

## SUMMARY

*Assembly Select Committee on Housing Construction Innovation*

*Informational Hearing #1: Perspectives from Developers & Manufacturers*

*January 06, 2025*

### **Members Present**

Buffy Wicks (Chair)	John Harabedian
Jessica Caloza	Josh Hoover
Juan Carrillo	Diane Papan
Mark Gonzalez	Sharon Quirk-Silva
Jeff Gonzalez	Rhodesia Ransom
Heather Hadwick	Lori Wilson

### **Agenda**

- I. Opening Remarks
- II. Setting the Stage
  - a. Ben Metcalf, Terner Center for Housing Innovation, UC Berkeley
- III. Developer Perspective
  - a. Caleb Roope, The Pacific Companies
  - b. Lois Kim, Mutual Housing
  - c. Danny Haber, oWOW
  - d. Don Ajamian, Emergent 3D
- IV. Manufacturer Perspective
  - a. Alex Shea, US-Offsite
  - b. Kevin Brown, Harbinger
  - c. Garrett Moore, TektonOS
  - d. Apoorva Pasricha, Cloud Apartments

- V. Public Comment
- VI. Closing Remarks

### **Key Points**

- Financing tools to support factory built housing
- Incentives for local governments and developers
- Support for building and labor industries

### **Overall Summary**

Today, the Assembly Select Committee on Housing Construction Innovation held an informational hearing to discuss strategies to reduce construction costs and support innovation in housing. While the state has made progress in streamlining projects—by ensuring land availability and making the entitlement process timely and objective—it must now shift its focus toward fostering innovation in construction. The committee heard testimony from developers and manufacturers in the industry with a focus on factory built housing. Part of California's severe housing shortage is a result of unaffordability with construction costs. The cost in housing development continues to rise placing much pressure on the industry as well as on homeowners and renters. The committee seeks to explore ways to address practical and innovative solutions to reduce housing costs.

### **Opening Remarks**

Chairwoman Wicks opened the meeting by expressing the need to reduce housing costs. This past Fall the Assemblymember and her colleagues attended tours in Sweden focusing on modular and prefabricated housing. Additionally, her delegation visited Idaho and Indiana to look at factory built housing. The key questions Assemblymember Wicks aims to explore with the committee are:

- How do we address the cost of construction?
- How do we support innovation?
- What can the state do?

- What actions can the state take to make homes more affordable?

Members of the committee also expressed their thoughts regarding housing development. For example, Members highlighted factory made housing and modular housing happening in their own districts – e.g., Palmdale factory and modular housing in El Monte. Other perspectives from the committee included the transportation of materials to field sites, materials used to construct, the type of design and innovation in building single family and multi-family factory housing, job creation in rural areas, supportive housing for veterans and seniors, as well as engaging in conversations with the building and labor industry, and finally addressing financing and interest rates.

### **Setting the Stage**

Ben Metcalf, Terner Center for Housing Innovation, UC Berkeley, testified on the impact of construction costs—particularly industrialized and factory-built housing. The costs continue to rise faster than inflation, driven in large part by labor shortages, an aging construction workforce, wage pressures, and federal policies affecting tariffs and immigration. Metcalf highlighted that construction is one of the only major industries where productivity has declined over decades, underscoring the need for innovation.

Industrialized construction—including factory-built housing—is a promising solution. Under the right conditions, factory-built housing can reduce hard construction costs by 10–25% and shorten construction timelines by 20–50%. Beyond cost and speed, factory-built housing improves construction quality, worker safety, workforce diversity, and environmental outcomes. Factory settings reduce material waste, support climate goals, and offer safer, more stable working conditions. Notably, women represent 20–30% of factory-built housing workforces, compared to roughly 4% in traditional on-site trades. Despite these benefits, factory-built housing currently accounts for only a few thousand units per year in California. Production capacity is limited, with only a small number of factories able to deliver multifamily housing at scale, many of which are located out of state. Idaho, in particular, produces a

significant share of modular housing used in California. With coordinated policy action, California could reduce risk for developers, stabilize manufacturing demand, support safer and more reliable construction jobs, and ultimately increase the state's capacity to meet its housing needs.

Metcalf identified four primary barriers to scaling factory-built housing:

1. Financing for early capital needs for factory production.
2. Addressing building codes and local design approvals.
3. Demand and pipeline uncertainty.
4. System fragmentation, including limited research capacity, insufficient data sharing, and the absence of a single coordinating entity within state government.

**Member Questions:**

Assemblymember Carrillo: How can the state incentivize cities—rather than just developers—to welcome and approve innovative housing types like manufactured or factory-built housing, especially given ongoing concerns about local control?

Metcalf: California already uses incentive-based approaches, such as the Pro-Housing Certification Program, which rewards cities that support housing production with preferential access to various funding sources, including non-housing grants. To more effectively incentivize local governments, the state must help offset the fiscal and infrastructure costs cities incur when approving housing, including lost property tax revenue and the need for additional public investments.

Assemblymember Wilson: How does the current system—where cities approve housing projects one at a time—disrupt the demand pipeline and make it harder to scale factory-built housing? Could the state play a stronger role in stabilizing demand by acting as a buyer or aggregator of factory-built units (for example, purchasing units and distributing them across projects statewide), and would that help address both demand uncertainty and system fragmentation?

Metcalf: Factories need predictable demand, typically programming their production schedules six months to a year in advance. To secure a production slot, developers are often required to put down significant upfront capital, which is difficult when projects are still awaiting approvals or final financing. This uncertainty makes it hard for factory-built housing to scale. Providing developers with earlier and more reliable entitlement approvals could help reduce this risk. Potential approaches include direct state procurement of units (such as for disaster recovery), incentives that steer a portion of affordable housing development toward factory-built methods, or other direct supports for factories. Collectively, these strategies could help build production capacity and address demand uncertainty.

Assemblymember Wilson: What did this look like in the '70's at the federal level?

Metcalf: A program known as Operation Breakthrough is a HUD-funded off-site construction research initiative. While state purchasing of factory-built units is an intriguing idea, it raises practical challenges. Currently, housing units cannot be built without a specific site in mind due to local building code requirements and variations in design. Factories also produce different housing types using different materials and serving different markets, from single-family and ADUs to large multifamily projects. As a result, an open question remains whether the state could identify standardized unit types suitable for purchase that would meaningfully support a diverse factory-built housing sector.

Assemblymember Mark Gonzalez: Is there currently any R&D happening in California?

Metcalf: Research on factory-built and industrialized housing is currently limited, with much of the existing work in California concentrated at the Turner Center. While Turner has led this research for the past several years, significant gaps remain. There is a need for expanded, state-supported research.

Assemblymember Mark Gonzalez: As California explores factory-built and industrialized construction—especially given that it's already being done at scale elsewhere—are state building trades and labor organizations being meaningfully included in these conversations so the state doesn't move ahead without them and end up having to 'play catch-up' later?

Metcalf: The building trades representatives are engaged in the process.

Assemblymember Ransom: What are the top research and development priorities in factory-built housing—specifically, what evidence or data does the state need to generate to build confidence and justify stronger incentives and broader adoption?

Metcalf: A major barrier to wider adoption of factory-built housing is the lack of reliable, publicly available data on construction costs. The state needs to build a robust, neutral evidence base that measures, documents, and evaluates outcomes across different factory-built approaches over time.

Assemblymember Ransom: Would establishing standardized or uniform building plans—similar to approaches used in post-wildfire rebuilding—help reduce entitlement delays and make it easier to incentivize and scale factory-built housing, and is this a meaningful opportunity for the state to pursue?

Metcalf: Standardization can significantly reduce delays and support factory-built housing. Greater regulatory certainty and streamlined coordination between state building code approvals and local inspections—particularly at connection points—could further simplify the process and reduce overlap.

Assemblymember Quirk-Silva: How do factory-built housing costs compare to traditional construction—especially for affordable and supportive housing—and what does that mean for public spending and labor impacts? How do recent or existing building code freezes or "code stays" affect the state's ability to pursue factory-built housing and potential code changes needed to support it?

Metcalf: Factory-built housing does not automatically deliver cost savings; savings depend on having the right conditions, including aligned project design, financing, and a supportive regulatory environment. When those factors are present, cost reductions of roughly 10–25% are achievable. While this alone will not solve the affordability crisis, it can stretch public investment further by producing more units with the same funding. Time savings are more consistent, which lowers financing costs by reducing how long capital is tied up. Even when factory-built housing does not reduce costs, it can still add value by expanding construction capacity in regions where there are too few local builders to meet demand, allowing projects to move forward faster than traditional methods. Additionally, while recent code freezes limit new local amendments, factory-built units certified by the state must still comply with existing local requirements. This variability makes it difficult for factories to standardize production and for developers to fully realize the benefits of factory-built housing.

### **Developer Perspective**

Caleb Roope, CEO, the Pacific Companies, noted that modular units are roughly 40% completed in the factory and 60% finished on-site, which still requires significant labor. Factory-built housing allows projects to be completed quickly—even large buildings (e.g., 170+ units) can be assembled in roughly 20 days—and in challenging climates or high-cost regions like mountain areas. Benefits include roughly 20–23% cost savings, faster schedules, higher quality, improved worker safety, and the ability to address labor shortages. For example, modular construction reduced public subsidy needs by \$18 million on a 2021 affordable housing project compared to traditional methods.

Roope suggested several strategies to encourage modular adoption:

1. Incentivize the state by demonstrating cost savings and housing output.
2. Exempt on-site or off-site fabrication from sales taxes.
3. Provide local governments with doubled housing credits for affordable homeownership projects using modular construction.

4. Create factory-friendly policies, such as property tax exemptions for affordable units built in factories, access to state-owned sites, streamlined credit systems, CEQA exemptions, and allowance for third-party inspectors.
5. Address logistical barriers, like California's requirement for highway escorts for large modules, which restricts modular unit sizes compared to neighboring states.

Overall, Roope emphasized that modular construction can deliver more housing, faster, safer, and more efficiently, but broader adoption requires targeted incentives, regulatory streamlining, and infrastructure support.

Lois Kim, Mutual Housing, described the nonprofit's approach to scalable factory-built affordable housing. Mutual Housing aims to reduce construction timelines by 40% and development costs by at least 10%, streamline design and production, and create efficiencies across projects. This predictable pipeline also encourages innovation and investor confidence. However, some challenges include limited demand due to perceived risks of modular construction, rigid financing timelines, and inconsistent factory experience and pricing in California—leading Mutual Housing to select a factory in Idaho for its projects. Kim emphasized that state policies, flexible funding, and explicit incentives for factory-built housing could increase demand, stabilize supply, and support scalable affordable housing solutions. Mutual Housing demonstrates that innovative construction can deliver affordable, zero net energy housing faster, cheaper, and at scale, aligning with the committee's priorities on reducing costs and increasing housing production.

Danny Haber, oWOW, expressed that their company uses mass timber and componentized construction to dramatically reduce costs and timelines for multi-family housing. Their 19-story Oakland timber tower was built 35% faster and 35% cheaper than comparable projects, and their upcoming 11-story, 284-unit affordable housing project will cost \$325,000 per unit, roughly half the cost of typical Bay Area projects. oWOW achieves these savings through standardized designs, flat-packed components, and simplified installation that does not require

specialized subcontractors. Innovations include mass timber floors, prefabricated exterior walls, and factory-made steel seismic systems, all reducing costs and speeding construction. Haber projects that with further improvements and policy support, costs could drop to \$200,000 per unit, demonstrating the potential to scale affordable housing while maintaining quality and sustainability.

Additionally, outdated building codes, excessive local fees, and lack of innovation incentives are driving up housing costs. Solutions include modernizing codes, reducing monopolistic fees, and providing state-backed incentives to reward innovation—potentially saving millions per project without additional taxpayer cost.

Don Ajamian, founder of Emergent 3D, has used 3D concrete printing to address labor shortages, high costs, and disaster resilience in California housing. 3D printing allows fire-resistant, energy-efficient, and aesthetically flexible structures, reduces on-site errors, and automates much of the construction process. However, outdated building codes force redundant structural systems, increasing costs and timelines. Ajamian requests allowing 3D printing projects to participate in self-certification programs, leveraging licensed architects and engineers to expedite permits. The technology is particularly suited for disaster recovery and addressing California's housing needs, while training a workforce in innovative construction methods.

### **Member Questions**

Assemblymember Papan: Does going above five stories require steel—is that correct? Would having the full faith and credit of the state of California to back the purchase of materials be helpful?

Haber: It is engineered with denser wood, which is also approved in Canada and Europe and approved in other U.S. states. Specifically, mass timber, a type of wood construction approved in California's 2021 building code, now allows buildings up to 27–28 stories (270 feet), enabling tall wood towers in the state. Haber also noted that the issue is on

high permanent loan interest rates. Even with low construction costs, high rates make new housing financially difficult. If the state could offer a guarantee or fee arrangement to reduce interest rates—e.g., by 0.5%—it could save millions on large projects.

Assemblymember Ransom: How many successful 3D-printed projects have been completed since the 2018 fire, and can you show examples that illustrate the full potential of what's possible with this technology? Are there additional challenges? Is this a community or state wide issue?

Ajamian: Adoption of new housing methods, especially in single-family detached homes, is slow because it's a major investment for buyers, but acceptance grows as more projects are completed.

Roope: The main challenge for Tracy was lack of steady business and operating capital.

Haber: Current project cost are \$325K per unit, could drop to \$250K with lower land costs and improvements, and potentially to \$200K by updating outdated building codes and reducing excessive fees, yielding 10–15% savings.

Assemblymember Wicks: How can the developer community be encouraged to take the risk on innovative or factory-built housing projects, especially after high-profile failures like Katara, when traditional stick-built construction feels safer and more reliable?

Kim: Emphasized the importance of committing to a full pipeline rather than one-off projects to build. Developers are eager to adopt innovative construction methods, but financing is still an issue.

### **Manufacturer Perspective**

Kevin Brown, Harbinger Production, highlighted the company's experience delivering over 4,000 modular homes in California, emphasizing that modular housing success depends on skilled union labor, efficient manufacturing, and consistent demand. Brown suggested the state

create multi-year, aggregated and coordinated policies, as well as focus on procurement, which would enable faster, lower-cost housing, foster innovation, attract private investment, and support California workers and local factories.

Apoorva Pasricha, Cloud Apartments, emphasized that the company is a modular integrator with 2,800 units under contract in California. She emphasized that most cost savings from modular construction are lost in the field, not the factory. Pasricha argued that flipping the “field-to-factory” cost ratio is key to cutting costs. Her recommendations include:

1. Market signaling to encourage modular adoption and trigger expedited local approvals.
2. Enforcement of state authority under the factory-built housing program to prevent costly local overrides.
3. Expansion of state authority to oversee on-site assembly, reducing redundancy and inefficiency.

Garrett Moore, TektonOS, shared his experience with modular housing and its challenges, particularly for single-family homes. He advocates for panelization, a flexible kit-of-parts system that allows industrialized construction while accommodating design variability. TektonOS focuses on creating a prefab operating system that enables top builders to scale production efficiently. He suggests the state centralize performance-based code approvals, absorbing or sharing liability so local jurisdictions can approve innovative off-site construction without risk.

Alex Shea, US-Offsite, a modular housing company in Redding, CA, discussed their factory-built modular approach. The company plans to scale from 150,000 to 1 million square feet annually. Their model emphasizes addressing local impact, creating jobs, providing second chance employment, and addressing homelessness. Shea emphasized the need for a reliable production pipeline and strong partnerships to scale housing effectively and sustainably. Shea stressed that modular housing is part of the solution, and proposed three key recommendations:

1. Demand incentives (e.g., density bonuses for factory-built housing).

2. Streamlined approvals (30-day local plan check shot clocks, third-party plan reviews).
3. Innovative financing (securitized factory-built housing loans, tax-exempt bonds, expanded federal support).

### **Member Questions**

Assemblymember Papan: With modular or factory-built construction, how much less on-site trades work is actually required, and does the increased efficiency free up skilled workers to do other projects, potentially maintaining or increasing overall labor productivity and income?

Pasricha: Cloud's modular system shifts most plumbing and mechanical work into the factory, drastically reducing the need for skilled trades on-site—from days to minutes.

Brown: In factory modular construction, about 35–40% of the project work shifts. Union jobs remain, just relocated, and cost savings can increase housing production.

Assemblymember Hoover: How does building in a factory setting benefit the workforce, particularly in terms of providing year-round work, compared to traditional on-site construction where weather, permitting, and project delays can limit tradespeople's employment opportunities?

Brown: Building in a factory provides workforce benefits by offering year-round, weather-independent work, shorter commutes for local employees, safer conditions, and more predictable hours, which improves quality of life and attracts experienced tradespeople.

Shea: Factory-built construction offers sustainable, family-friendly work by keeping jobs local, providing regular hours, shorter commutes, and consistent time off, improving work-life balance for tradespeople compared to traveling long distances for traditional job sites.

Moore: Factory-built and off-site construction improves worker safety and productivity without replacing jobs. By shifting some tasks from the field to the factory, crews can work more efficiently, produce more units, and earn more in safer conditions.

Pasricha: Shifting trades work to factories makes on-site construction more efficient, unlocking greater capacity for field workers. Factory-built housing lowers costs and enables projects that otherwise wouldn't pencil, creating new union trade jobs on-site and expanding housing development opportunities.

### **Public Comment**

Abundant Housing LA: Expressed appreciation for the committee and looking forward to its future work.