

Factory-Built Housing in the U.S.: Ready to Scale or Destined to Fail?

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ABSTRACT

The U.S. housing market should be ripe for innovation given a five-million-unit shortage. But cost of capital, supply chain disruptions, and staggeringly low labor productivity in construction, relative to other industries, stymie growth and have led to decreasing construction starts over the past five years.

Industry experts often promote industrialized construction as a means to greater productivity, improved worker safety, time savings, less waste, and more efficient homes. Unfortunately, except for manufactured housing, factory-built homes (FBH) in the U.S. have not demonstrated substantial cost savings for homebuyers and remain niche. Even deep-pocket investors have not succeeded in mass producing quality, affordable homes that meet local codes.

Simultaneously, another threat to housing stability is growing: insurers have withdrawn from high-risk markets, and millions of homeowners face coverage gaps that expose them to catastrophic financial loss. With only a few states adopting policies encouraging construction to withstand disasters, most new homes are built without sufficient mitigation for growing hazards, and like energy efficiency, resilience is invisible and undervalued in most markets.

This paper argues that growing residential insurance market instabilities, if addressed strategically, present an opportunity to garner state and local government support for regional or national FBH resilience standards and allow FBH to compete much more effectively with onsite construction. Based on market research and interviews with leading industry thinkers, it examines the converging housing and resilience crises and proposes a strategy through which coordinated action across policy, insurance, and capital markets can catalyze factory production of resilient, energy efficient homes.

Introduction

The U.S. housing market has been stubbornly resistant to growth for the past two decades despite significant, well-documented shortages in towns and cities across the nation. Factory-built housing (FBH)¹ has long been proposed as a method for filling these gaps given factory production can be faster, potentially cheaper, and more precise than conventional site-built construction. Yet FBH has repeatedly failed to achieve meaningful scale in the U.S. despite sustained interest from investors, policymakers, and advocates. During this same period, another threat to housing has been steadily growing in parallel: rising catastrophe losses, retreating insurers, and millions of homeowners in high-risk markets without adequate coverage.

These two problems have generally been tackled by different communities of practice and in different policy venues; [yet,yet](#) they are both hindered by unclear, complex standards and

¹We define “factory-built housing” (“FBH”) as any home where the majority of construction labor activity happens in a factory rather than onsite. This definition includes both manufactured housing (which must be built to national codes set by HUD) and modular/panelized housing, which must be built to local building codes.

ineffective market valuation. Just as the lack of standard building specifications stymies growth of FBH, a lack of widely accepted resilience specifications and accompanying data prevents insurers from offering a distinct, priceable product category for more resilient homes. On the valuation side, capital markets and consumers do not fully recognize the benefits of a home's resiliency, including passive survivability² as provided through effective structural design (e.g., insulation, sealing, natural ventilation). Lenders similarly have been wary of financing non-traditional construction methods due to insufficient access to credible information on risks as well as societal and institutional preferences for traditional construction (Smith et al. 2022).

Given these common underlying obstacles, this paper suggests a joint approach to address barriers that hinder both FBH and home insurability. Building on recent FBH market analyses as well as interviews with leading thinkers in the field, we propose a strategy through which coordinated action across policy, insurance, and capital markets can accelerate FBH production, expand homeowner access to insurance in high-risk markets, and establish the market infrastructure to value resilient homes appropriately.

The Unfulfilled Promise of Factory-Built Housing in the U.S.

The nation's housing shortage, estimated to be about 5 million units (CRS 2026), reflects decades of underbuilding relative to household formation and population growth (National Association of Realtors 2021; Freddie Mac 2021). Rather than accelerating to meet this need, construction starts have declined for five consecutive years falling to 1.36 million units in 2025, roughly 15% below 2021's market high (Census Bureau 2025). At a time when demand and prices remain elevated, this type of market decline indicates the significant structural obstacles that hinder growth particularly in high-demand markets where regulatory and labor cost barriers are most acute (Gyourko and Krimmel 2021).

In addition to burdens such as cost of capital, supply chain disruptions, and regulatory barriers like restrictive zoning and varied local building codes, strikingly low labor productivity of the construction sector relative to the broader economy continues to stymie the market. While productivity across most industries has increased substantially over the past several decades, construction productivity has remained essentially flat since the 1960s (McKinsey Global Institute 2017). With no ability to offset rising labor and material costs through productivity improvements, these cost increases are passed on to the consumer in the form of higher home prices (Holt and Ray 2024; HBI 2025).

It is in this context that FBH attracts attention as a potential path to increasing housing supply at lower cost and more expeditiously than traditional construction. The potential advantages of FBH relative to site-built construction are well documented: factory environments allow for tighter construction tolerances (i.e., more precision), reduced material waste, and greater scheduling predictability. Construction timelines can be 20 to 50% shorter than comparable site-built projects, potentially reducing financing costs and allowing faster response to demand (McKinsey & Company 2019). In some cases, the advantage can be even more dramatic: a 155-unit modular student housing project in Quebec, which would have taken four years through traditional construction, was completed in twelve months (Fournier Filion, cited in Held 2025). Factory production offers cost savings of 10 to 20% under the right conditions of

² Passive survivability refers to a home's ability to maintain habitable temperatures during extended power outages without mechanical heating or cooling.

scale and standardization (McKinsey & Company 2019; Center for American Progress 2024). Furthermore, manufacturing environments in the U.S. are substantially safer than construction sites: in 2024, fatal injury rates in construction were about 4 times higher than manufacturing.³

Outside of the U.S., FBH has achieved significant and sustained market share and growing commitments. In Japan, factory-built methods account for approximately 15% of new housing production, supported by a national housing system certification program that has been in operation since 1962 (Rupnik et al. 2026). Sweden's adoption of performance-based building codes beginning in the late 1980s similarly enabled industrialized construction to become a dominant delivery method with 45% of Swedish homes built using FBH methods (McKinsey & Company 2019). The United Kingdom has pursued a modern method of construction (MMC) framework since the late 1990s, with increasing government commitment to industrialized delivery as a housing supply strategy (Rupnik et al. 2026). And in 2025, Canada committed \$13 billion to expedite FBH construction and fund up to 45,000 new modular homes throughout the country (CBC News 2025). In all these cases, sustained government action to address regulatory and demand-side barriers preceded private sector investment and scaling.

The United States, by contrast, has a long history of promising FBH initiatives that have failed to achieve lasting scale. The federal government's most ambitious effort—HUD's Operation Breakthrough, launched in 1968—sought to catalyze a national industrialized housing sector through demand aggregation and regulatory harmonization. Despite significant federal investment and industry participation, the program did not produce the self-sustaining market transformation it sought (Rupnik et al. 2026). More recent private sector efforts have similarly fallen short. Kattera, a venture-backed industrialized construction company that raised over \$2 billion in capital, collapsed in 2021 in part because it could not successfully navigate the hundreds of different local building code requirements throughout the country (authors' interview with Ryan Smith, March 2026). Factory OS, a modular manufacturer with strong institutional backing and a focus on affordable housing in California, was acquired by a private equity consortium in 2024 and rebranded as Harbinger Homes, only to be sold off at auction in June 2026 (Onyx 2026). Veev, which developed a proprietary panel system with integrated mechanical, electrical, and plumbing for FBH, shut down in late 2023 after its final round of investor funding fell through (The Real Deal 2023). These repeated misstarts, only a few among many, occurred despite significant capital and institutional backing, highlighting the structural barriers that hinder FBH in the US.

There is substantial and growing consensus among researchers, practitioners, and policymakers regarding why FBH has failed to scale in the United States despite its demonstrated advantages. A 2022 research roadmap developed by MOD X Advisory and the National Institute of Building Sciences, in collaboration with HUD, identified six obstacles to scaling offsite construction: the nation's regulatory framework; standards and system performance; capital, finance, and insurance; project delivery and contracts; labor and workforce training; and business models and economic performance (Smith et al. 2022). A subsequent comparative study published by HUD in 2026 reinforced these findings, concluding, as HUD recognized as far back as 1968, that the barriers to scaling industrialized construction "are not technological, design, or cost factors, but only institutional constraints" (Rupnik et al. 2026). Similarly, a March 2026 study by the Turner Center for Housing Innovation at the University of

³ In 2024, there were 9.2 fatalities per 100,000 workers in construction compared to 2.4 fatalities per 100,000 in manufacturing (BLS 2026).

California, Berkeley synthesized input from more than 65 industry practitioners, and identified seven major types of barriers that persist despite growing policy attention: building code fragmentation, permitting inconsistency, financial risk and liability, demand volatility, workforce gaps, misalignment of existing public funding streams with FBH delivery timelines, and negative market perceptions (Hawke, Aguilar, and Pullen 2026).

Despite these formidable challenges, a number of U.S. cities, states, and private companies have been undeterred, working toward policy reforms and investing public and private resources. Cleveland has committed to producing 5,000 affordable homes and intends to pick a modular home manufacturer to produce 100 to 200 units annually in a repurposed former General Electric plant (City of Cleveland 2025) as part of its strategy. Boston's Metropolitan Area Planning Council is using \$2.2 million of its \$3 million PRO Housing grant as seed funding for a regional modular manufacturing facility. The City of San Jose established a foundation-only permitting process for state-approved factory-built units to allow a home to move from permit application to occupancy in as little as 90 days. Utah, Colorado, and Virginia have adopted building code reforms intended to reduce friction for offsite construction. A new generation of integrated FBH companies has emerged with models explicitly designed to address the financing and demand volatility barriers. For example, two among likely more than 200 modular companies in North America (Mesocore 2025), Volumetric Building Companies and Reframe Systems represent serious private sector efforts to crack the scale problem through vertical integration, standardized product platforms, and long-term developer relationships.

While each of these examples offers lessons to inform future policy and industry efforts, this paper posits that FBH is likely to remain niche unless one barrier in particular is overcome: regulatory fragmentation. Without consistent building codes and streamlined inspection requirements, factories cannot standardize; without standardization, they cannot achieve the scale that allows them to be cost-competitive; without demonstrated cost competitiveness, developers are reluctant to commit; without developer demand, factories cannot sustain the production volume needed to justify capital investment. So, the question is, in a country where land use is fundamentally viewed as a local issue, could any bigger concern drive state and local governments to accept something developed outside their jurisdictions?

As discussed next, another crisis in housing—increasing difficulties in accessing home insurance—may actually be big enough to drive change. We suggest that interest in housing resilience and insurability may provide an unexpected opportunity to develop an approach that preserves some local authority over site-specific decisions while allowing FBH manufacturers to construct to building performance specifications standardized across large, likely regional markets, as an alternative compliance path to meeting state and local building requirements.

The Resilience and Insurability Crisis: A Parallel and Converging Problem

A parallel crisis has been building in the residential insurance market, driven by the increased frequency and severity of weather-related disasters. The homeowners insurance product line has been unprofitable in most years over the past decade. In 2023, insurers had their worst underwriting year since 2011, with the net combined ratio reaching 110.9 on a scale where 100 corresponds to insurers breaking even given expenses such as claims and revenues such as premiums (Insurance Information Institute 2024). Carriers have responded by aggressively raising rates, exiting high-risk markets, tightening underwriting, and transferring greater risk to reinsurers and policyholders. While the product line returned to marginal profitability in 2024 —

its first underwriting profit since 2019 — that result rested largely on those rate increases and on catastrophe losses absorbed by reinsurers, not on any resolution of the underlying risk (S&P Global Market Intelligence 2025). Major insurers have stopped writing new policies or withdrawn entirely from California, Florida, and Louisiana (California Department of Insurance 2024; CNN 2023; E&E News 2022). Approximately 6.1 million homeowners, representing 7.4% of all U.S. homeowners, are currently without private insurance, relying on state insurers of last resort — mechanisms designed as temporary backstops, not permanent market substitutes — or carrying no coverage at all (Consumer Federation of America 2024). The structural conditions driving insurer withdrawal from high-risk markets are unresolved: premiums remain at historic highs, state residual markets continue to grow, and private insurers will continue to make market adjustments after future catastrophes hurt their bottom line.

The physical structure of the existing housing stock, and of many new homes built today, is at the root of this crisis. Homes built to minimum code standards (or to older codes that predate current understanding of wind, flood, and wildfire risk) generally fare poorly in major disasters, generating claims that insurers can no longer cover without significant premium hikes. These homes also often lack energy efficiency and are not designed for passive survivability, putting residents at higher risk in extreme temperatures.⁴

In response to growing damages from hurricanes and severe storms, the Insurance Institute for Business & Home Safety (IBHS) developed FORTIFIED Home™, a voluntary above-code construction and retrofit certification program based on rigorous, hazard-specific standards for residential roofing and construction. A 2025 study of more than 40,000 properties affected by Hurricane Sally found that FORTIFIED-certified homes experienced 55 to 74% fewer insurance claims than comparable conventionally built homes in the same storm and accounted for only 9% of claims despite representing nearly a quarter of policies studied (University of Alabama/CRIR 2025). IBHS also developed the “Wildfire Prepared Home™” program to provide a similar designation for homes built to be resilient to wildfire risks, with certifications available in fourteen states (Wildfire Prepared 2026). Experience from the FORTIFIED and Wildfire Prepared programs is consistent with broader resilience research: updating building codes returns \$11 for every \$1 invested in avoided losses (NIBS 2019).

These findings have begun to reshape state-level policy in some of the highest-risk markets. Alabama has led the country in translating resilience certification into insurance market incentives: homeowners who build or retrofit to the FORTIFIED Gold™ standard can receive wind premium discounts up to 55% from participating insurers (Alabama Department of Insurance 2024; Smart Home America 2024). Alabama's mandatory discount law requires admitted carriers to offer rate reductions for FORTIFIED-certified homes. Other states have developed similar programs in response to their own recent disaster losses, with over a dozen states⁵ either specifically naming FORTIFIED or recognizing the upgrades required in the standard when offering homeowners incentives for strengthening their homes. The National Association of Insurance Commissioners (NAIC) supports states in adopting these programs by providing program design guidance and technical assistance. NAIC also conducts research to validate the effectiveness of adopting resilience standards (NAIC 2026).

⁴ Heat is the highest cause of weather-related fatalities in the U.S. (National Weather Service 2024)

⁵ Texas, Oklahoma, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Maryland, New Jersey, New York, Connecticut. Source: <https://fortifiedhome.org/incentives/>; accessed June 18, 2026.

These state-level efforts are noteworthy demonstrations that resilience certification can change both construction behavior and insurance market dynamics. But, with only about 100,000 FORTIFIED certified homes across the country (Smart Home America 2024), it is clear that piecemeal efforts won't drive systematic change. Just as no one state or city acting alone can bring FBH to scale, none can send a market signal large enough to make resilience a standard, valued practice in the larger new construction market.

A Strategy for Driving Resilient Home Construction and Supporting FBH

Although not obviously linked, addressing insurance challenges through the establishment and promotion of national or regional resilience standards may be the best way for FBH to scale. Standard resilience specifications, combined with a simplified method for manufacturers to demonstrate that their production lines produce homes that meet those specifications, solve multiple problems simultaneously: FBH manufacturers have a standard target to build to and a streamlined path to ensure regulatory compliance; insurers can confidently underwrite certified homes built by FBH manufacturers; and in the long-run, with sufficient supporting data, capital markets can recognize and value certified homes as distinct from other homes. Equally important, a focus on resilience and insurability may provide the political cover that state and local governments need to justify recognizing regional or national standards as an alternative path to meeting state and/or local building codes.

A strategy that provides an alternative to regulatory fragmentation, and goes further to address other fundamental market needs, has the potential to create a self-reinforcing cycle that has eluded previous attempts to scale FBH in the U.S. Figure 1 provides an overview of the strategy's three pillars and primary functions.

The first pillar requires establishment of a multisector consortium with insurance at its core. The Consortium develops a residential resilience standard, a corresponding certification for homes that meet the standard, and a streamlined process for manufacturers to demonstrate that they produce certified homes. It also establishes underwriting standards for data collection and sharing protocols to allow actuarial analysis of claims data from certified homes. The second pillar – preferential public procurement and policies, along with state and local government recognition of the certification as an alternative method for meeting state or local building codes – provides a reliable pipeline that supports investment in FBH. The third pillar focuses on longer-term transformation: if certified FBH are more durable and resilient, the consortium's collection of standardized claims data drives the mortgage capital markets to translate superior performance into price signals, thereby making resilient FBH the economically rational choice for builders, buyers, and communities.

Establishing the resilience standard, certification, and FBH compliance method are the essential first steps, but the strength of that foundation depends on upfront and ongoing engagement of insurers, state and local governments, and institutional homebuyers. Insurance companies, likely represented by IBHS, are key to making a resilient FBH certification economically self-sustaining, through the establishment of underwriting standards, data collection, and actuarial analysis. Entities that fund or subsidize large numbers of homes (e.g., state housing finance agencies for homes built with low-income housing tax credits, FEMA for rebuilding homes during disaster recovery) need to have faith in the efficacy of the resilient FBH certification to make procurement and policy commitments that favor certified homes. State and local governments are key constituents who have the power to recognize certification as an

alternative path for complying with state and/or local building codes. Finally, while it will take longer to achieve, data on how resilient FBH certified homes perform in different hazard regions and claim cycles is key to ultimately driving changes in mortgage markets and allowing rational pricing of resilient FBH.

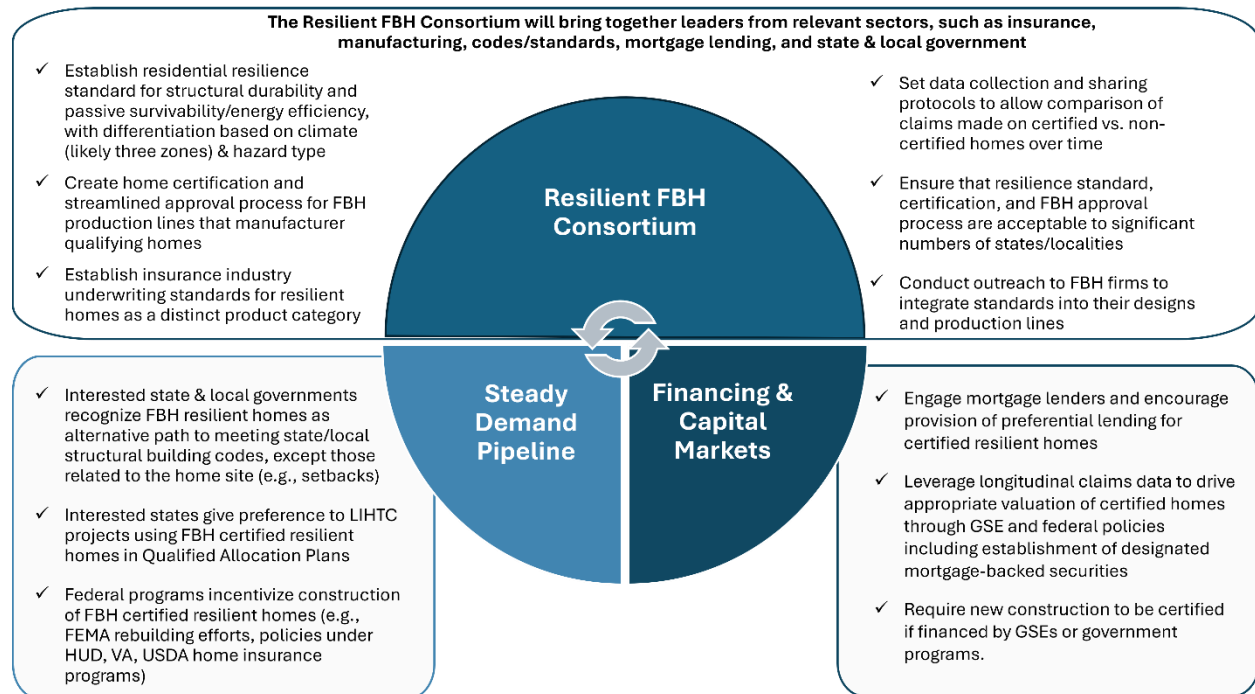


Figure 1. Three-pronged strategy

Resilient FBH Consortium, Resilience Standard, Certification, & Streamlined Compliance

With disasters destroying communities across the U.S. each year, and insurers exiting high-risk markets, the issue of resilience is of growing interest to homeowners, federal, state, and local government, builders, and insurers alike. Individual states have created state-specific resilience requirements (e.g., California’s Wildland-Urban Interface “WUI” building codes), but a coordinated effort is needed to spur large scale production of homes that offer wind resistance in hurricane-prone markets in the Southeast, hail resilience in the central US, wildfire hardening in fire-risk zones in the West, and addresses threats across the entire nation.⁶

Efforts to date have focused on either how to improve resilience or how to speed production of housing. In contrast, the proposed Consortium seeks to address both needs simultaneously by focusing on the development of a resilience standard, certification, and streamlined compliance process for qualifying FBH. With representatives from insurance, manufacturing, state and local government, and other relevant sectors, an effective consortium

⁶ The overwhelming majority of U.S. residential catastrophe losses from the private home insurance market are due to three major threats: hurricanes and coastal wind (about 61% of building value at risk) in the Southeast, severe convective storms including tornadoes and hail (about 25%) in the Great Plains, and wildfire (about 12%) in the West (Federal Insurance Office 2025).

brings together individuals with the motivation, expertise, experience, and influence needed to develop a resilience standard and implementation methods that can flourish in application. These include states and localities that face significant disaster risks and housing shortages; insurance leaders such as IBHS and the National Association of Insurance Commissioners; leading FBH manufacturers and MOD X; as well as building science and code organizations such as the National Institute of Building Sciences (NIBS) and the International Code Council (ICC).

The Resilient FBH Standard

The Consortium's first task is developing an FBH resilience standard or specifications⁷, with variations established to address different climates and different hazard types. While called a "resilience" standard to signal its importance to insurers, governments, and disaster-exposed communities, the standard must in fact be a whole-home construction standard for resilient FBH to scale. In addition to addressing the primary weather hazard threats of wind, hail, and wildfire, resilience specifications must address passive survivability. Although insurers might not be as inclined to incorporate passive survivability considerations, state and local governments (along with federal agencies like FEMA) have strong reasons to demand it as part of any resilience certification since they bear the costs of displaced residents, emergency services, and temporary housing after disasters. A home engineered to sustain habitable temperatures for an extended period requires a high-performance thermal envelope and that envelope, by definition, produces substantially lower energy loads during normal operation. Energy efficiency, from this vantage point, is not a separate mandate but an engineered consequence of building to the thermal performance that disaster survivability requires. By covering structure, envelope, and energy performance rather than sitting as an overlay on other codes, the standard can serve both as a building-code equivalent and anchor a whole-home resiliency label, comparable to the ENERGY STAR® or DOE Efficient New Home labels. Ideally, the standard should offer both a prescriptive and a performance-based path for demonstrating compliance to encourage innovation, rather than limiting manufacturers to either.

Home Certification and Production-Line Qualification

In addition to the standard, the Consortium must establish a streamlined certification process that enables FBH manufacturers to modify their production lines and meet the standard reliably and expeditiously. An important advantage of FBH is reliable construction quality: an equivalent home built on-site will usually exhibit more construction variability than a factory-certified home built to the same specification, because factory production controls quality in ways that site construction, which is subject to weather, subcontractor variation, and inspector inconsistency, cannot reliably replicate. This consistency extends to thermal performance: a factory-built home designed to meet a specific envelope standard will deliver that performance reliably across units, whereas site-built homes, depending on the builder, are likely to exhibit greater variability in air sealing, insulation installation, and other details that affect energy performance.

⁷ In this this paper, we use the term "specifications" to refer to the detailed requirements (whether prescriptive or performance-based) to which a home would have to be built to receive a resilience certification. We also use the term "standard" to refer to the resilience specifications as a whole, that is, the resilience standard is made up of many resilience specifications or requirements. Regardless of terminology, state and local governments could elect to recognize certification (which demonstrates a home incorporates the required specifications or fulfills the overall resilience standard) as an alternative method for meeting local code requirements.

This reliability is what makes a streamlined approach workable: rather than certifying each home individually, a third party qualifies the production line itself, so that every home coming off a qualified line is certified to the standard by default. Japan's housing system certification program, in operation since 1962, provides a clear precedent for how this approach can drive growth of FBH. Japan's nationally sanctioned program allows a third party to evaluate whether a factory production system reliably produces homes that meets performance requirements. After the factory gains approval, all homes it produces are considered code-compliant, and local jurisdictions accept the certification in lieu of conducting their own structural review. As a result of eliminating the jurisdiction-by-jurisdiction approval process that constrains American manufacturers today, FBH accounts for approximately 15% of the Japanese national housing market (Rupnik et al. 2026). The Consortium should seek to apply this housing system certification approach to the resilient FBH standard, as this will allow a qualified factory to continuously produce housing that is certified to the resilient standard, with only periodic QA/QC checks rather than mandatory inspections of every single home.

This factory-level approval serves all types of FBH, whether produced as manufactured or modular homes. For modular and panelized homes — otherwise built to state and local codes — a qualified factory's output would be accepted in lieu of jurisdiction-by-jurisdiction structural review, giving them an expedited path to compliance. For manufactured homes, the voluntary resilience standard serves as a “HUD-Code+” option, adopted not for regulatory relief (since HUD Code already provides that) but for the insurance and market recognition that certification brings. And, regardless of the production and compliance path used, a certified home can be underwritten as a single, distinct product category.

Model Underwriting Standards

In addition to establishing the resilience standard and resilient FBH certification process, the Consortium, likely through a subcommittee made up of its insurance sector members, will develop model underwriting standards for homes that meet the specifications as a distinct national product category, thereby ensuring that the certification remains actuarially defensible and ~~market-credible~~[market credible](#). This group will also develop data collection and sharing protocols to create a feedback loop by which the industry will be able to assess how certified homes perform relative to non-certified homes over time. This model, in which insurers pool claims data and develop shared underwriting standards, will create the market infrastructure needed to translate proven performance into consistent premium advantages across hazard regions and markets. There is precedent for this kind of insurance-sector coordination: the Insurance Institute for Highway Safety, an auto insurance industry-funded organization analogous to IBHS for automobile safety, transformed vehicle safety standards through credible ratings and data sharing without a regulatory mandate. The housing market differs from automotive with thousands of local jurisdictions rather than a handful of national manufacturers, but the core mechanism is the same: an industry consortium that could make performance data transparent and actionable can shift market behavior.

The Alabama experience provides the proof of concept that a national transformation could be possible through shared underwriting standards for resilient FBH. As noted above, Alabama's mandatory discount law, which passed in 2009 as insurers were withdrawing from the coastal market, required admitted carriers to file actuarially justified rate reductions for FORTIFIED-certified homes. Rather than exiting, insurers complied and remained in the market, demonstrating with their actions that these discounts are justified and supported actuarially by

claims data. If the Consortium can encourage other states to adopt similar policies, then the resilient FBH certification will provide clear financial incentives for builders and home buyers: lower insurance premiums, made possible through real-world data that shows that housing built to the resilient FBH standard performs better than normal homes.

Demand Aggregation Through Public Procurement and Policy

As noted previously, the success of FBH rests on steady demand for housing. While administratively and politically challenging, the federal government has the ability to signal steady demand through its own housing-related procurement. HUD's most recent comparative study concludes that a whole-of-government standard award criteria, applying consistent requirements across federal programs that fund or finance housing, is the single fastest path to demand aggregation at meaningful scale (Rupnik et al. 2026). Federal programs including FEMA's Individual Assistance program and HUD's community development programs collectively influence the construction of hundreds of thousands of housing units annually.

Within the context of disaster recovery, the combined use of a resilience certification and FBH is particularly compelling. FEMA's Individual Assistance program has disbursed approximately \$33 billion over its history for housing recovery, yet conventional post-disaster reconstruction remains slow, expensive, and inconsistent in quality (FEMA OpenFEMA dataset). The Maui wildfire recovery demonstrated that factory-built methods can compress recovery timelines dramatically, with some units going up in weeks rather than years. State and federal officials committed to using modular construction in the rebuild and with the help of the Modular Building Institute prepared modular-friendly requests for proposals. FEMA's Kilohana development in Lahaina subsequently delivered 167 permanent-quality modular homes in 13 months — a timeline that conventional post-disaster reconstruction has rarely matched (FEMA 2025). Structuring FEMA recovery housing procurement around factory-built resilient construction could simultaneously accelerate recovery, improve housing quality, and provide the demand anchor that manufacturers need.

Even without federal action, a viable parallel pathway exists at the state level. State housing finance agencies administer the Low-Income Housing Tax Credit (LIHTC) program, and have significant discretion on how they allocate the credits through their Qualified Allocation Plans (QAPs). States already use QAPs to incentivize green building standards, energy efficiency, and proximity to transit and could similarly provide preferential scoring for projects of resilience-certified homes. In addition to providing a steady demand, if one region, for instance the Gulf Coast and Southeast states, favored resilience-certified homes in their QAPs, that regional concentration of certified homes will generate the claims data that insurers need to build actuarial models and that the Consortium needs to establish shared underwriting standards. Action does not have to be nationwide, but more likely will begin with highest-risk states having the strongest incentive to move first.

Perhaps even more essential to bolstering and sustaining demand for certified homes is state and local government recognition of certified homes as de facto meeting state and local code requirements for the building structure.⁸ Many states and local governments will not opt-in

⁸ Housing developers would presumably still need to fulfill site-based requirements (e.g., vegetation management for fires, set-backs) but these would be outside the scope of the builder or manufacturer.

to this approach, but those experiencing housing shortages and most threatened by weather-related hazards are likely to see this path as a viable option to addressing their needs, particularly if the certification is clearly backed by insurers, lenders, and other key players.

Leveraging the Mortgage Markets

The third element of the strategy operates on a longer timescale and is explicitly downstream from the others. Today, neither lenders nor investors have a consistent way to differentiate resilient homes from the broader housing stock; as a result, the mortgage market treats them as roughly equivalent collateral. A standardized resilience certification, paired with pooled claims and performance data from the Consortium, could give lenders and investors the evidence they need to treat resilient homes as a distinct, higher-quality asset class, similar to what has developed for energy efficient multifamily housing.

Fannie Mae and Freddie Mac, also known as the Government-Sponsored Enterprises (GSEs), together back the majority of American residential mortgages and have significant influence over appraisal standards, mortgage underwriting requirements, and the pricing of mortgage risk. Both GSEs have demonstrated the structural capacity to issue differentiated mortgage-backed securities (MBS) tied to building efficiency and performance characteristics as well as to mission-oriented criteria through their respective green and social bond programs, which link securities to energy-efficient and socially targeted housing. Green MBS helped mainstream energy-efficient multifamily buildings by aligning incentives for lenders, property owners, and investors. Lenders gain preferential pricing, additional loan proceeds, and strong investor demand for transparently labeled Green MBS, making green loans attractive to originate. Property owners are motivated by lower interest rates, extra capital for retrofits, and expected measurable utility savings tied to required efficiency improvements or third-party certifications. By standardizing data collection, embedding performance criteria into underwriting, and scaling issuance into the tens of billions, the program has effectively moved the market, turning what had been niche efficiency upgrades into a normalized, financially rational component of housing finance and development.

Over time, with supporting data, the resilient homes market could similarly garner preferential loan terms, stronger investor demand, and ultimately a differentiated secondary market product, or “Resilient MBS”. Just as Green MBS have broadened the investor base, attracted ESG-oriented capital, and provided transparent impact reporting, a Resilient MBS could appeal to investors seeking lower-risk, climate-aligned collateral. And, if the resilience certification incorporates passive survivability requirements, these securities will be backed by homes that are not only protected against wind, wildfire, and other hazards, but also more energy efficient – characteristics that reduce both insurance losses and borrower instability.

Federal housing programs can also play a role in accelerating this market shift. Fannie Mae and Freddie Mac could recognize certified homes through loan-level price adjustments, automated underwriting incentives, or dedicated Resilient MBS designations, creating immediate demand for resilient FBH production. HUD, the VA, and USDA, as direct lenders and guarantors, could similarly incorporate resilience standards into their underwriting activities, ensuring that federally supported new construction meets a minimum resilience threshold (e.g., preceded under the Energy Independence and Security Act of 2007 (EISA) that requires HUD and USDA to adopt the most recently published IECC energy codes for new construction they finance or assist). The GSEs could also adopt resilience standards for new construction as a

requirement for lending. State housing finance agencies could adopt the certification within LIHTC Qualified Allocation Plans, rewarding developers who deliver resilient, energy-efficient homes that reduce long-term insurance and operating costs. Together, these levers will align federal credit policy with the emerging evidence base, accelerate adoption of resilient FBH, and help translate superior physical performance into durable capital-market value.

Finally, manufacturers of resilience certified FBH will benefit from this higher valuation of resilient homes, albeit indirectly. By mass producing homes recognized as higher or differently valued by capital markets and federal housing programs, FBH manufacturers will be favorably positioned to seek financing for their own production and expansion. In this way, the mortgage market becomes a long-term engine for scaling resilient FBH, completing the feedback loop that today's fragmented system has never been able to achieve.

Right Strategy at the Right Time

As previously noted, the three pillars support and reinforce each other. A resilience certification gives manufacturers a consistent set of specifications to engineer to, the same standard to which insurers can pool and underwrite, and that can eventually be recognized in mortgage pricing. It also gives state and local governments a politically palatable alternative to offer builders while still enforcing local codes for homes that do not meet the certification standard. The insurance consortium turns the certification into a market reward: lower premiums for certified homes make resilience financially attractive to builders and buyers without mandates. Favorable federal and state procurement and policies, whether through FEMA, LIHTC, or federal mortgage insurance programs, create the demand pipeline that justifies factory investment and generate the performance data that insurers need. And as performance data accumulates across hazard regions and claim cycles, the actuarial case for differentiation becomes progressively easier to make to the GSEs.

It is worth noting that most of the components called for exist in some form: resilience certification, preferential mortgage instruments, and procurement preferences are not new inventions. However, no one element has, or likely can, move the market alone. What is new is the deliberate coordination among them and the data infrastructure that makes them actionable and defensible. Green MBS, for example, exists as a mechanism but has not reached full potential for price differentiation across housing markets because the underlying performance data is insufficient. The Consortium's collection of claims data will be designed to solve exactly that problem: giving capital markets the actuarial foundation they currently lack.

The strategy's political logic is equally important. A standard resilience certification is justified by disaster losses and homeowner protection, not climate or energy goals, making it more palatable across political environments where explicit mandates, particularly environmental ones, face resistance. Insurance premium savings are visible and immediate to homeowners. Regional standards will be a boon to FBH; and factory production delivers consistent quality, making this approach particularly well suited to producing certified homes at scale. None of these arguments works as well in isolation. Together, they constitute a case for coordinated action that is both economically compelling and politically navigable, unlike previous attempts to scale FBH in the US.

Finally, recent Congressional action makes this effort even more timely and important. The advancement of the 21st Century ROAD to Housing Act, a strongly bipartisan effort, represents both meaningful progress and a cautionary signal. The legislation, which is expected

to go into law later in 2026, includes provisions intended to promote FBH. Section 302 directs HUD to review FHA construction financing programs to identify barriers for modular housing developers and consider modifying draw schedules to better accommodate factory production timelines. Section 303 directs HUD to study the long-term cost-effectiveness of FBH finance (21st Century ROAD to Housing Act 2026). Section 301, perhaps most significant, removes the permanent chassis requirement from the federal definition of manufactured housing and thereby expands the population of structures that can be built to HUD Code. While this change offers potential design and affordability benefits, it could lead to a proliferation of homes built without consideration of severe weather threats. For example, many Gulf Coast and Atlantic counties impose substantially higher wind load requirements than those required by current HUD Code. If the legislation goes into effect, manufactured homes placed on permanent foundations without a chassis might look exactly like other site-built homes yet be built to completely different standards. Communities with less resources available to enforce zoning and codes (e.g., rural and unincorporated areas) are at greatest risk of having homes built without regard to local conditions. Without changes to the HUD Code to address resilience, the supply-side reforms in the ROAD Act may become a mechanism for delivering low-resilience housing at scale to the markets least equipped to absorb additional catastrophe losses. Ideally, the proposed strategy described in this paper could be done in concert with HUD's efforts to update its code. Insurance industry involvement and buy-in is essential to ensuring that resilience specifications reflect the industry's risk calculations and lead to construction of insurable homes.

Next Steps and Conclusion

The strategy proposed in this paper suggests key actions, many of which require participation across different constituents.

- Formation of a multisector consortium to establish resilient FBH specifications, a corresponding resilience certification, and a streamlined approval process for FBH production lines; encourage state and local governments to recognize the certification as an alternative path to code compliance; pool claims data; develop shared underwriting standards; and make the actuarial case for premium differentiation of resilience-certified homes.
- Adoption of certified resilient FBH as a scoring criterion in state LIHTC Qualified Allocation Plans, in FEMA rebuild efforts, and, where feasible, in other federal housing procurement programs and policies, thereby creating the demand pipeline that FBH manufacturers and investors need to justify factory investment.
- As a longer-term priority based on performance data collected over time, establishment of mortgage-backed securities instruments (particularly led by the GSEs) that recognize the lower risk profile of resilience-certified homes.

Outside of the U.S., coordinated national or regional action has been key to FBH achieving lasting market share: a combination of regulatory reform, sustained demand commitment, and institutional coordination that no single city, state, or company could provide alone (Rupnik et al. 2026). The convergence of the housing shortage and the residential insurance crisis creates both the urgency and the opportunity for that coordination in the U.S. Given the wide range of interests in the building, insurance, and finance sectors, buy-in from all

constituents is not possible nor needed. Instead, what is needed is the commitment of leaders from each of the principal sectors (e.g., insurance, state/local government, manufacturers) to begin now and drive this effort forward on an aggressive timeline, one that recognizes growing hazards and the importance of creating a system that encourages construction of insurable, resilient FBH going forward.

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