

## FEATURE

### Building Blocks of the Future

Our Story: How My Company Developed Modular Construction with Recycled Shipping Containers is Advancing Solutions to the Affordable Housing Crisis and Environmental Sustainability

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By Paul Galvin

We constantly see headlines announcing this punishing housing affordability crisis – that the younger generation cannot afford homes, that nearly half of U.S. renter households are cost-burdened,<sup>1</sup> and that each year fewer households can afford the limited number of homes on the market.<sup>2</sup>

However, the housing affordability crisis is actually a construction crisis. The cost of building materials can represent anywhere from 30 to more than 50% of total costs for a housing project.<sup>3</sup> The cost of materials continues to rise, with traditionally constructed buildings suffering from inevitable waste and economic, environmental, and time inefficiencies, all of which have higher cost than their sticker price.

But even so, much of these materials go to waste. The volume of construction waste generated worldwide every year will nearly double to 2.2 billion tons by the year 2025, according to a report from Transparency Market Research.<sup>4</sup> Further, a McKinsey & Company study found that construction productivity has remained flat for decades.<sup>5</sup> One would be hard-pressed to name any other industry in modern times that could confess that deficiency in efficiency.

This all adds up to making affordable housing unaffordable to construct, especially due to how long it takes. To be clear, while the terms “affordable



Photo: Hindrik Johannes de Groot/Shutterstock.com

#### ABOUT THE AUTHOR



**Paul Galvin** is Chairman and Chief Executive Officer of SG Blocks, Inc., a leading designer, innovator and fabricator of container-based structures. Galvin brings over 25 years of experience in developing and managing real estate, including

residential condominiums, luxury sales, market rate and affordable rental projects. Prior to his involvement in real estate, Galvin founded a non-profit organization that focused on public health, housing and child survival, where he served for over a decade in a leadership position. Earlier in his career, Galvin was Chief Operating Officer of a division of Yucaipa Investments, focusing on repurposing redundant religious and nonprofit assets. He also previously served as an adjunct professor at Fordham University's Graduate School of Welfare. Galvin holds a Master of Science Degree in Social Policy from Fordham University and a Bachelor of Science in Accounting from Le Moyne College. He is also on the board of ToughBuilt Industries, which markets and distributes various home improvement and construction product lines for both do-it-yourself and professional markets.

housing” and “public housing” are sometimes used interchangeably, here we’re discussing “affordable housing” which is developed by private entities but incentivized by government subsidies. The Low-Income Housing Tax-Credit Program provides incentives for

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private developers and investors to build affordable rental housing within communities.

Despite these incentives, affordable housing can be excessively expensive to develop. The cost results from the fact that these developments can take several years to construct, and that's once ground has been broken. Getting the related tax credits and other government participation and support can take years and tens – or hundreds – of thousands of dollars, and in some communities, the application process is highly competitive. Our society is currently totally dependent on government solutions for the successful delivery of affordable housing. This, in large part, is because it requires government subsidy for developers to afford the excessive cost and time of traditional construction. New construction solutions are required, especially ones that do not require subsidy because of the speed and efficiency with which they are delivered. The housing crisis is a market-based problem, and it has not been prudent to wait for the government to provide a structural solution.

Instead, the market is delivering new solutions. One of the most elegant and efficient of these new solutions is modular construction premised upon the repurposing of steel shipping containers into sustainable building blocks.

SG Blocks, founded in 2007, uses code-engineered cargo shipping containers to create sustainable, modular construction for both commercial and residential uses that are safer, faster, longer-lasting, and less expensive than traditional construction. We use these shipping containers as modules, connecting them in different configurations depending on the end-use of the structure desired. Due to the strength of the container, they can be stacked as high as nine containers on top of one another.

SG Blocks builds out our shipping container modules completely in our facilities as design builds or standard model homes. We fit them with steel or wood studs; electrical and plumbing; insulation; wall finishes and sheetrock; ceiling and floors; fixtures; cabinets; appliances; apertures; and all other fixtures and finishes.

They are then prepared for shipment out to the home site, where they can be assembled in a matter of hours.



*Watch video on the development of modular housing at [cre.org/sqblocks](http://cre.org/sqblocks)*

This type of modular construction of course generates less waste and is more environmentally friendly. This is due to the fact that the cargo shipping containers are reused rather than left to rust, and that they replace traditional construction methods that waste leftover materials. Further on down the line, steel is more recyclable. Of traditional construction materials, 20% of wood construction debris ends up in landfills, according to the EPA.<sup>6</sup> Structural steel is recycled at a rate of about 90%, with a recovery rate of 98%.<sup>7</sup>

Our structures provide a combination of design flexibility with the resiliency of cor-ten steel. We can add on additional containers to accommodate a growing family, providing another bedroom and bathroom in a matter of an hour.

### *Time and Cost*

In construction, the saying “time is money” resonates particularly strongly because not only does a faster build mean less labor costs, it also means that the units can begin generating cash flow earlier. Container modules are modified and built out with modular finishing work while the site work is being completed. A three-container home could be erected and buttoned up in one day. This results in significant cost savings. SG Blocks building costs to developers average at about 15% less than traditional construction, as a result of savings on labor, security, insurance, and other factors like construction interest savings due to an approximate

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40% reduction in construction duration. This creates immediate occupancy which drives that significant cost savings.

*Durability*

The structures built from our recycled maritime-grade shipping containers benefit from the resiliency and longevity of steel. In an age of changing climate cycles, they're also extremely stable. Shipping containers were designed and engineered to survive at sea, and so can withstand storms, saltwater, hurricanes, tornadoes, and earthquakes. In fact, we have an exclusive Evaluation Service Report (ESR) number, granted by the International Code Council,<sup>8</sup> which ensures our ability to meet and exceed all international building codes. It also significantly expedites reviews and approvals by building departments. In the future, we expect this ESR number to accelerate the acceptance of our container fabrication in the construction industry, especially for builders serving the large number of American householders are located at risk of earthquakes and hurricanes.

*Sustainability*

Typical residences framed with steel leave less than 2% of the steel to waste, and even that is usually recycled. The same house built of wood would generate 20% waste.<sup>9</sup> Further, because we source our material from the largest manager of recycled shipping containers, we don't usually need to haul the containers further than 500 miles away from our construction locations due to our national footprint.

*Flexible Design*

We like to call our model "right-sized housing, meaning that we can grow and evolve a building in a day or even an hour, by adding modularly built-out containers to a structure where and how they are needed, depending on what our clients need. That means that people can expand their homes as they need to, when they need to, with minimal effort. The strength of the containers means that they can be stacked up to nine high, and because they are all built on the same specifications and requirements, we have a lot of freedom and confidence in designing our structures.

For instance, we've done projects like a beach house that began as a one-story home. As the family grew over the years, the homeowner eventually added on additional containers to provide multiple stories to the house and more facilities for the expanding family. Considering the inherent strength of the design and resistance to weather – shipping containers are designed to take the brunt of the sea and storms, after all – this beach house will be a home to this family for many generations to come.

In fact, consumer interest in flexibility for future generations is evidenced in the demographics of our customers and homebuyers. We serve many older millennials – that is, those around the early 40's who are in the peak of their careers and starting families – and on the opposite of the spectrum, retirees who are creating homes that serve their purposes as empty-nesters who may in the future wish to accommodate multigenerational home spaces.

Interestingly enough, it's not just the design flexibility and pragmatic considerations that drive both generations to adopt flexible design in modular homebuilding.

For both millennials and Boomers, the "green" movement and environmental sustainability of SG Blocks' use of recycled shipping containers is also a major consideration. While many may not realize how environmentally conscious "Boomers" may be, as college students this generation celebrated the first-ever Earth Day in 1970. Retiring Boomers and Gen X'ers have been noted as taking on a new "job" in retirement – environmental activism. The MIT AgeLab conducted a nationwide survey that found that a majority of older adults in the Boomer and Gen X generations saw themselves as more environmentally minded than they were in their twenties.<sup>10</sup>

They can take some responsibility for much of the interest in ESG investments – those that take into account the environmental and social impact of companies in the process of investments – which have grown more than 97% in the last 20 years.<sup>11</sup>

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GenX and Baby Boomers also perform a significant portion of volunteer work at the “atomic level of environmental action”. As a recent Forbes article cited, “with Boomers poised to have a lot of times on their hands in the coming decades, they will have the opportunity to show their commitment and leave a very personal stamp on the environment.”<sup>12</sup>

As for older millennials, who fall into their mid-thirties to about 40 years old, this generation has a fairly unique viewpoint. Millennials are more likely (63%) compared to Boomers to see it as their duty to care for their aging parents.<sup>13</sup> Millennials have a higher margin of favor of new family forms, according to the Pew Research Center.<sup>14</sup> If there were ever a generation to adopt a form of housing that can be “right-sized” to fit their multi-generational, flexible views of family, Millennials are primed to see inherent value in modular building. Add in the trendy “industrial modern chic” aesthetic that containers are prepared to provide, as well as the environmental sustainability that is of critical importance to this generation and the generations they see coming after them to inherit the planet, and we cannot be surprised that older millennials who are prepared to invest in their “forever home” are putting down roots in one of these sustainable, flexible structures, with the dream of modifying it in the future as their family structure grows and evolves.

While anecdotally SG Blocks has seen many of our homebuyers fall into the aforementioned two demographics of late millennials and retirees, we do staunchly believe that modular construction with shipping containers are solutions for not only single-family homes in custom design builds, but also for broader solutions for affordable housing in entire communities.

This construction type is suitable for the complete mix and ecosystem of different housing typology to address housing density and create enough housing, where it’s needed, how it’s needed, and when it is needed. Our mission is to get the construction and debt market more familiar with this methodology and its benefits, and set up a strong network to pump resources into the channels that will drive the growth of the necessary

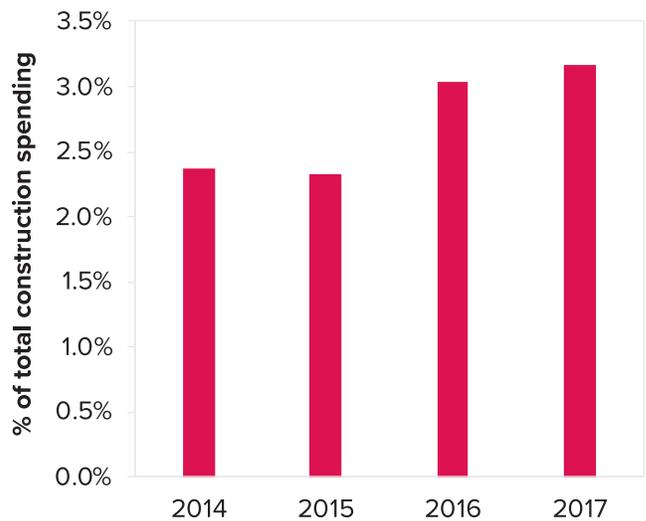
ecosystems to cultivate modular construction projects that benefit the homebuyers, communities, financial institutions, and economy. The single-family mortgage market is well-represented. What we’re doing now is making inroads into the multi-story and multifamily financing market to secure more representation so that communities can minimize the impact of ongoing construction sites and benefit from the speed, environmental mitigation, safety, and reduction of risk and societal problematics of a modular assembly site.

That means breaking down barriers to adoption of modular construction.

As we have seen so far, modular building with shipping containers saves time, money, and waste, and is better for the environment and more flexible to design with. Industry adoption is indeed beginning to pick up, with those barriers beginning to fall, and it’s not hard to see why.

Developers enjoy a significantly improved IRR (internal rate of return). Conventional developments receive about a 2.04x cash-on-cash return with a project IRR of 16.14%. However, SG Blocks sees a 2.66x cash-on-cash return and a whopping 26.78% project IRR. Modular construction is typically about 10-20% less expensive per square foot than site-built construction.

**Share of total construction spending spent on modular construction projects**



*JLL Research and the US Chamber*

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Urban and remote locations tend to reap the higher end of savings.

Much of that is due to savings on labor, security, and insurance, and construction interest savings due to a 40% reduction in project duration. Our time savings also allows the project to generate revenue when it would otherwise be under construction, further increasing project-level IRR.

Further, in terms of technical barriers, we've never been denied a permit or certificate of occupancy. We have never run into any issues with appraisers valuing these structures.

However, in institutional terms, it is still a nascent and innovative category of modular construction, and SG Blocks is still trailblazing the path to secure widespread adoption. One hurdle has been a reluctance to change as the establishment of market demand continues. The percentage of construction spending on modular construction remains low. However, confidence has been growing steadily, according to JLL Research.<sup>15</sup>

A recent McKinsey & Company report states that modularization and off-site, product-based approaches are increasingly easier to achieve and more popular.<sup>16</sup> However, recent world events are accelerating the changes in the construction industry. The same report showed that the COVID-19 pandemic is pushing these transformations ahead.<sup>17</sup>

The most pronounced effects of the pandemic on industry leaders' actions, so far, are on investments in digitalization and supply-chain control – both which could significantly impact the growth of the modular construction space.<sup>18</sup>

However, we are also seeing the pandemic and business closures impact the way construction spaces are dealt with. There are many more factories that are open and building off-site than there are on-site. Many find that it's easier, more practical, and more observable to build out in a factory than it is out on a site. All of our shipping container modules are completed and prepared in our facilities before they are shipped and assembled on-site.

As discussed previously, site construction is already time-consuming; given pandemic-related issues, it may now be compounded by further delays. Fabrication off-site is a much more manageable environment, especially for developers looking to control costs and variables.

Clearly there are many reasons to implement modular construction, and the method is being adopted more and more. However, in my experience many banks and other financial institutions have yet to develop the track record, competence, or even the infrastructure to manage new types of construction like modular. As an anecdote, we'd been seeking Freddie Mac's approval and intent to buy our paper in the market. After following up with them many times, we finally got them to look at our prospectus. Discovering the value and the potential of this solution, our contacts immediately became receptive and ambitious in seeking ways to help us to find options to reduce housing insecurity. The team there connected us to speak with a housing summit about prefabricated housing as well as modular housing. Their leadership and support is invaluable as we continue to clear the pathway towards securing support from even more government agencies like federal housing authorities. We've received little to no resistance – it's clear that this is a free-market solution and our government wants to support it.

In terms of the private market and securing financing, it's hard work to generate greater awareness among lenders. However, we've developed strategic pathways to work with financial institutions to not only build inroads, but also to get our affordable homes into communities.

One way is by licensing our intellectual property to financial institutions. We can issue licenses to financial institutions to help build modular housing with shipping containers within certain parameters, whether they are geographic (in a certain area) or in a certain market (educational buildings or organizations) while the financial institutions also issue the mortgages for these developments.

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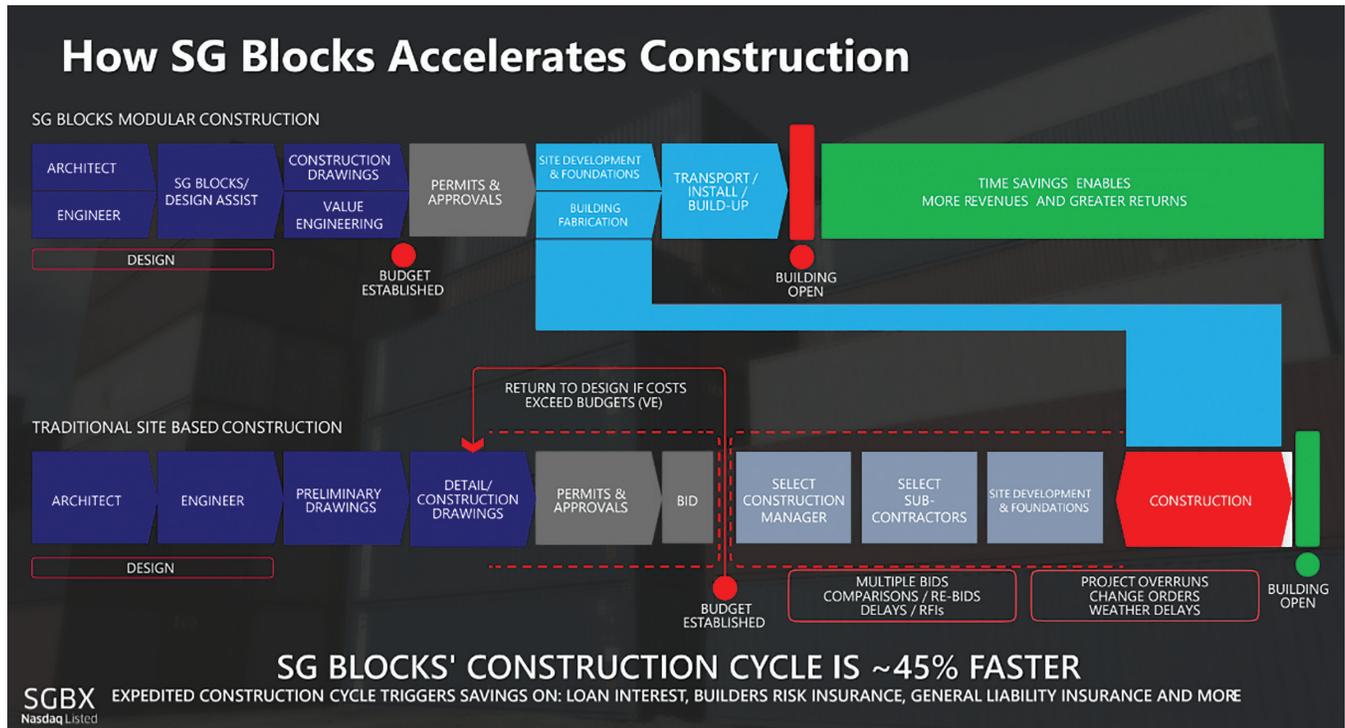
Rendering – Laf. Exterior Elevation by SG Blocks

This assures that mortgages will be issued in specific communities for these affordable housing developments and helps us confirm that affordable housing will be built in the area and that the mortgages will be available. For example, we have issued a license for our residential projects with a Certified Community Lender called Capital Plus Financial.

Since 1992, they've specialized in working with first-time homebuyers to help them qualify for mortgages, particularly in Latino communities. Strategic partnerships like these are important advances towards not only educating the financial community about the benefits of modular building, but most importantly towards our bigger mission of combatting the affordable housing crisis.

Without doubt, affordable housing is difficult to fight for in local government. Even more difficult are the construction sites. Many communities object to construction projects because of their never-ending nature. Community members must navigate scaffolding, noise pollution, safety issues, increased traffic, and other safety risks associated with having an active construction site in the area. In fact, lengthy construction projects can destroy a neighborhood and its retail ecosystem.

For developers, they're paying interest on construction loans, no matter how drawn out the process is – a real financial danger in the pandemic era.



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They assume risk (a huge issue if there are schools in the area, for instance) and pay for security cameras and security personnel on site. Property management has to wait for the building to be completed to show a single apartment.

There are literally tons of waste – concrete, wood, debris – that must be hauled off and taken to a landfill. That’s a significant cost to the environment (and to the developer as well).

But if you could use recycled shipping containers – finished and built out in a safe and controlled factory environment, fully to spec – and then shipped out and assembled in a matter of hours, with little waste from start to finish, and a cost comparable to other homes in the same neighborhood, why wouldn’t you?

Having finished modules ready for delivery when the site is approved greatly reduces the strain and stress on host communities. Our rapid installation process reduces site time, noise pollution, and safety risks often associated with site-built construction sites.

Our intellectual property strategies help put the homes in the hands of new homebuyers through our licensing agreements with financial institutions who work to achieve financing for affordable, environmentally sustainable, flexible-design housing in communities where home ownership can support a thriving economic ecosystem.

Ongoing, on-site construction sites are huge liabilities for everyone and always have been. Combined with the two generations buying homes who want something different than a static home that can’t flex to those generations’ wants and needs – or adhere to serious, escalating issues relating to environmental waste – this is the time for developers, contractors, financial institutions, and designers to home in on how to position themselves and their expertise in the modular construction category.

It's a pandemic era; an age of innovative design, disrupting supply chains, reconfigured build-out methods, and recalibrated financial backing structures.

It’s also an era of new consumer values that will drive innovation and the need for new forms of homes to fit how people plan to live their lives and grow their family units.

The old economics – financial and social, not to mention environmental – are no longer feasible. The private market is coming up with solutions to these public issues, and SG Blocks is committed to continuing its innovation and leadership as we combat housing insecurity and construction waste for better, more sustainable, more affordable homes for all – now, and in the future. •

**ENDNOTES**

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