



SUMMARY

It is often said that modular construction is faster than conventional construction. This is because instead of waiting for site preparation and foundations to be completed, modules are manufactured at the same time as the site is being prepared and the foundation is being built. This overlap in conventional and modular construction processes results in significant timesavings compared to completely conventional construction — 20% to 50%, according to a 2019 McKinsey report.[i]

Even if we consider for a particular project that modular and conventional hard costs are exactly the same, it is crucial to remember that hard costs are not all that matter — and modular construction's shorter timeline results in various cost savings and other financial benefits that will be explored further in this document.

5 FINANCIAL REASONS TO CHOOSE MODULAR

EVEN WHEN MODULAR & CONVENTIONAL HARD COSTS ARE THE SAME

What is the financial upshot of a faster construction process?

In this white paper we look at five financial reasons to choose modular construction — even when the hard costs are the same as conventional construction:

1. Lower Soft Costs
2. Capital Turn and Quicker to Cash
3. Cost and Timeline Certainty
4. Lower Site-Related Costs
5. Asset Value

1. LOWER SOFT COSTS

Modular construction consistently delivers lower soft costs due to the shortened timeline, resulting in lower overall project costs for developers or owners.

In some locations, modular construction may result in lower hard costs. But it's on soft costs that modular construction can consistently make a financial impact, with savings on insurance, bonding, and financing due to the shortened schedule.

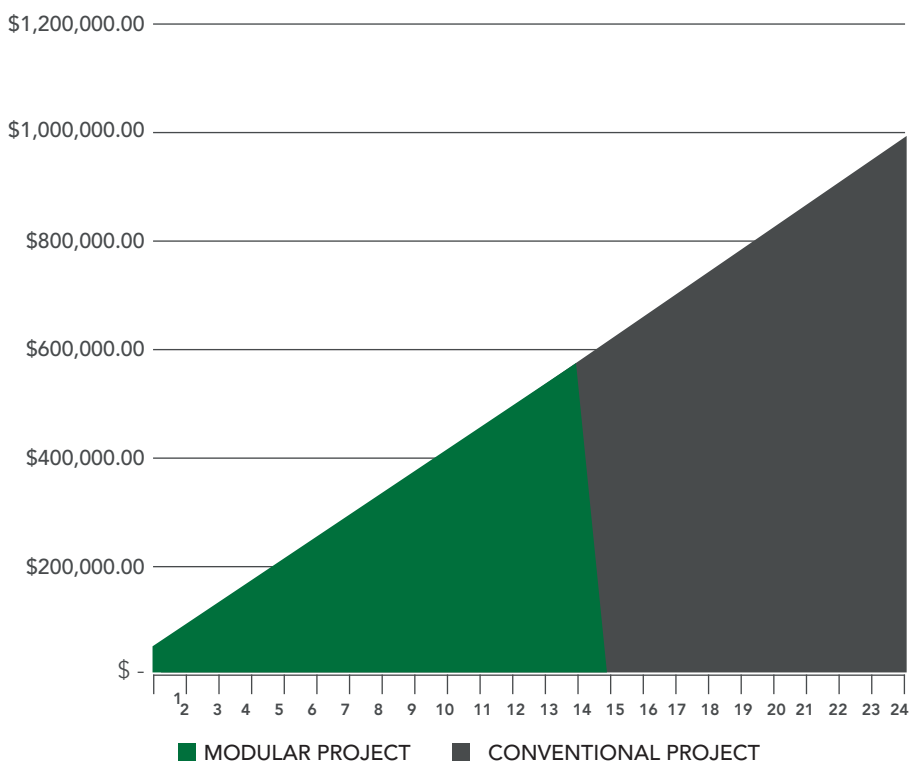
According to a 2016 report, soft construction costs accounted for between 12.25% and 17.7% of total project costs for various types of commercial building.[ii]

So, saving on soft costs can have a big effect on the total cost of a project.

Insurance and bonding:
The compressed schedule of modular construction compared to conventional construction results in savings on both builders' risk insurance and surety bonds.

Quicker takeout financing:
The shorter construction period for modular construction means that less interest is paid on construction loans, and the loans can be replaced with less expensive financing sooner. Even if the entire payment for a modular project is due upfront, financing is required for less time, which can result in significant savings for the developer.[iii]

PROJECT INTEREST COSTS



"The sooner you're able to open up the hotel, the sooner you're able to get to stabilization, and potentially refinance more expensive debt for cheaper debt. So the viability of the project increases because of the shorter construction time."

NIRAV SHAH

"Our projects typically range in total capitalization cost from $40 to $80 million with one at over $150 million. Usually, 70% of that is debt, or $28 million to $56 million and $105 million, respectively. At typical debt cost of 6%, even a couple of months' reduction in the time to build reduces our interest carry costs by hundreds of thousands of dollars. It also gets us more quickly to operating cash flows and also to debt refinancing, so we can enhance investment returns. This acceleration materially reduces cost and gets us to our investment returns earlier."

EBBIE NAKHJAVANI

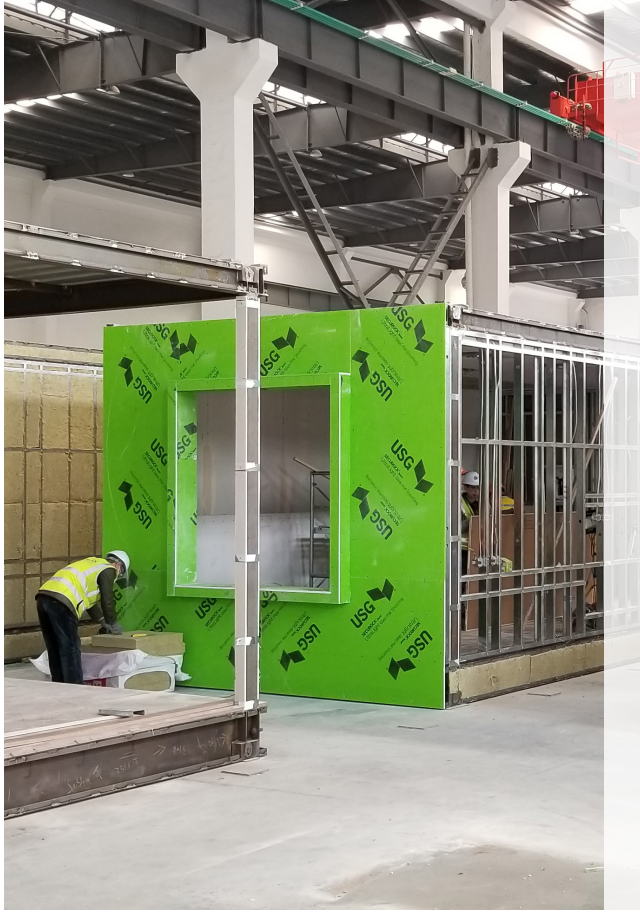


At Hyatt Hotels Corporation, Nirav Shah is the Vice President of Real Estate & Development for the San Francisco Bay area.



Ebbie Nakhjavani, P.E., is the President & CEO of EKN Development Group, a real estate development firm specializing in hospitality, retail, mixed use, and high-density residential development.





2. CAPITAL TURN AND QUICKER TO CASH

Faster construction means developers' capital can be invested more frequently in a given time period. It also means that revenue can be generated sooner. These are compelling reasons to choose modular.

It's key to remember, hard costs are not all that matter!

Capital turn:
Speedier construction means more projects can be completed in a given period of time and capital can be put to work more frequently. The more projects a developer can complete in a year, the more revenue they can generate in that period.

Quicker to cash:
The sooner apartments and hotels can be occupied, the sooner they start generating revenue. This allows for improved cash flow and higher internal rate of return for owners. [iv]

FOR **EXAMPLE:**

10
YEAR TIMEFRAME

$10M
REPEATABLE PROJECT

20%
RETURNED ACHIEVED ON COMPLETION

$2M
PROFIT

SCENARIO A:

MODULAR PROJECT COMPLETES EVERY 14 MONTHS

8.57
COMPLETIONS =

$16M
PROFIT IN 10 YEARS + PARTIALLY COMPLETED PROJECT

SCENARIO B:

SITE-BUILT PROJECT COMPLETES EVERY 24 MONTHS

5
COMPLETIONS =

$10M
PROFIT IN 10 YEARS

"Being able to get to market faster is a huge benefit in the hotel industry."
NIRAV SHAH

"As a developer we are always working on multiple projects at once and bringing new projects into our pipeline.

Quicker capital turn gives us greater flexibility through availability of deployable capital to lock up new projects as they become available — without overstressing our working capital reserves."
EBBIE NAKHJAVANI

"Modular construction can save a significant amount of time compared to onsite construction.

A 400-room hotel, if planned early and preconstruction is performed by a collaborative team, can produce three or more months of time savings.

Cutting three months from a developer's carry costs and starting the revenue stream three months earlier is worth millions."
SEAN ANDERSON





Sean Anderson founded the full service general contracting company, Stoer Construction, in 2014 and is the President & CEO.
He has extensive experience with both conventional and modular construction.

3. COST AND TIMELINE CERTAINTY

The modular construction process means there's much greater certainty around project cost and timeline, compared to conventional construction. Certainty around costs is valuable.

Cost certainty:
For example, a modular and a conventional hotel project might both need 125,000 board feet of lumber. If the project is built using conventional construction, much of that lumber may not be needed until two or three years in the future. It can't all be stored on the construction site until then. So, at the outset of the project, it has to be predicted what the cost of the lumber will be at the time it's needed. This introduces a significant amount of uncertainty around costing.

If the project is built using modular construction, the lumber can be ordered upfront and stored at the manufacturing facility. This means that the cost can be known right away. This difference in cost certainty applies to many of the different materials needed to construct a large project such as a hotel or a multi-family residence.



Timeline certainty:
With modular construction, everything is designed and planned in detail in advance, and factories are not subject to weather-related delays. Unavailability of labour is also less of an issue. This results in much greater certainty about the construction timeline. This is especially beneficial in areas with a short construction season. This contrasts with traditional construction, where delays are common and costly. In fact:

"[The] most significant unanticipated cost in most construction projects is the financial impact associated with delay and disruption to the works." [v]

Less impacted by supply delays:
Because conventional construction is a linear process, any delay in supplies being delivered can severely hamper a project's progress. Modular construction consists of multiple parallel processes so if a delivery is delayed, other work can continue.

Fewer change orders:
There are fewer change orders with modular construction compared to conventional construction. The modular construction process requires upfront decision making. The pay-off is a shorter and more certain project timeline, and more certain project costs. [vi]

Shorter punch list:
Last minute corrections and repairs can significantly lengthen a project's overall timeline. Because modules can be fully furnished and sealed when they arrive at the site, there's less risk of damage that has to be fixed.

"Modular units arrive at the site fully furnished, finished, sealed and locked; when they are set into place they do not need to be accessed until final connections are made. This greatly reduces punch list work within the guestrooms."

SEAN ANDERSON



"The cost of modular and the cost of conventional construction might look similar on a spreadsheet. But one way modular wins out is that there are always so many change orders that go into a traditionally developed hotel. That can really increase costs. The cost of construction is so high, and labour is a major contributor to costs. When you have change orders, you're compounding that.

So, with conventional construction, you can see some huge increases from the original estimate to where the costs eventually end up. The chronology of a modular project is very different from a traditional construction project. Decisions are made upfront, which really forces the discipline of not having as many change orders. I think that makes a big difference."

NIRAV SHAH

"If you're operating a hotel, you need to hire staff before it opens. Six months before it opens, you hire your general manager. Three months later, you have your entire staff on the payroll. You open your booking channel and start selling rooms. But most contractors find out that they will deliver late only during the last month and a half. By then, you've hired your staff and sold rooms. Now you have a nightmare to deal with.

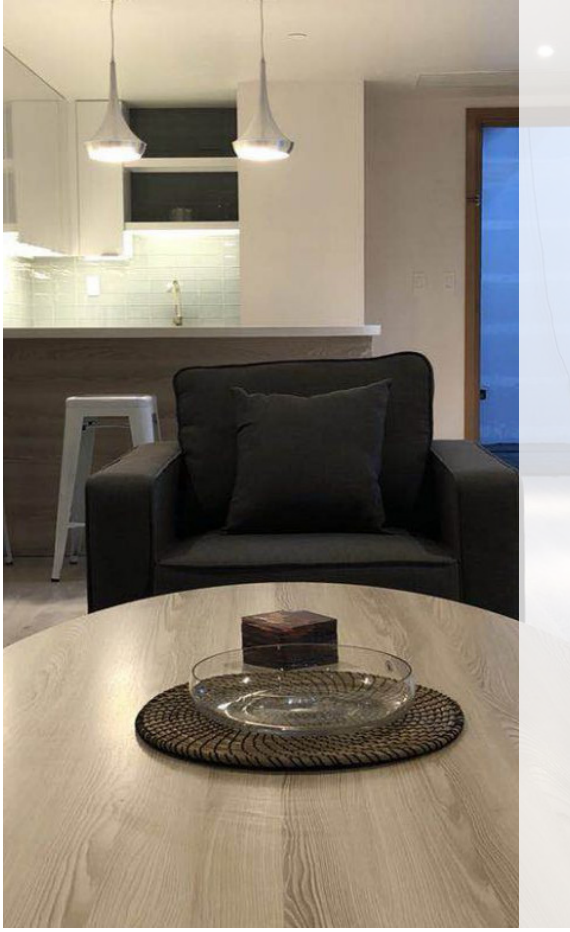
Delayed projects are even more of a problem for student housing. If a building isn't delivered before September, an entire year of income is probably lost. So although fast delivery is very important, the certainty of delivery might even be more important."

CAREL VAN HOUTE

Carel van Houte has run a modular construction consulting firm, Prolodge, since 2016. Earlier in his career, he spent a decade as Chief Design & Construction Officer for citizen M Hotels, where he developed over a dozen hotels around the world, both conventional & modular.







4. LOWER SITE-RELATED COSTS

Performing construction offsite has a number of financial advantages including less disruption to current operations, less theft and vandalism, less weather damage, and reduced general conditions.

Again, note that hard costs are not all that matter!

Less theft and vandalism:
Construction sites are notoriously vulnerable to theft and vandalism. "Annual estimates of the cost of equipment theft [in the United States] vary from about $300 million to $1 billion, with most estimates in the range of $400 million." [vii]

These estimates don't include the theft of tools or building materials. Nor does it include the cost of damage caused during a theft, and losses that result from business interruption.

Less onsite activity means less opportunity for theft. Modular construction occurs inside a secure facility, and modules can be delivered with Furniture, Fixtures and Equipment (FF&E) and Operating Supplies and Equipment (OS&E) secured inside, making theft and vandalism less likely.

"Suppose you've built a 20-storey hotel and now you need to furnish it. First, it's a challenge to bring all the kit up to all those floors and distribute it. You'll have different trades working simultaneously, which is a bit of a ballet and it's not always very successful. Electricians and plumbers may end up needing to go in behind cabinetry that's already been installed. It can be a mess. Second, both the goods and the building can get damaged — starting with unloading the goods from the trucks. Third, a fair portion of what you try to bring into the building disappears on the way up and you never know where it goes — TVs, towel rails, taps, all sorts of things. So having secure modules arrive onsite fully furnished without the need for anyone to enter these during construction is a huge benefit."

CAREL VAN HOUTE





Less site disruption:
Construction sites cause disruption for pedestrians, traffic, and surrounding homes and businesses. Furthermore, when a building is an addition to a current structure — such as an existing hotel — there are financial reasons to minimize disruption. Construction traffic, noise, dust, and general unsightliness can cause guests to choose another hotel or to leave bad reviews that have a future financial impact for owners. Having most construction activity take place in an offsite facility minimizes this disruption. This allows communities to get back to normal more quickly, which has the potential to encourage more development.

Less weather disruption:
When materials are stored onsite, they are vulnerable to weather damage. This can result in a lower quality building, which can add to owners' long-term costs, or it can mean materials have to be replaced, adding to developers' costs.

Less general conditions:
General conditions — including costs for site security — are reduced because of the shortened construction timeline. [viii]

"The cost to keep a site operable for any amount of time is considerable. General conditions form a significant part of overall project costs. Any opportunity to reduce schedule is hugely importantto reduce costs."
BRYAN REID



Bryan Reid is the President of Kindred Construction, a construction management and general contracting company working throughout British Columbia, Canada.

"Site-built construction requires the structure to be built and 'dried-in' (roof, exterior skin, etc.) before finishes start. With modular construction, the finishes are completed in the factory and modules are shipped to the site completely weatherprotected. The potential for weather damage to the structure and the finishes in modular construction is greatly reduced."

SEAN ANDERSON

"Onsite dumpster quantities are reduced since cardboard boxes and packing materials stay at the factory where they are recycled."

GREGORY SLODITSKIE





Gregory Sloditskie founded the engineering consulting company, MBS Consulting, in 1997. He has worked continuously in the prefab industry since 1985 & has experience in modular, mobile, container, and panelized construction.

"By using a modular system, there are hardly any points of connection between one room and the neighbouring room, or the room above and below. So sound insulation is a fantastic feature in modular construction and one that's hard to beat with traditional construction."

CAREL VAN HOUTE

5. ASSET VALUE

The modular construction process lends itself to creating consistent quality buildings that are structurally robust, energy efficient, and have impressive acoustic performance — all of which have a financial impact.

Lower operational costs:
Compared to conventional construction, "The increased precision in fabrication of exterior wall components… results in a much tighter building envelope with fewer air leaks." [ix] With fewer seams and joints being completed onsite, modular construction "naturally lends itself to achieving very high levels of air tightness, such as those required by the Passive House Institute performance standard." [x] All this means that the finished building will use less energy — ultimately costing owners less to operate.

Higher sound ratings:
Because each module has its own walls, ceiling, and floor, rather than the continuous shared nature of traditional walls, there is less sound transfer between units. This addresses a common hotel guest complaint — noise. [xi] Given the impact of negative online reviews, noise is a problem that can have financial implications for hotel owners. Noise is also an important consideration for residents in multi-family and student housing.



"The lack of consistency between hotel rooms is something you wouldn't notice as a guest. But for a hotel owner, if no two rooms have the same width, and none of the walls are straight, fitting your case goods in the rooms becomes a nuisance."

CAREL VAN HOUTE

Consistent quality:
Modular construction results in more consistent quality. In a factory, it's easy for testing every aspect of the modules to be part of a routine QA/QC program. If a developer wants every room to be exactly the same — perhaps so it's easy to use identical case goods in every room — modular construction delivers that.

Less need for stabilizing structure:
Each module has to be very sturdy to withstand the rigours of transportation and craning. Furthermore, when 6-sided modules are stacked together, the double walls and double floor/ceilings mean the building itself is more robust. The upshot is that the building may not need an additional concrete stabilizing structure, potentially reducing costs for developers.

Reduced punch list:
Because modules can be delivered to the site almost completely finished — after inspections at the factory — damage (e.g. to plumbing fixtures and paintwork) is less likely. A reduced punch list means fewer unforeseen costs at the end of a project. It also means less disruption to the opening schedule and a project is quicker to cash.

"Before you open a hotel, a team goes through all the rooms with a punch list, taking photos and putting red stickers on things they see are wrong. They might do that two or three times before it reaches an acceptable level of work. If there are 300 rooms, say, that takes a long time — and with a conventionally built hotel, there are usually many things that can't be fixed because they're basically the result of poor construction work."

CAREL VAN HOUTE





Dr. Mohammad Kamali is a researcher in the field of sustainable construction. He is also a sessional lecturer at the University of British Columbia & a college professor at Okanagan College. He has published a number of academic research papers on the life cycle sustainability of modular buildings.

"Each individual module must maintain structural integrity during transportation and being craned into place. Because each module has high structural quality, this typically results in a building with a tighter envelope than if it had been site-built. This tighter envelope can be beneficial for the energy performance of the finished building. In addition, around 85-90% of a modular building is built indoors by experts doing the same tasks (including energy-related tasks) on a daily basis.

This means that the quality of the finished building tends to be better — including more energy efficient — than a site built building. So, even when building to the same energy efficiency standards, the quality of the finished modular building can be greater than a site-built structure."

DR. MOHAMMAD KAMALI

"Because modules are engineered to withstand transportation, each individual module is very rigid. In practice, this means that in some projects — such as the [five-storey] Iqaluit hotel — we can take out all of the lateral loads in the modules and not use any site-built concrete structures at all to stabilize the building laterally. This can significantly reduce construction time."

DANNY WOLSEY, LEED AP, P. Eng.



Since 2006, Danny Wolsey, LEED AP, P. Eng., has been the Owner & Principal at Wolsey Structural Engineering. He's worked as structural engineer since 1999, on numerous conventional and modular projects.

"With exactly the same product, when one is built sooner than the other, we can see there are numerous intangible savings opportunities that will materialize over time. However, and more importantly, clients can also see a substantial quantifiable figure in cash due to that time gain, over top of the other savings when they go modular. It's not just faster; it makes financial sense."
JIM DUNN



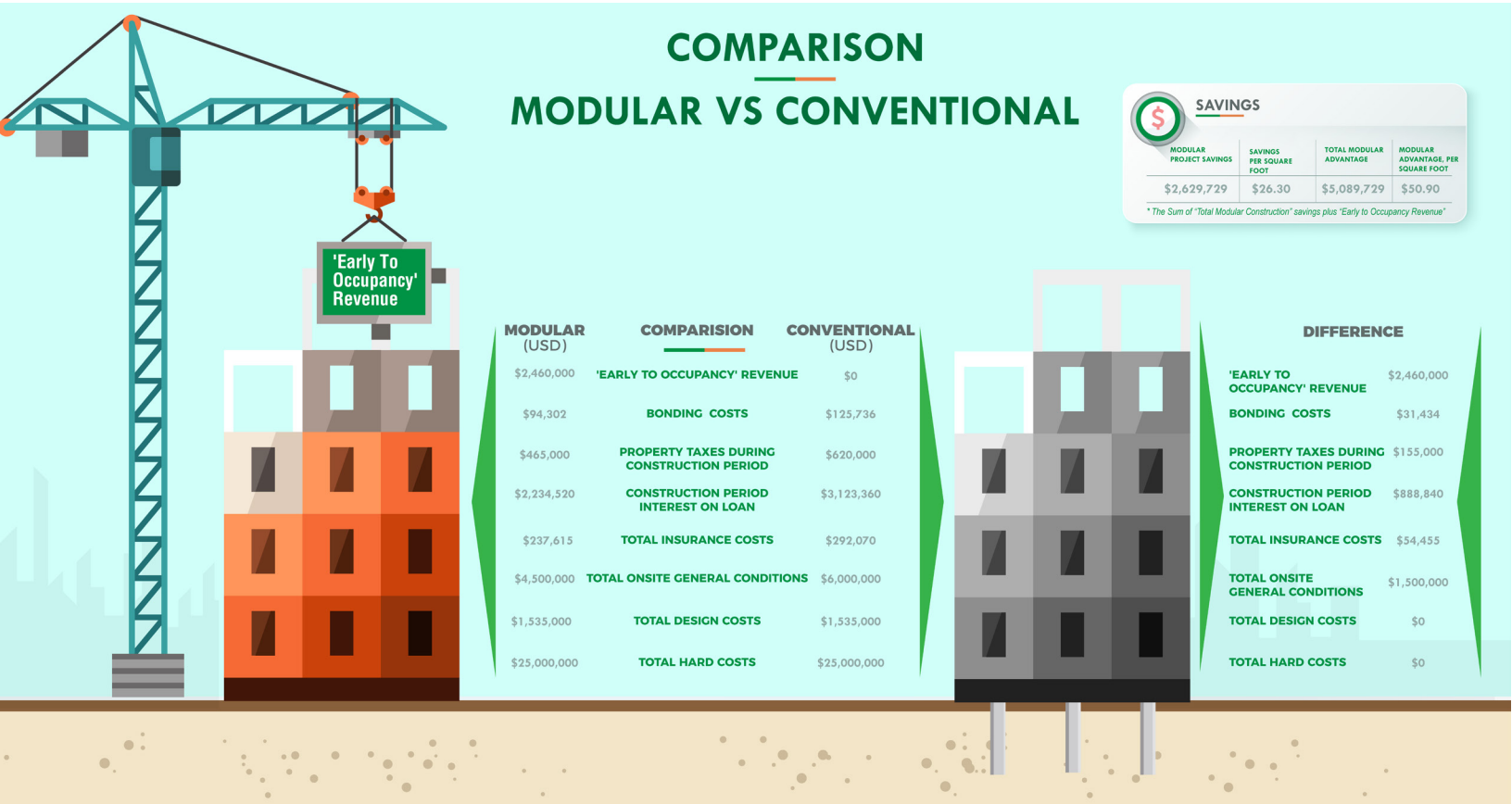
Jim Dunn is the President and founder of Stack Modular, a design-build manufacturer of up to 40-storey structural steel modular buildings for Canada and USA and with it's own wholly foreign-owned China-based modular manufacturing.

CONCLUSION

Although modular construction and conventional construction may have similar hard costs, there are other financial reasons to choose modular: lower soft costs, capital turn and quicker to cash, cost and timeline certainty, lower site-related costs, and asset value.

Key take away when considering your next project: **Hard costs are not all that matter!**

If you'd like to learn more about how modular construction can benefit your next hotel, student or seniors housing, or multi-family residence project, please contact Stack Modular at 1-800-819-3190 or info@stackmodular.com.



COMPARISON
MODULAR VS CONVENTIONAL

SAVINGS

MODULAR PROJECT SAVINGS	SAVINGS PER SQUARE FOOT	TOTAL MODULAR ADVANTAGE	MODULAR ADVANTAGE, PER SQUARE FOOT
$2,629,729	$26.30	$5,089,729	$50.90

* The Sum of "Total Modular Construction" savings plus "Early to Occupancy Revenue"

MODULAR (USD)	COMPARISION	CONVENTIONAL (USD)
$2,460,000	'EARLY TO OCCUPANCY' REVENUE	$0
$94,302	BONDING COSTS	$125,736
$465,000	PROPERTY TAXES DURING CONSTRUCTION PERIOD	$620,000
$2,234,520	CONSTRUCTION PERIOD INTEREST ON LOAN	$3,123,360
$237,615	TOTAL INSURANCE COSTS	$292,070
$4,500,000	TOTAL ONSITE GENERAL CONDITIONS	$6,000,000
$1,535,000	TOTAL DESIGN COSTS	$1,535,000
$25,000,000	TOTAL HARD COSTS	$25,000,000

DIFFERENCE	
'EARLY TO OCCUPANCY' REVENUE	$2,460,000
BONDING COSTS	$31,434
PROPERTY TAXES DURING CONSTRUCTION PERIOD	$155,000
CONSTRUCTION PERIOD INTEREST ON LOAN	$888,840
TOTAL INSURANCE COSTS	$54,455
TOTAL ONSITE GENERAL CONDITIONS	$1,500,000
TOTAL DESIGN COSTS	$0
TOTAL HARD COSTS	$0

MODULAR CONSTRUCTION TIMELINE

TOTAL MODULAR ADVANTAGE: $5,089,729

CONVENTIONAL CONSTRUCTION TIMELINE

*Based on 100,000 sq. ft. project.

STACK MODULAR
A BIRD PARTNERSHIP

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[i] Modular Construction: From Projects to Products, p. 10.
[ii] Economic Impacts of Commercial Real Estate, p. 74.
[iii] See p. 15, Modular Construction: From Projects to Products.
[iv] See p. 12, Modular Construction: From Projects to Products.
[v] Delay Analysis in Construction Contracts, p. 2.
[vi] "Compared with traditional construction, PMC [permanent modular construction] projects have statistically fewer change orders, which makes the design/construction process go smoother and faster." See also p. 3, Getting the Most Out of Off-Site Construction.
[vii] 2016 Equipment Theft Report, p16.
[viii] See p. 14, Modular Construction: From Projects to Products.
[ix] Design for Modular Construction: An Introduction for Architects, p. 13.
[x] Design for Modular Construction: An Introduction for Architects, p. 16.
[xi] See, for example, What do hotel customers complain about? Text analysis using structural topic model.

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Stack Modular is a design-build manufacturer of structural steel modular buildings for the multi-family/affordable housing, hospitality, student and senior or longterm care housing sectors. With our global supply chain, logistics platform and the ability to build up to 40 storeys, we are focused on helping our clients leverage the advantages of combining conventional and modular methods of construction to control spiralling project costs, schedules and risk.

As a manufacturer we also provide our clients with pre-construction services that include design assist, supply chain, logistics, and general contracting modular set and install consulting.

Stack combines it's 12 years of modular experience with the experience of our 100-year-old general contracting partner, Bird Construction, to deliver local code compliant modules, with stakeholder assurance that projects will be executed successfully.

Contact us contact us today for any inquiries

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