

With the rise in “green” construction at the forefront of our industry, what do you believe is the next ***innovative, energy-saving approach*** to home building or visionary product that will make construction more sustainable?

There are compelling reasons to promote sustainable construction from both a global and local standpoint. According to the Minnesota Sustainable Housing Initiative, in the United States alone, approximately 95% of all building materials are non-renewable, calling for a much-needed change in the way we build. While to some individuals the concept of “going green” may seem intimidating, sustainable materials and methods maximize efficiency, which better utilizes the resources we have available and justifies the slightly higher cost. Pursuing a career in the construction industry, specifically in architecture, enables me to have an important influence to literally and figuratively develop the blueprints for a greener society. Moreover, not only in selecting adequate building materials but a moral responsibility to sustaining the Earth's resources. Although there are obvious environmentally friendly products such as solar panels and LED lights, there are products that are not often implemented into buildings which are the future of construction. This includes advancements beyond physical materials but incorporates new technologies to maximize their functionality and efficiency. Integrating insulated concrete forms (ICFs) and home automation systems will be a key component in evolving the way we build by restricting the amount of energy that buildings consume.

More than ever before are sustainable construction methods essential, as the following statistic speaks for itself. According to the UNEP Buildings and Climate Report, buildings account for around 40% of worldwide energy use and one-third of global greenhouse gas emissions. As a result, the building sector has the highest potential for minimizing natural resource depletion and addressing climate-related concerns. Green buildings utilize less energy and water, minimize waste, save cost on maintenance, enhance interior air quality, provide comfort to their occupants, and have a lower environmental impact. On the contrary to traditional construction methods such as wood-frame or concrete masonry units (CMU), insulated concrete forms (ICFs) provide an excellent sustainable alternative for the building envelope. These traditional methods do not compare to the permanence, resilience, safety, and energy efficiency of walls built with ICF construction.

Certain materials may make a substantial difference in pricing, performance, and aesthetics depending on the project. These decisions can be vital to a project's success, especially if the budget is tight. In light of this, home construction utilizing ICFs is growing at an approximated rate of 20% a year, largely due to the fact it can

add an important amount of points for achieving Leadership in Energy and Environmental Design (LEED) certification and is considered a green product. ICFs are formed from lightweight EPS foam, commonly referred to as Styrofoam. The exterior walls of the structure are assembled like legos through stacking hollow blocks. Once properly assembled, steel-reinforced concrete is used to fill the interior of the ICF wall. The ICF forms are locked in place once the concrete sets, giving an additional layer of insulation on both the outside and inside of the home. This "locking in place" of the ICFs completely air seals the building envelope and rejects the heat from the sun and humidity from the outside making them not only durable but extremely energy efficient. Since the ICFs are air-tight, they maintain the building's air HVAC cooling system and results in a 40% - 50% savings on heating and cooling costs. In addition, ICFs are resistant to moisture, rot, mold, insect infestation, and other factors that could jeopardize a building's structural integrity. The steel links that are precisely built and linked within each wall of ICF blocks account for this. Even under the most extreme conditions, these bonds maintain the structure firm and intact. While undoubtedly ICF construction positively contributes to the green building industry, there is the possibility for an even higher percentage of energy efficiency through simultaneously using home automation systems.

The development of home automation technology has paved the way for efficiency improvements that do not require a significant financial investment. Home automation technology nowadays allows for a lower-cost solution to energy saving, specifically, making better use of existing home equipment. A home automation system is the automation of a home, sometimes known as a smart home or smart house. Lighting, climate, entertainment systems, and appliances are monitored and/or controlled by a home automation system. Home security systems, such as access control and alarm systems, may also be included. Lighting control is a combination of using sheer shades and energy-saving LED lights. During the day you have sheers that reject UV coming into the house, but you can still see through and at night it grants privacy. With lighting control, you can automate the potency of the light. This customization can easily save 40% - 50% of lighting energy costs. Wireless architectures including these technologies use real-time information collected by sensors and are processed by AI algorithms through IoT technology in the system provider's cloud to provide real-time control that preserves energy and satisfies occupant's comfort. To illustrate a case in point, the lights connected to the system are adapted via an astronomical clock to the position of the sun daily for maximum efficiency. This technology is not only brilliant from an efficiency standpoint but also is able to be controlled from the convenience of the individual's phone via an application.

Architecture is considered to be a competitive and rigorous profession, which can make it difficult to stand out among others in the industry. Any architect can meet deadlines, produce plans, and design; however, not all will positively contribute to the society they live in. With the anticipated rise in population and the demand for resources, not only will integrating ICFs and home automation systems in my future projects be a key component for future construction but will aid in preserving our precious Earth. What will the future have that is worth looking after if we don't sustain what we have now?