performance of Buildings Directive requires all new buildings to be nearly zero-energy by the end of 2020. In the United States, California has a mandate that all new commercial construction must achieve a zero net energy rating by 2030.⁸ China has its own green building standards based heavily on LEED certification and has mandated that at least 50% of new urban construction will meet this standard by the end of 2020.⁹ These requirements will only grow and spread in the next quarter century.



Overhauls for Existing Structures

The two sectors of new construction and renovation are likely to overlap more in coming years as existing structures require more advanced remodeling than in the past. New construction is obviously the prime time for optimising for green performance, but older and aging buildings will need plenty of attention to bring them up to speed as well. Construction firms that once found renovation work too time-consuming or less profitable than new construction will likely expand as budgets for remodeling grow to compensate for the need for green technologies.

Greater Reliance on Big Data

Embracing construction technology to analyse and model designs is a requirement for today's green construction, but future building techniques will rely on big data as well. Within 25 years, every new construction project will begin with a sampling of data showing everything from the projected impact on surrounding structures to the latest demands of the expected residents. Embracing data is likely to streamline the green construction process in ways that are impossible to imagine today.



Conclusion

Green construction isn't going anywhere, so it's time for construction firms in all sectors of the industry to embrace it. As construction technology continues to grow and evolve, it will be interesting to see how green construction changes and grows alongside it. Thankfully, going green during the building process is easier than ever, thanks to the proliferation of powerful construction technology tools available today.

Sources:

- [1] [Energy Efficiency: Buildings](#), International Energy Agency
- [2] [Green Building: Basic Information](#), United States Environmental Protection Agency
- [3] [Global CO2 emissions from cement production](#), Robbie M. Andrew, CICERO Center for International Climate Research, January 2018
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- [5] [What is Green Building?](#), U.S. Green Building Council
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- [7] [Green Building Materials Market Size Worth \\$364.6 Billion by 2022](#), Grand View Research
- [8] [California's Net Zero Mandate Is Shaking Up the Home Building Industry](#), Proud Green Building
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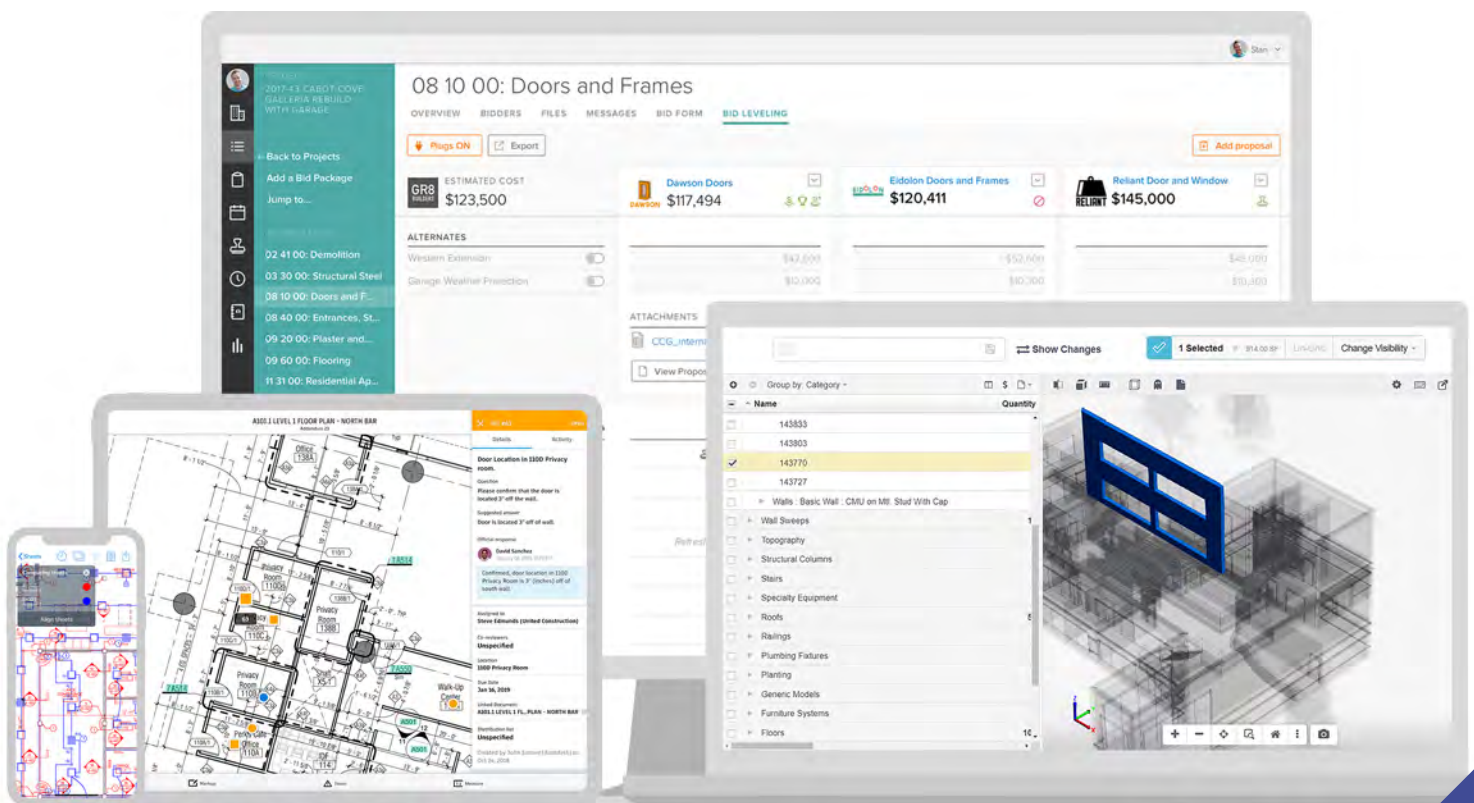


See the Future of Connected Construction

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In 2018, Autodesk announced that construction would be a key focus area to help our customers on their design and make journey. To capitalise on the opportunity, Construction became its own CEO-staff level organisation, Autodesk Construction Solutions. This unique structure is comprised of product development, customer success, marketing, and field operations. The organisation is designed to move at the speed of the market and serve customers on a level playing field with other solution providers. Autodesk Construction Solutions offers products that cover the entire construction lifecycle, from design through plan to build and operate, including the Autodesk Construction Cloud which brings together our cloud-based solutions Assemble, BIM 360, BuildingConnected and PlanGrid Build..

Our vision is to create a vibrant construction industry where predictability and productivity are exponentially increased, while construction site waste is proportionately reduced. The time has come for platform that will empower an industry transformation. Our mission is to help construction teams meet the world's rapidly expanding building and infrastructure needs, while making construction more predictable, safe and sustainable.





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