New York City Policy Forum

Climate & Community INSTITUTE

Industrialized Construction in New York City

Unlocking Affordably Built Affordable Housing

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Executive Summary: A new era for building housing

Mayor Zohran Mamdani has promised a new era for New York City, including a goal of constructing 200,000 new affordable, union-built, and sustainable homes over the next 10 years.[1] To meet this ambitious goal and necessary timeline, the administration should invest in housing construction methods that enable speed and scale while supporting workers and New York communities. One such approach is called industrialized construction (referred to as "IC" in this paper).

Industrialized construction, which creates precise prefabricated building components in factories, has the potential to reduce on-site construction timelines by 20–50 percent, reduce construction costs by up to 20 percent, and develop

[1] "Housing By and For New York," Zohran for New York City, February 3, 2025, https://www.zohranfornyc.com/policies/housing-by-and-for-new-york.

housing with superior energy performance.[2] IC methods have been used to produce millions of high-quality affordable homes at lower costs in Sweden, Singapore, Japan, and Canada. However, IC approaches remain marginal in New York, in large part because NYC and the State of New York have not aggregated the consistent demand that IC housing factories need to operate effectively.

Mayor Mamdani can change this. By committing to using IC methods for a small percentage of its affordable housing pipeline each year, NYC could aggregate the demand needed to unlock significant speed and cost benefits. This volume could also support the development of new IC factories that provide high-road union jobs in New York City or elsewhere in New York state.

Sweden's Kombohus program offers a compelling model for how to aggregate demand for homes built with IC methods. Through this program, Public Housing Sweden created specifications for a standardized multifamily building that would serve the needs of its members. The association then asked the construction industry to competitively bid to deliver hundreds of apartments that used the standardized design. The winning firm used IC methods to build apartments for 25 percent lower than typical construction costs. Public Housing Sweden then used this approach repeatedly to deliver over 11,000 apartments via framework agreement contracts with costs per housing unit reduced by 20–25 percent.[3]

The Kombohus model works because it creates standardized and pre-approved housing "products" that IC manufacturers can then produce at scale. NYC could emulate this approach by asking IC companies to create standardized housing products designed to fit New York's architectural context. Then, the City could subsidize affordable housing developers to place bulk orders for these standardized buildings, aggregating enough demand to achieve significant cost savings.

When implemented repeatedly at sufficient scale, this approach could lead to high-quality affordable homes at a lower cost per unit throughout New York. To achieve this scale, NYC should launch an IC for affordable housing initiative that includes three phrases over the next 5–10 years.

[2] US Department of Energy, "Industrialized Construction," January 2024, energy.gov/sites/default/files/2024-02/bto-abc-industrialized-construction-022624.pdf.
[3] Sveriges Allmännytta, "Public Housing Sweden's Kombohus," https://www.sverigesallmannytta.se/in-english/public-housing-swedens-kombohus/.

Phase 1: Develop the capacity to deliver industrialized construction in NYC (next 1–2 years)

To help structure a successful long-term initiative, NYC should pursue an expert-led study to identify which IC approaches are most likely to deliver sustained housing cost reductions, drawing on international precedents and lessons from the City's own IC projects. Simultaneously, NYC can build institutional capacity by aggregating demand for IC-based accessory dwelling units (ADUs). NYC can also partner with the State of New York to test small-scale IC prototypes for multifamily housing.

Phase 2: Execute the first IC for affordable housing framework agreement (in 2–5 years)

Learning from Phase 1 should be incorporated into the outcome of Phase 2: a Kombohus-style framework agreement for 1,000+ units of an affordable housing product suited for New York. NYC would first need to assemble interested affordable housing developers and a collection of suitable sites. It would then need to work with the developers to create a housing product performance specification, which would be used to solicit bids from IC companies. NYC would then select 2–3 winning housing products, coordinate orders and finalize financing, execute the contract, and oversee construction.

Phase 3: Build at scale with IC housing products (in 5–10 years)

The housing product from Phase 2 can serve as the starting point for additional framework agreements, ideally with new housing product varieties and options. This phase would also enable successful IC firms from Phase 2 to expand by serving market-rate developers on private infill sites or potentially by serving new publicly owned and managed social housing developed by the New York City Housing Authority (NYCHA). NYC could also work during Phase 3 to support new unionized IC factories designed to serve its market. Such factories could be subsidized to be built within the city or developed elsewhere in New York state.

To execute these three phases, NYC will need to overcome three notable challenges. First, because most past IC efforts in New York were isolated single-building pilots, many observers are skeptical that IC can achieve significant time and cost savings. NYC can overcome this skepticism by compiling evidence showing that meaningful

IC benefits come only after replicating the approach for many buildings. NYC can also highlight compelling examples like Kombohus of IC demand aggregation.

Second, if NYC wants to support a local IC factory it would need to overcome the challenging logistics and high operating costs that come with manufacturing in New York. It can do this by sustaining a local pipeline of purchases of IC housing products and considering subsidies to help offset a factory's local operating costs.

Third, NYC would need to align its goals of using union labor, employing minority- and women-owned enterprises (M/WBEs) for construction work, and achieving IC cost savings. To achieve these goals simultaneously, NYC could pursue project labor agreements (PLAs) for unionized factory workers that ensure fair wages for the IC factory's location. NYC could then use M/WBE firms for site preparation work and on-site assembly. Finally, the higher productivity of IC can lead to cost savings.

Research shows that achieving major cost reductions via IC methods would require a consistent pipeline of at least 1,000 units of standardized housing products constructed each year.[4] While ambitious, building 1,000 affordable units per year with IC methods would only require 5 percent of the 20,000 homes needed each year to reach Mamdani's 10-year goal. But if successful, setting aside 5 percent of NYC's housing subsidies for IC approaches could unlock lower construction costs across the City's future affordable housing portfolio while also helping to transform the broader housing construction market.

This initiative could deliver on multiple fronts for New Yorkers: building affordable housing at scale, supporting high-road jobs, and fundamentally improving the City's ability to deliver housing faster, at lower cost, and with greater certainty over time. It will prove that a bold public sector can deliver a more just and affordable city. As Mayor Mamdani said in his inaugural address: "We will govern expansively and audaciously … never will we be accused of lacking the courage to try." New York should courageously create a new era for building housing.

[4] Griffin Primeau and Emma Yudelevitch, "Level Setting on Offsite Construction," September 24, 2025, www.mapc.org/wp-content/uploads/2025/09/Offsite-Construction-White-Paper-2025_v2-9.24.25.pdf.

Part I: Affordability through building at speed and scale

New York City is in an acute housing affordability crisis. Less than 1 percent of all NYC moderately priced apartments (with rents less than $2,400 per month) are currently vacant.[5] While Mayor Mamdani's planned commitment to deliver a rent freeze will bring relief to the 1 million households living in rent-stabilized apartments, New York City also desperately needs more housing—and it especially needs more homes with affordable rents.

Mayor Mamdani recognizes the need to build, having pledged to develop 200,000 new publicly subsidized, affordable, union-built, rent-stabilized homes over the next 10 years. However, even this scale of construction may be insufficient. Mayor de Blasio also pursued an ambitious housing strategy, financing 204,505 affordable units over eight years.[6] Mayor Adams claims to have exceeded those numbers, tracking 229,800 affordable homes built or preserved during his term.[7] But as shown by the support for Mamdani's affordability message during his campaign, the cost of rent remains far too high.

To achieve a real breakthrough in housing affordability, New York needs to build many more affordable homes for its lowest-income residents *and* produce a lot more housing generally. For the roughly 820,000 extremely low-income households in NYC (who make less than ~$43,300), housing will always be unaffordable without high subsidies to cover the difference between what residents can pay and the cost of constructing and maintaining an apartment.[8] But many other families could afford rents without subsidies if the city did not face a shortage of roughly 500,000 homes.[9] To close this gap, the NYC Charter Commission called for housing production to double to at least 50,000 homes per year.

[5] David Brand, "Want an NYC Apartment under $2,400? Good Luck with That.," Gothamist, February 8, 2024, https://gothamist.com/news/want-an-nyc-apartment-under-2400-good-luck-with-that.
[6] Rent Guidelines Board, "2025 Housing Supply Report," May 22, 2025, rentguidelinesboard.cityofnewyork.us/wp-content/uploads/2025/05/2025-HSR.pdf.
[7] "Most Pro-Housing Administration in City History: Mayor Adams' Administration Shatters Affordable Housing Records (Again)," The Official Website of the City of New York, August 1, 2025, https://www.nyc.gov/mayors-office/news/2025/08/most-pro-housing-administration-in-city-history--mayor-adams--ad.
[8] Coalition for the Homeless, "Housing Is the Solution," https://www.coalitionforthehomeless.org/housing-is-the-solution-2025-recommendations/.
[9] NYC Charter Revision Commission, "Charter Revision Commission: Adopted Final Report," July 21, 2025, https://www.nyc.gov/assets/charter/downloads/pdf/2025/7-21-2025-charter-revision-commission-adopted-final-report-digital.pdf.

If NYC can build both abundant subsidized housing and homes for a range of incomes, rents should finally become more affordable. But executing on both goals is made harder by two big challenges:

- **It takes too long to build housing.** From 2021 to 2023, new construction for NYC affordable housing took an average of 4.9 years from construction loan closing to project completion.[10] This period is mostly construction. Unless this timeline substantially improves, affordable housing started by Mamdani will not be completed during a single four-year mayoral term.
- **It costs too much to build housing.** New York City currently has the highest construction costs in the world, with low-rise apartments costing 75 percent more on average than in Houston, Toronto, or Paris.[11] Building affordable housing in NYC currently costs about $700,000 per unit, without including the land costs.[12] Higher construction costs lead to more subsidies needed for affordable housing and higher rents for market-rate units to cover the higher debt service needed for larger development loans.

If NYC can build high-quality housing faster and at a lower cost, it could bring housing affordability to all its residents. Industrialized construction (IC) offers one way to achieve these goals.

How could industrialized construction (IC) help NYC to build high-quality housing?

The National Renewable Energy Laboratory (NREL) defines industrialized construction as "using industrialized production methods—such as high-volume off-site construction, prefabrication, and automation—to build buildings."[13] NREL

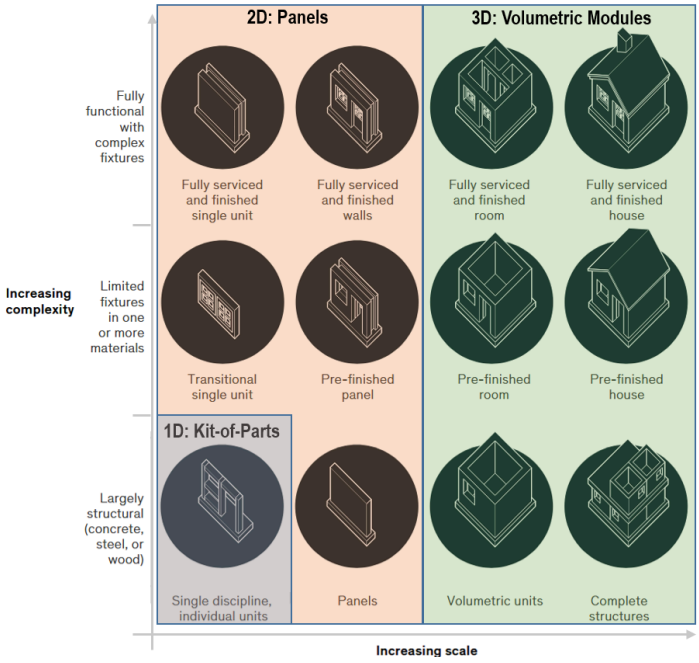
[10] New York City Comptroller, "Building Blocks of Change," Bureau of Policy and Organizing, February 2024, https://comptroller.nyc.gov/wp-content/uploads/documents/Building-Blocks-of-Change-A-Blueprint-for-Progress-at-NYCs-Housing-Preservation-and-Development.pdf.
[11] Sean Campion, "Why It Costs So Much To Build in New York City," *Vital City*, September 17, 2025, https://www.vitalcitynyc.org/articles/why-it-costs-so-much-to-build-in-new-york-city.
[12] Erik Engquist, "How to Fake Support for a Bill," The Real Deal, January 17, 2025, therealdeal.com/new-york/2025/01/17/council-members-back-fair-share-act-knowing-it-wont-pass/.
[13] Shanti Pless, Ankur Podder, Zoe Kaufman, et al., "The Energy in Modular (EMOD) Buildings Method: A Guide to Energy-Efficient Design for Industrialized Construction of Modular Buildings," National Renewable Energy Laboratory, June2022, https://www.osti.gov/servlets/purl/1875070/.

further explains that green IC methods can be used to build housing at scale that is energy-efficient, low-carbon, resilient, and friendly to the electric grid.

In this paper, "IC" and "IC methods" refer primarily to approaches that utilize off-site construction, where building components are prefabricated at a factory instead of at the site of the final building. Off-site IC can use a variety of approaches, including 1D standardized components known as a "kit-of-parts," 2D components known as "panels," and 3D components known as "volumetric modules."[14] As shown in Figure 1, IC approaches vary from a simple standard beam to a finished house.

IC methods can also use a variety of materials, including wood, concrete, or steel.[15] However, each IC manufacturer generally works with one primary structural material and one approach to maximize efficient factory production.

Figure 1: Industrialized construction can use a variety of methods.[16]



[14] Ivan Rupnik, Ryan E Smith, and Tyler Schmetterer, "Modularization Precedes Digitalization," Joint Center for Housing Studies of Harvard University, November 2022, https://www.jchs.harvard.edu/sites/default/files/research/files/harvard_jchs_digitalization_panel1_rupnik.pdf.
[15] National Institute of Building Sciences, "Off-Site and Modular Construction Explained," Whole Building Design Guide, 2025, www.wbdg.org/resources/site-and-modular-construction-explained.
[16] Figure 1 is a modified version of a graphic included in Nick Bertram et al., "Modular Construction: From Projects to Products," McKinsey & Company, June 2019, https://www.mckinsey.com/~/media/mckinsey/business%20functions/operations/our%20insights/modular%20construction%20from%20projects%20to%20products%20new/modular-construction-from-projects-to-products-full-report-new.pdf.

Using IC methods to build housing in NYC could lead to the following benefits:

- **Accelerated timelines and less site disruption:** By manufacturing standardized components year-round in controlled environments, IC can reduce construction timelines by 20–50 percent.[17] With 80–90 percent of construction work occurring off-site, on-site assembly work is faster and causes less disruption to neighborhoods than traditional construction.
- **Reduced costs:** IC methods can achieve economies of scale and reduced construction timelines, potentially leading to cost savings of 20 percent or more per housing unit built.[17] These savings could be used to build more homes or to help the City subsidize deeper affordability.
- **Quality control and green performance:** Factory construction occurs in a controlled setting with consistent quality checks, unaffected by site constraints. This can enable higher construction quality, leading to lower operating costs through reduced utility bills.[17] Certain IC approaches, such as mass timber, can also reduce embodied carbon in buildings.

Building housing like a social democracy: IC policy innovation in Sweden

Sweden and other countries have already achieved the speed, cost, and quality benefits of housing built with IC methods.[18] These IC breakthroughs required strong public-sector leadership that aggregated demand for housing and enabled the regulatory conditions for success.

Demand aggregation at scale: Sweden's "Million Dwellings Programme" (1965–1974)

Sweden first embraced industrialized construction in the mid-1960s. In response to a severe housing shortage, Sweden's social democratic government launched an ambitious program to build 1 million high-quality homes in 10 years—a remarkable

[17] US Department of Energy, "Industrialized Construction."
[18] See the appendix for brief discussions of how Singapore, Japan, and Canada used policy innovation to create breakthroughs for IC methods to build housing.

amount of housing for a population of only roughly 8 million people.[19] Sweden provided generous loans and subsidies to encourage IC techniques like precast concrete panels. Construction firms adopted mass-production approaches, assembling large apartment blocks in factories and then installing them on-site. Sweden's stable, government-guaranteed demand gave manufacturers the certainty to invest in factory production lines, spurring private investment and innovation that improved overall construction productivity.

Sweden's public sector initiative exceeded its goal and built more than 1 million homes, achieving a production rate per capita more than double that of the United States. Unfortunately, public housing production in Sweden starkly declined during the 1990s as a new center-right government withdrew subsidies, eventually leading to increased rents and less housing stability for Swedes.

Creating a streamlined approvals process: Sweden's performance codes (1995 to today)

While Sweden's rate of housing construction stalled during the 1990s, the country did embark on a different type of public sector innovation: performance codes. Instead of specifying materials, features, or construction methods, in 1995 Sweden shifted to a code system that defined the outcomes buildings must achieve—such as fire resistance, structural safety, energy performance, and durability.[20] Designers and builders were then given flexibility to meet these requirements, encouraging innovative approaches. This contrasts with "prescriptive" codes used in the United States, where specific materials or construction methods must be used to ensure building safety.

Although Sweden's code reform was not intended to be a housing supply policy, the performance-based framework supported industrialized and factory-based construction approaches. This is because performance codes allow Swedish IC companies to shift compliance upstream. Rather than code inspectors making site visits to every building throughout construction (a process that often adds delays), Sweden's code makes it possible to certify standardized building systems, components, and factory processes, dramatically streamlining approvals.

[19] Terner Center for Housing Innovation, "Housing in Sweden: An Overview," November 2017, https://ternercenter.berkeley.edu/wp-content/uploads/2020/11/Swedish_Housing_System_Memo.pdf.
[20] Francesca Mari and Amir Hamja, "How an American Dream of Housing Became a Reality in Sweden," *The New York Times*, June 8, 2024, https://www.nytimes.com/2024/06/08/headway/how-an-american-dream-of-housing-became-a-reality-in-sweden.html.

Once an IC factory system is certified as meeting the performance code, it can then be used to repeatedly make homes that are code compliant. The factory certification pathway led many large construction firms to start using IC methods. Sweden's performance code also provided the foundation for its most recent innovation: Kombohus, a modern demand aggregation approach from Public Housing Sweden.

Kombohus: How Public Housing Sweden used IC to achieve 25 percent cost declines (2010 to today)

In part because of the underbuilding in the 1990s, by the late 2000s Sweden's public housing sector faced rising cost pressures. Development costs for multifamily buildings in Sweden had more than doubled since 1992, while general price inflation had risen by only 30 percent.[21] In response, Public Housing Sweden (the national association for municipal housing companies) convened its members to create Kombohus, an innovative procurement program to bring down housing costs.

Public Housing Sweden determined the best approach to reduce costs was to use a "framework agreement," a procurement contract for a large volume of a particular product across multiple projects or entities. While such an approach is common for smaller building components, in this case it was utilized for ready-to-occupy housing.[22] To execute the contract, Public Housing Sweden first created a set of specifications for a standardized building called "Kombohus Bas" ("bas" meaning "base" or "basic"), which was a design for a low-rise 2–4-story multifamily building with 8–16 units. They then asked the building industry to competitively bid on a cost per unit for delivering 300–500 apartments that used the standard Bas design, with the goal of driving down costs via IC methods and bulk procurement.

In 2010, Public Housing Sweden selected a builder that committed to delivering Bas-style housing at a 25 percent lower cost than standard construction.[23] The association then invited its members to place orders for the Bas-style homes at the offered price. The first framework agreement was open from 2010 to 2014, during which municipal housing companies placed orders for 2,700 Bas-style apartments. The model was so successful that Public Housing Sweden created two additional standard designs: the "Kombohus Plus," a small tower block of 5–8 floors; and the

[21] Swedish Association of Public Housing Companies, "Sabos Kombohus: Forcing Construction Prices Down By 25%," https://www.sverigesallmannytta.se/document/sabos-kombohus-forcing-construction-prices-down/.
[22] Sveriges Allmännytta, "Public Housing Sweden's Kombohus," https://www.sverigesallmannytta.se/in-english/public-housing-swedens-kombohus/.
[23] An analysis of the program calculated that half the cost reduction was from demand aggregation and half was from using IC methods.

"Kombohus Mini," with smaller apartments making up 2–6 floors. All three designs are highly energy efficient, have low embodied carbon, and achieve energy efficiency performance levels similar to Passive House standards.[24]

Figure 2: Photos of completed Kombohus Bas, Plus, and Mini standardized buildings built with IC methods.[25]

In its latest framework agreements, Public Housing Sweden has shifted from entirely standard designs into standardized "building systems," which it likens to the common chassis used by automakers for different types of cars.[26] This allows multiple IC companies to offer customizable buildings with different configurations while still offering standard pricing per apartment or per unit floor area.

The orders from Kombohus help to support the deep capital investments needed for advanced factories used by Swedish IC companies, which also deliver housing for the private market at a lower cost per unit. In this way, public sector demand de-risks industrialized construction, enabling IC firms to scale production, spread fixed costs across public and private projects, and ultimately lower housing costs across the broader market. Because of its success with demand aggregation and its innovative performance code, Sweden leads the world with 45 percent of its homes built with IC methods, compared with only 3 percent of homes in the United States.[27]

[24] The Kombohus standard buildings must meet an energy performance of 65 kWhr/m2, or an energy use intensity level of 20.6 kBTU/sf in English units.
[25] Swedish Association of Public Housing Companies, "Sabos Kombohus: Forcing Construction Prices Down By 25%," https://www.sverigesallmannytta.se/document/sabos-kombohus-forcing-construction-prices-down/.
[26] Sveriges Allmännytta, "Kombohus Punkt," https://www.sverigesallmannytta.se/nyproduktion/allmannyttans-kombohus/kombohus-punkt/.
[27] Bertram et al., "Modular Construction: From Projects to Products."

Part II: A strategy for industrialized construction in NYC

The Swedish Kombohus approach works because it creates standardized and pre-approved housing "products" that factory-based industrialized construction can then produce at scale. If NYC creates its own catalog of pre-approved housing IC products that are designed to fit within the architectural context of New York's neighborhoods, the City can then subsidize the use of these products to create new affordable housing. When implemented at scale, this approach could lead to high-quality homes at a lower cost per unit throughout New York.

Research suggests that achieving major cost reductions via IC methods would require a consistent pipeline of at least 1,000 standardized housing units constructed each year.[28] To achieve and then exceed 1,000 IC homes per year, NYC should undertake a three-phase effort over the next 5–10 years.

Phase 1: Develop the capacity to deliver IC in NYC (next 1–2 years)

After establishing an interagency IC tiger team through the Deputy Mayor for Housing and Planning, NYC should undertake a comprehensive study of which IC approaches are most viable for achieving long-term cost reductions for housing. Such a study would be conducted in partnership with IC experts and examine lessons from other countries and from NYC's own experiences with IC projects. It would also assess the viability of new IC factories in NYC and New York state.

At the same time, NYC can learn by doing. Given the wide availability of IC approaches for accessory dwelling units (ADUs), NYC can aggregate demand from interested homeowners to provide cost savings via bulk purchases of ADUs with existing standardized designs. NYC can also work with the State of New York's affordable housing agency to pilot small-scale prototypes of IC housing products for low-rise or mid-rise multifamily buildings.

[28] Primeau and Yudelevitch, "Level Setting on Offsite Construction."

Phase 2: Execute the first IC framework agreement (in 2–5 years)

Learning from Phase 1 should be incorporated into the outcome of Phase 2: a Kombohus-style framework agreement for 1,000+ units of a housing product suited for New York. NYC would first need to assemble interested affordable housing developers and a collection of suitable sites. It would then need to work with the developers to create a housing product performance specification, which would be used to solicit bids from existing IC companies. NYC would then select 2–3 winning companies, pre-approve their IC building designs, execute the contract, and oversee construction while rigorously monitoring the outcomes.

Phase 3: Build at scale with IC housing products (in 5–10 years)

The housing product from Phase 2 can serve as the starting point for additional 1,000+ unit framework agreements each year, ideally with new housing product varieties and options. This phase should also support successful builders from Phase 2 to expand by serving market-rate developers on private infill sites or potentially by serving new publicly owned and managed social housing built by the New York City Housing Authority (NYCHA). NYC could also work during Phase 3 to develop new unionized IC factories designed to serve its market. Such factories could be subsidized to be built within the city or built elsewhere in New York state.

A strategy for scale: housing typologies and phased implementation

While ambitious, investing in 1,000 affordable units per year built through IC methods would only amount to 5 percent of the 20,000 homes needed each year to reach Mayor Mamdani's 10-year goal. But setting aside 5 percent of NYC's housing subsidies for innovative IC approaches could unlock lower construction costs for the overall affordable housing portfolio, leading to even greater use of IC methods for new affordable homes. IC approaches could then expand and transform the broader market, leading to lower construction costs for housing at all income levels.

The remainder of this section expands this high-level strategy into concrete implementation choices. It first identifies the housing typologies in New York that are best suited to standardized IC housing products. It then describes, in greater detail, how NYC could execute each phase of the proposed three-phase strategy: building institutional capacity, executing the first framework agreement, and scaling IC housing products across affordable, market-rate, and social housing.

Building types in NYC that are well suited for IC housing products

To start imagining what standardized housing products for NYC could look like, it is helpful to first understand what housing types might be constructed within the city. One approach comes from the architecture firm Practice for Architecture and Urbanism (PAU), which assessed what new housing could be created on private vacant and underutilized land in New York.[29] After eliminating areas inaccessible to public transit and at risk to future flooding, PAU considered which housing types might fit at each underutilized site to maximize new homes while still matching the current neighborhood's density and architectural context. Within these constraints, PAU found room for over 520,000 new homes, including 55,000 units from low-rises (2–3 stories), 336,000 units from mid-rises (5–15 stories), 93,000 units from high-rises (30–50 stories), and 35,000 units from office conversions.[30]

Since mid-rise buildings provide 65 percent of the units in PAU's potential future housing mix, IC approaches for mid-rise housing would be especially valuable. If NYC wants only a single housing product for its first framework agreement, it should choose an IC product for mid-rise housing. While low-rise buildings make up a smaller share of potential new units, their relative simplicity also makes them well suited to standardized, mass-manufactured IC housing products.

In contrast, high-rise buildings and office conversions are not well suited for IC housing methods. IC approaches that use volumetric modular methods at 30 stories or more can have major problems, as it can be difficult to align the modules properly at that height.[31] Since existing office buildings have unique designs, conversions to housing would struggle if using standardized IC approaches.

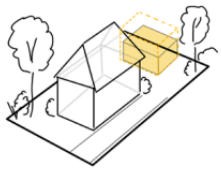
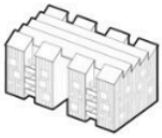
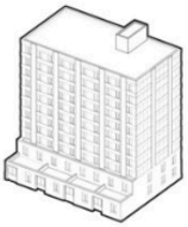
In addition to the housing types identified by PAU, NYC's City of Yes for Housing Opportunity zoning reforms allow for 68,000 new accessory dwelling units (ADUs).[32] These are small secondary homes that are already being built with panelized or modular IC approaches in other states. Their relatively small size and high potential

[29] While City-owned parcels can and should be used for new housing development, there is far less public land available than vacant or underutilized private parcels.
[30] Practice for Architecture Urbanism, "Affordable New York — How to Make Room for One Million New Yorkers," 2023, https://pau.studio/what/affordable-new-york/.
[31] Norman Oder, "Documents Reveal Woes at Pioneering Atlantic Yards Building," Housing and Homelessness, City Limits, August 31, 2015, https://citylimits.org/documents-reveal-woes-at-pioneering-atlantic-yards-building/.
[32] Marcel Negret and Christine Garner, "Navigating NYC's New ADU Rules: Progress and Persistent Challenges," Regional Plan Association, September 10, 2025, https://rpa.org/news/lab/navigating-nycs-new-adu-rules-progress-and-persistent-challenges.

for design repetition make ADUs a good fit for standardized IC products. If paired with pre-approved designs and streamlined permitting, ADUs could serve as an early test case for scaling IC housing production across thousands of sites citywide.

ADUs, low-rise housing, and mid-rise housing all appear well suited to use IC methods to scale up development and achieve lower housing construction costs. And as shown in Figure 3, standardized IC housing products for these housing types have the potential to be used for hundreds of thousands of new homes in NYC.

Figure 3: ADUs, low-rise multifamily, and mid-rise multifamily are building types in NYC that are well suited for IC housing products.[33]

Accessory dwelling units (ADUs): Room for 68,000 homes	**Low-rise multifamily:** Room for 55,000 homes	**Mid-rise multifamily:** Room for 336,000 homes
• 1 Story • Inexpensive (simple) • Usually made from wood • Many IC manufacturers: panelized and modular	• 2–3 stories • Inexpensive (no elevator) • Usually made from wood, sometimes masonry • Some IC manufacturers: panelized and modular	• 5–15 stories • Slightly more expensive • Usually concrete, with some mass timber options • Some IC manufacturers: panelized and modular
		

[33] Graphic modified from the original "Residential Prototypes" graphic by PAU, available at https://pau.studio/what/affordable-new-york/. Potential numbers of new homes by building type come from PAU's analysis except for the potential number of ADUs, which comes from the Regional Plan Association.

Phase 1: Develop the capacity to deliver IC in NYC (next 1–2 years)

Before initiating a framework agreement, NYC should develop its internal capacity to deliver IC housing. This can be done through an interagency IC tiger team, a study on optimal IC pathways for NYC, small-scale pilots with the State of New York, and demand aggregation for ADUs built with existing IC designs.

Establish an interagency IC tiger team through the Deputy Mayor for Housing and Planning

Executing an IC for affordable housing initiative will require working across several different NYC agencies. The Department of Housing Preservation and Development (HPD) has expertise in financing affordable housing, while the Department of Buildings (DOB) will be integral to developing an IC housing product performance specification and then approving IC building systems. The Mayor's Office of Contracting Services (MOCS) has expertise in designing and executing complex contracts, while the Economic Development Corporation (EDC) has expertise in mass timber buildings and in managing complex construction efforts. Still other NYC agencies have expertise in zoning, transportation logistics, community engagement, workforce training, and labor standards and protections. And this list does not include important state-level agency partners.

Given this inherent complexity, strong leadership is needed to coordinate the various agencies. While the NYC organizational chart is still in flux as of January 2026, the best leader for an IC for affordable housing initiative is likely the Deputy Mayor of Housing and Planning. As an initial step, this Deputy Mayor should establish an interagency IC tiger team with members from critical NYC agencies. This tiger team would have two immediate tasks for Phase 1: setting up an optimal IC pathways study for NYC and overseeing potential IC housing pilots in partnership with the State of New York.

Conduct a study to evaluate optimal IC pathways for low-rise and mid-rise housing in NYC

To lay the foundation for a successful long-term initiative, the City should conduct a study to identify the most effective IC strategies for cost reduction, scalability, and

long-term market sustainability of low-rise and mid-rise housing in New York.[34] The study should evaluate which delivery structures and contract approaches are most likely to reduce costs and risks when scaling IC methods for these building types, including options that may need new city- or state-level legal authority. The study should also evaluate the existing options of IC factories in the Northeast, including factory scale, geographic distribution, utilization rates, and workforce standards.

In addition to quantitative market analysis, the study should incorporate qualitative feedback from developers, architects, contractors, and unions with direct experience using modular, panelized, mass timber, and other IC approaches for low-rise and mid-rise buildings in NYC. This feedback should surface practical lessons related to financing, risk allocation, scheduling, design flexibility, and coordination with City agencies. The study should also surface and incorporate lessons learned from the NYC Government's existing efforts with IC, including HPD-financed housing that used IC methods, DOB's evaluation of prefabricated components, and EDC's support for mass timber.

Finally, the study should examine the economics of standing up new IC factories in NYC or New York state, including capital costs, siting and zoning constraints, workforce requirements, and the level of continuous housing demand required to sustain a factory. Evaluating new factory options will be especially important for the Mamdani administration to meet its campaign goal of ensuring union-built affordable housing, as very few existing IC factories in the Northeast are unionized.

Consider simple pilots in partnership with the State of New York for low-rise and mid-rise IC housing

In addition to a comprehensive study, NYC should consider simple pilot projects that allow existing IC companies to prove they can deliver low-rise and mid-rise buildings quickly and smoothly. To reduce the risk for later large-scale purchases, NYC could require that IC firms first execute a successful small pilot before being eligible for the framework agreement in Phase 2. These pilots should be kept small and be treated as early tests rather than showcases of IC approaches.

In 2025, New York State Homes and Community Renewal (HCR), the State's affordable housing agency, demonstrated what such a small pilot could look like

[34] As an example of what such a study could look like, see the "Greater Boston Regional Offsite Construction Strategy" led by the Metropolitan Area Planning Council, available at https://www.mapc.org/resource-library/housing-offsite-construction-strategy/.

through its CrossMod Pilot. HCR selected the experienced manufacturer Champion Homes to deliver three modular homes in Newcomb, Schenectady, and Syracuse.[35] The homes took only six months from order to being move-in ready, three times faster than site-built construction. Because of the pilot's success, Governor Hochul then secured $50 million to expand the program to purchase 200 modular homes.

NYC could work with HCR to execute and potentially co-fund similar small IC pilots. To ensure the pilots can be built quickly, NYC should look for small parcels owned by the City or by affordable housing developer partners with existing zoning that allows for new small low-rise or mid-rise housing. Partnering with established housing developers could speed up these small IC pilot projects while growing developers' experience with IC methods before larger projects in Phase 2.

ADUs: An opportunity to demonstrate the value of demand aggregation for housing built with IC methods

While NYC should complete its IC pathways study before aggregating demand for low-rise and mid-rise buildings, ADUs can provide immediate proof of concept for the approach. Many IC manufacturers already provide 2D panelized and 3D volumetric modular options for ADUs.[36] To utilize these existing companies, NYC should solicit manufacturers to submit their designs for the "ADU for You" program's Pre-Approved Plan Library.[37] NYC could aggregate demand from interested homeowners who want to add an ADU using one of these designs, then solicit bids from ADU manufacturers for bulk purchases at a lower cost per unit. A similar bulk purchasing approach was used previously for solar PV installations under Mayor de Blasio.[38]

Because of the on-site installation work needed, ADUs built with IC methods could also provide opportunities for small minority- and women-owned business enterprises (M/WBEs) that are construction contractors. Such work would not compete with union labor, as the NYC Building Trades almost never work on residential construction on such a small scale. By matching small construction

[35] "Move-In NY: Governor Hochul Announces Breakthrough in Affordable Homeownership for New Yorkers," The Official Website of New York State, September 22, 2025, https://www.governor.ny.gov/news/move-ny-governor-hochul-announces-breakthrough-affordable-homeownership-new-yorkers.
[36] Lynette Padwa, "Prefab ADU 101," *Maxable*, February 25, 2022, https://maxablespace.com/prefab-adu-101-a-crash-course-in-prefab-adus/.
[37] NYC Housing Preservation & Development, "ADU for You,"2025, https://www.nyc.gov/site/hpd/services-and-information/adu-for-you.page.
[38] Herman Trabish, "New York City Launches Solarize Program Targeting 350 MW of New Distributed Solar by 2025," *Utility Dive*, April 27, 2016, https://www.utilitydive.com/news/new-york-city-launches-solarize-program-targeting-350-mw-of-new-distributed/418161/.

contractors with homeowners who opted into the ADU campaign, the City would help to facilitate fast installation while also creating a pipeline of projects for participating contractors.

Aggregating demand for ADUs is an ideal strategy for NYC to start learning how to use IC to reduce housing construction costs. ADUs are privately financed and naturally affordable because of their modest features, so NYC would not need to commit subsidies. Because 68,000 parcels are now legally zoned for ADUs, no rezoning work is needed. Finally, the simplicity of ADUs would allow the DOB to start with an easy building type as it develops expedited review procedures for IC homes.

Phase 2: Execute the first IC framework agreement (in 2–5 years)

By using the institutional capacity and technical knowledge established in Phase 1, in Phase 2 NYC can develop and execute a framework agreement for 1,000+ units of an IC housing product. This can be done through six interlocking steps: assembling a developer cohort; assembling a portfolio of buildable sites; defining the housing product performance specifications; issuing a challenge-based procurement to the IC industry; standardizing financing for the selected housing product(s); and executing a multi-year framework agreement for project delivery and scale-up. The steps are complementary, and decisions like selecting sites and the housing product specification must align.

Identify and assemble a cohort of capable and aligned affordable housing developers

For Sweden's Kombohus, Public Housing Sweden worked directly with its member municipal housing companies to envision the framework agreement strategy and to design the building performance specifications for its first "Kombohus Bas" housing product. These same municipal housing companies also financed their own orders for the Kombohus Bas housing product from the winning IC company, serving as the developers for new housing units on their own municipal land.

To execute its own framework agreement for IC housing, NYC needs to identify its equivalent of the municipal housing companies in Sweden. The most obvious starting point is to work with its existing partners that already create housing in New York: experienced affordable housing developers. NYC should therefore

assemble a cohort of nonprofit and mission-driven affordable housing developers willing to execute projects using the City's first IC framework agreement.

When considering developers, the City should select partners with an organizational readiness to adopt standardized housing products, a willingness to adjust their development practices, and a capacity to deliver multiple buildings over time. Preference should be given to developers that can bring forward available or near-ready sites and credibly signal intent to deliver a defined number of housing units through the framework agreement. To support developers in joining the cohort, NYC could provide technical assistance throughout the process of creating the framework agreement.

Identify and assemble a portfolio of build-ready sites

NYC also needs to identify build-ready sites for the IC housing procured through its framework agreement. The City should prioritize public parcels suited for standardized mid-rise or low-rise housing products. In evaluating sites, NYC should consider how it would transport panels or modules to the sites. NYC could use the new "Land Inventory Fast Track" task force to find suitable City-owned parcels.[39] Additional public land opportunities may exist from NYCHA or the City University of New York (CUNY), though these sites would require more complex negotiations since the NYC Government does not directly control them.

In parallel, the City should actively solicit private-site proposals from aligned housing developers. The goal should be to assemble a portfolio of both public and private sites capable of supporting at least 1,000 units. The precise number of sites will depend on parcel sizes and whether the City ultimately selects a mid-rise product, a low-rise product, or products for both housing types. What matters most is that the portfolio of sites is suitable for repeated delivery of the standard housing products, as a large-scale purchase of homes built with IC methods is critical to reducing costs.

[39] "Executive Order 04," The Official Website of the City of New York, January 1, 2026, https://www.nyc.gov/mayors-office/news/2026/01/executive-order-04.

Define the housing product performance specifications

Based on the preferences of its developer partners and the options provided by the portfolio of sites, the City needs to define clear performance-based specifications for the housing product(s) it will purchase via the framework agreement. One initial key decision for this step is whether to pursue a single housing product (a "Kombohus Bas" equivalent) or to pursue both a low-rise and a mid-rise product. Choosing one housing product to start would enable easier execution and greater focus, while choosing two would enable greater flexibility across a range of developers and sites.

Regardless of the path chosen, the City's performance specifications should not be full architectural or engineering designs. Instead, they should function as a set of requirements and constraints that ensure the housing products align with policy goals (such as cost per housing unit, energy performance, accessibility, resilience, and replicability) without locking NYC into a single IC method, proprietary factory configuration, or supplier. To ensure the performance specifications reflect real-world feasibility, the City should solicit feedback through targeted industry engagement, such as technical advisory sessions, structured stakeholder workshops, or a request for information focused on manufacturability, transport logistics, and on-site assembly constraints.

Issue a request for proposals for the IC industry and select the winning housing product(s)

With the housing product spec(s) in hand, the City should then issue a request for proposals (RFP) from integrated teams. These teams should consist, at a minimum, of an architect/engineering team, an industrialized construction manufacturer, and a general contractor or on-site assembly firm (which ideally would commit to using union labor). Teams should demonstrate financial capacity, relevant experience, and a clear strategy for repeatedly delivering buildings across available sites.

The City's solicitation should ideally use a best-value award approach, judging proposals not only on price but also on construction speed, energy performance, replicability, and transparency. Such an approach may require new legal authority, though NYC may be able to use elements from its challenge-based procurement rules in its RFP for IC housing products.[40]

[40] NYC Rules, "Challenge-Based Procurements," October 27, 2024, https://rules.cityofnewyork.us/rule/challenge-based-procurements/.

NYC should structure the RFP to select 2–5 qualified teams with IC systems or approaches that best meet the City's objectives. Selecting multiple teams would allow NYC to compare performance across different IC systems while avoiding over-reliance on a single manufacturer or technology, fostering healthy competition and reducing delivery risks. The solicitation could also be structured with performance-based triggers and flexibility. Strong performance on initial sites could activate options for additional buildings, expanded site pipelines, or priority consideration for future IC framework agreements, while poor performance could lead to reallocation of remaining housing to higher-performing teams.

The NYC Department of Buildings will be critical for both defining the performance specification and selecting the winning teams, as it will need to approve the permits for housing built to these specifications. DOB should play an active role throughout this step, advising on code interpretation, considering egress and fire-safety implications, and considering ways it can issue expedited approvals for the winning IC systems. This work could help the DOB to later pre-approve the use of IC systems after it evaluates the first batch of housing products delivered by the IC teams.[41]

Orchestrate orders and finalize financing terms for the affordable housing developments that will use the selected IC product(s)

With the IC teams selected, the City must orchestrate orders for them to deliver homes. This step could occur in parallel with the RFP, with each IC team bidding on delivering its housing product for a particular set of sites in partnership with a developer. This option would be similar to current standard practice in NYC. Alternatively, NYC could more closely emulate the framework agreement model from Kombohus by letting each participating developer choose a product from the IC winning team(s). This would be analogous to developers selecting housing products from a catalog of options, with the total price per housing unit potentially tied to the number of homes ordered.

However the City orchestrates the orders of the housing products, NYC then needs to complete financing terms for the affordable housing developments. This is when the City would finalize the level of affordability for the housing units for each project (e.g., deeply affordable, moderately affordable, or mixed-income), although the

[41] DOB approves most NYC housing built with IC methods, as described at https://www.nyc.gov/site/buildings/codes/fabricated-items.page. However, IC housing under two stories must be certified by the NYS Department of State (DOS), as described at https://dos.ny.gov/code/factory-manufactured-buildings-modular. DOB could potentially work with NYS DOS to create State approvals for IC housing products for taller heights, which would then approve those housing products to be used both in NYC and throughout the state.

target income levels would need to be determined with developer partners much earlier. Ideally, the City's financing would be very similar to the term sheets used for typical projects financed by NYC HPD to help minimize the number of new variables. However, some details such as the withdrawal schedule for construction loans would likely need to be modified, as total construction progress cannot be assessed at the building's final site if a majority of IC work happens within a factory.

Execute the framework agreement, begin construction, and rigorously monitor progress

Once the orders and financing arrangements are complete, the City can execute the framework agreement, commencing the factory fabrication of the IC products and preparation work at the sites for the new housing. During this stage, the City should work closely with the selected IC teams to coordinate factory production, site preparation, delivery logistics, and module or panel installation.

To expedite fabrication and final assembly, the DOB should establish clear inspection protocols for both factory-built components and on-site construction, including structural, fire-safety, and energy-systems reviews. This may involve a combination of in-factory inspections, third-party certifications, and adapted on-site procedures to ensure compliance with the NYC Building Code while accounting for the unique characteristics of the IC building systems.

Throughout manufacturing and assembly, the City should also collect and monitor performance data on IC production, such as fabrication timelines, on-site assembly duration, labor hours (factory vs. on-site), safety outcomes, material waste, change orders, commissioning results, and the costs incurred at each step of the process. Ideally, selected teams would be required to commit to robust data sharing, including construction schedules, cost breakdowns, production rates, energy modeling, and post-occupancy performance metrics. This data would allow NYC to evaluate the effectiveness of IC methods relative to traditional construction. The data would inform future investment decisions, including for more framework agreements and the design of additional IC housing products.

To ensure objectivity and methodological rigor, the City should engage an independent external evaluator (such as a university research partner like CUNY or the New York Institute of Technology) to support data validation, comparative analysis, and public reporting of outcomes. While the City would retain ownership of

the data and overall program oversight, the external evaluator would provide third-party credibility, develop standardized evaluation methods, and help translate findings into clear insights for NYC policymakers, affordable housing developers, and the general public.

Phase 3: Build at scale with IC housing products (in 5–10 years)

A successful Phase 2 would unlock true scaling in Phase 3: multiple IC housing products used for affordable, market-rate, and social housing, with the possibility for establishing new IC factories in NYC or elsewhere in New York state.

Repeat the framework agreement process for additional IC housing products and approaches

Just as Kombohus expanded from its Bas model to offer the Plus and Mini standardized housing products, the City should expand future framework agreements to include additional housing products. Over time, this would result in a full catalog of pre-qualified low-rise and mid-rise housing products that vary by height, unit mix, structural system, and architectural configuration.

Repeating the framework agreement process would also reinforce competition and learning within the IC market. Firms that were successful under the first agreement would be incentivized to improve cost, quality, and speed, while new entrants could introduce alternative systems or innovations. This iterative approach would allow the City to continuously update performance standards, incorporate lessons learned, and expand the range of viable IC housing solutions.

Open future framework agreements for market-rate development and social housing

As IC capacity matures, future framework agreements could be opened to serve market-rate or mixed-income housing on private infill sites. Allowing market-rate developers to access City-qualified IC housing products could dramatically expand demand, stabilize factory utilization, and reduce per-unit costs even further. This cross-subsidization effect, where affordable and market-rate housing projects draw

from the same IC production ecosystem, is important for the success of IC methods in Sweden and other countries, and it could also prove valuable for New York.

At the same time, NYC could directly leverage its IC producer partners to deliver social housing, or homes built and managed directly by the public sector. Groups like the Community Service Society envision abundant social housing developed by a revamped New York City Housing Authority (NYCHA).[42] With standardized housing products available for predictable lower costs, NYCHA could use IC methods for new multi-building, multi-site developments that provide deeply affordable homes.

Consider supporting new IC factories in NYC or in New York state

Finally, the City should assess whether its housing pipeline could support new IC manufacturing facilities located within NYC. With multiple framework agreements in place and demand spanning affordable and market-rate housing, it would be much easier to sustain a new IC factory even at the high NYC operating costs. The City could also provide subsidies, low-cost financing, or assistance with site preparation. Alternatively, the State of New York could support a new IC factory in another part of the state with lower operating costs while NYC provides a purchase guarantee for its output of housing products.

In theory, developing new IC factories could be included as a requirement for the City's first framework agreement. As will be discussed in the next section, State or City subsidies could be used to ensure that new IC factories use project labor agreements that guarantee good union jobs. However, establishing new factories would be more expensive, take longer to deliver housing, and be riskier than using existing IC suppliers, since a new factory would likely require a guarantee of 1,000+ homes per year for several years to attract the necessary initial capital investment.[43]

[42] Iziah Thompson, "Can New York City Build Again? A Blueprint for a New Era of Social Housing," Community Service Society, 2025, https://www.cssny.org/publications/entry/can-new-york-build-again-a-blueprint-for-a-new-era-of-social-housing.
[43] Primeau and Yudelevitch, "Level Setting on Offsite Construction."

Part III: Overcoming challenges to industrialized construction in NYC

If NYC is to succeed in using IC approaches to build affordable housing at scale, it will need to overcome many challenges. These will include the technical execution of complex financing, permitting, and logistics for moving IC components from the factory to the final site. But in discussing this paper with reviewers, three challenges were consistently named as top concerns: the perception of failure from past IC projects, the difficulty of sustaining an IC factory in NYC, and aligning the goals of using union labor, using M/WBE firms, and achieving IC cost savings.

Challenge 1: Overcoming perceptions of failure from past IC housing projects

NYC has a robust history of industrialized construction, with many examples of IC methods used successfully for affordable housing projects. Yet there continues to be a general perception that past efforts failed. Why?

First, many developers who use IC methods wrongly expect immediate results. The IC industry, and especially the modular industry, heavily advertises its speed and cost benefits.[44] These benefits are real, but they are difficult to achieve on the first building with a team new to IC methods. Anecdotally, one reviewer mentioned that the hardest IC project for a developer to complete is its second—because it often struggles so much with its first project that it reverts to traditional construction.

Second, NYC has experienced some well-known IC "failures." One was the B2 Tower at Atlantic Yards, with modules built in a Brooklyn Navy Yard factory. Designed to be the "tallest modular building in the world" and originally intended to take just 14 months, the project was plagued by technical problems with stacking the modules and took over four years to finish. Assessing B2, IC expert Ryan Smith explained that at very tall heights, small dimensional differences between modules can accumulate

[44] As one example, see the Modular Building Institute's "Greener, Faster, Smarter" branding at https://www.modular.org/what-is-modular-construction/.

as they are stacked, leading to alignment and structural stability challenges.[45] For that reason, this paper advises to avoid IC approaches for high-rise buildings.

The other most notable failure was an NYC-led modular pilot intended for East New York. Branded as a key part of Mayor de Blasio's Housing NY 2.0 plan, the City released an RFP for the site and selected a developer team that included FullStack Modular—the company that inherited the Brooklyn Navy Yard factory used for the B2 project.[46] Yet FullStack appears to not have been a reliable partner, announcing in 2023 that it was relocating to Connecticut.[47] With FullStack's move, the City and the developer decided to switch back to traditional construction methods.[48] This saga reinforces this paper's recommendation to solicit proposals for housing products from 2–5 experienced IC producers, as an assortment of experienced suppliers reduces the risk of one firm failing or reneging on its commitments.

Finally, almost all IC efforts in NYC have been for single projects. It is easy to find stories covering innovative housing projects using IC: see coverage of the "first for New York" seven-story modular project The Stack from 2013,[49] the "revolutionary" modular micro-apartments in the nine-story Carmel Place building from 2016,[50] or the "groundbreaking" modular four-story Bethany Terraces project that achieved Passive House energy performance in 2024.[51] Each award-winning project was assembled on-site in less than four weeks, and combined they produced 140 new homes. But each building was also specifically intended to be a pilot and did not include planning or financing for replicating the approach for future projects. Because these projects were not replicated, their development teams could not use repeated buildings to achieve deeper savings.

There is one notable exception to this pattern, and it proves the value of demand aggregation for IC approaches: Nehemiah Spring Creek. This development is a decades-long effort by East Brooklyn Congregations (EBC) to convert a former

[45] Norman Oder, "Documents Reveal Woes at Pioneering Atlantic Yards Building," Housing and Homelessness, City Limits, August 31, 2015, https://citylimits.org/documents-reveal-woes-at-pioneering-atlantic-yards-building/.
[46] NYC Housing Preservation & Development, "City Announces Plans to Build Modular Housing in East New York," September 21, 2019, https://web.archive.org/web/20190921193649/https://www1.nyc.gov/site/hpd/about/press-releases/2019/03/city-announces-plans-to-build-modular-housing-in-east-new-york.page.
[47] "FullStack Modular & Governor Ned Lamont Announce Company Relocation and $8-12M Investment in Connecticut," Modular Building Institute, April 24, 2023, https://www.modular.org/2023/04/24/fullstack-modular-relocates-to-connecticut/.
[48] "Discussion on the Shift from Modular to Conventional Construction," February 5, 2025, https://citymeetings.nyc/meetings/new-york-city-council/2025-02-05-1100-am-subcommittee-on-landmarks-public-sitings-and-dispositions/chapter/discussion-on-the-shift-from-modular-to-conventional-construction/.
[49] Sammy Medina, "This Prefab Building Is A First For New York," Fast Company, July 23, 2013, https://www.fastcompany.com/1673057/this-prefab-building-is-a-first-for-new-york/.
[50] "Carmel Place, My Micro NY," urbanNext,May 2016, https://urbannext.net/carmel-place/.
[51] "Bethany Senior Terraces," Modular Building Institute, https://www.modular.org/bethany-senior-terraces/.

landfill in East New York into a thriving mixed-income community. As part of the effort, the EBC leadership team approached the builder Nick Lembo of Monadnock Construction with the idea of using modular approaches to build hundreds of townhomes for first-time homebuyers.[52] Backed by this project pipeline, Lembo founded Capsys, NYC's first modular IC manufacturer, which set up its factory in the Brooklyn Navy Yard in 1996.

From the start of the Nehemiah Spring Creek townhomes project until completion in 2015, Capsys reliably and affordably fabricated the modules used to build over 800 affordable homes.[53] The architect for the townhomes used 12 facades and 10 colors, creating diversity in appearance while achieving the cost and time benefits of IC via the standardized design.[54] The success of the townhomes proves the value of a stable, consistent pipeline. NYC's challenge will be to synthesize a similarly consistent pipeline by combining demand from many different sites, which this paper proposes to achieve by using Kombohus-style framework agreements.

Challenge 2: The difficulty of sustaining an IC factory in New York City

One potential reason for NYC to use IC methods is that the City's guaranteed demand for affordable housing could support the creation of a new local IC factory located within the five boroughs. This could create hundreds of new high-road jobs that are safer and more accessible than traditional construction work, as factories are protected from harsh weather and other outdoor hazards. Factories can also provide stable employment compared with cyclical traditional construction. However, two factors make it hard to sustain IC factories in NYC: challenging logistics and high relative operating costs.

FullStack Modular's decision to leave NYC illustrates the first factor of challenging logistics, particularly in serving construction markets outside of New York. While the Brooklyn Navy Yard is located near port shipping options, FullStack's new location in Hamden, CT provides greater flexibility with options to ship modules by

[52] Lera Covington, "DSS Wrap-up: Nick Lembo and Kirk Goodrich of Monadnock (4 Mins) – Cornell Real Estate Review," *Cornell Real Estate Review*, February 22, 2018, https://blog.realestate.cornell.edu/2018/02/22/dss-wrap-up-monadnock/.
[53] "Nehemiah Spring Creek by Alexander Gorlin Architects," Architizer, October 26, 2009, https://architizer.com/projects/nehemiah-spring-creek/.
[54] "Nehemiah Spring Creek Housing | Alexander Gorlin Architects," Archinect, https://archinect.com/gorlinarchitects/project/nehemiah-spring-creek-housing.

highway, rail, or deep-water ports.[55] In discussing the decision to relocate, FullStack founder Roger Krulak explained that improved logistics were important to the company because its biggest markets are currently on the West Coast.

However, there are some advantages to locating IC manufacturing locally that NYC could emphasize if it seeks to support a new factory. During Capsys' heyday, New York architects appreciated that they could easily commute to the factory to coordinate the designs with the manufacturing team and keep track of the buildings' progress.[56] Local factories would also make it easier for NYC code officials from the DOB to inspect and approve the use of IC systems. In addition, local factories should have lower transportation costs compared to factories located elsewhere. The key to unlocking these local advantages is consistent local demand for IC housing products—NYC could help to sustain local factories via continuous purchases for new subsidized affordable housing.

NYC's high relative operating costs pose another difficulty, and they are a symptom of the City's broader affordability crisis. Like many families, the IC company Capsys was displaced from NYC because of rising rents. When the company opened its Brooklyn Navy Yard factory in 1996, rent was $4 per square foot. But rent then quintupled to $20 per square foot when Capsys' lease was up for renewal in 2015.[57] Rather than operating at a loss, founder Nick Lembo sold the company to Whitley Manufacturing in Leola, PA. Whitley now builds IC housing products with Capsys technology at its less expensive location in rural Pennsylvania.[58]

Capsys' departure from NYC was not inevitable. After all, the Brooklyn Navy Yard is on City-owned land. The City could have directly or indirectly subsidized the rent for the company. If Mayor Mamdani's administration wants to see an IC factory located in NYC, it could provide subsidies to help offset high rent costs. But depending on the arrangement and level of subsidies needed, this approach could increase the costs of housing produced in local IC factories compared with other locations.

Another operating cost challenge for local IC factories is the high relative cost of wages in NYC compared to the rural locations of most current IC factories in the

[55] Luther Turmelle, "Why a New York Business Wants to Move Its Headquarters to CT," *CT Insider*, May 2, 2023, https://www.ctinsider.com/business/article/fullstack-new-york-connecticut-move-17922359.php.
[56] Konrad Putzier, "Capsys, New York's Oldest Modular Company, to Shutter," The Real Deal, October 19, 2015, https://therealdeal.com/new-york/2015/10/19/capsys-new-yorks-oldest-modular-company-to-shutter/.
[57] Hannah Frishberg, "Capsys: Brooklyn Navy Yard Factory Closes Due To Rising Rents," Brownstoner, October 20, 2015, https://www.brownstoner.com/real-estate-market/capsys-brooklyn-navy-yard-factory-closes-due-to-rising-rents/.
[58] "Modular Construction Company Whitley Acquires Capsys," *Multi-Housing News*, February 10, 2016, https://www.multihousingnews.com/modular-construction-company-whitley-acquires-capsys/.

Northeast. While exact wages are not available for the former Brooklyn-based employees of Capsys or FullStack, Capsys' union partner Carpenters Local 2790 that represented its factory employees has posted wages of $34/hr for journeyman workers with $24/hr in benefits.[59] In contrast, the wage rates for a non-union modular housing production worker position located in Liverpool, PA (about a 30-minute drive north of Harrisburg) are $17–$25.50, with significantly fewer benefits than a Local 2790 position.[60]

Similarly to the challenge of higher rent costs for IC factories in NYC compared to other locations, the City could simply subsidize the extra wage costs for local workers. And like rental subsidies, higher wages would likely increase the cost per unit of housing built with IC methods. As discussed in the next section, this is a potential tension for supporting IC factories in New York City. But if the Mamdani administration wants to prioritize using local union labor to fulfill its affordable housing goals, building housing in NYC-based IC factories could still produce less-expensive housing with faster construction timelines relative to union labor using traditional construction methods. During the optimal IC pathways study recommended for Phase 1, the City should more thoroughly evaluate how high space costs and wages in NYC would affect the cost of housing produced with IC methods in potential local factories compared with existing Northeast factories.

Challenge 3: Aligning goals of using union labor, using M/WBEs, and achieving IC cost savings

The costs and benefits of IC housing projects depend not only on where the work is performed, but also on who is employed and the working conditions of IC jobs. This initiative has the potential to create high-road job opportunities for workers across New York City, including for members of building trades unions and minority and women-owned enterprises (M/WBEs). There are options where IC housing could use union labor, use M/WBEs for on-site assembly, and still achieve cost savings. But to make this happen, the Mamdani administration would need to set clear priorities.

Regardless of construction method, there can be tensions between using union labor, employing M/WBEs, and reducing the costs of building new housing. The NYC

[59] "Wages & Benefits & Tiers," Shop & Industrial Local 2790, http://local2790.squarespace.com/wages-benefits-tiers/.
[60] "Production Worker - Custom Modular Housing Industry," Applicant Pro, December 3, 2025, https://championhomes.applicantpro.com/jobs/3926834.

Independent Budget Office (IBO) estimates that labor amounts to roughly one third of the total development costs for new affordable housing.[61] Because union workers generally earn higher wages and have safer working conditions, union-built housing can cost more to build. And because M/WBEs are often smaller construction contractors, they can face barriers to competing for subsidized housing projects compared with larger construction firms.

In recent years, affordable housing developers have increasingly used non-union contractors.[62] This shift has occurred as the overall percentage of unionized construction workers in the NYC Metro Area decreased significantly, from 27.4 percent in 2014 to just 19 percent in 2024.[63] In response, NYC's construction unions have called for prevailing wages for all affordable housing projects in the city, which would provide union wage rates for work on those projects.[64] While this could create family-sustaining jobs and ensure NYC construction workers have economic stability and access to high-road careers, prevailing wages would likely raise construction costs. According to analysis of past projects by the IBO, prevailing wages increase the average cost of new affordable homes by 23 percent.[65]

NYC's Construction Justice Act creates a new wage floor requirement for affordable housing projects

In December 2025, the NYC Council passed legislation called the "Construction Justice Act," which was supported by many unions including Laborers Local 79, Greater NY LECET, Mason Tenders, IUPAT DC 9, 32BJ SEIU, AFSCME District Council 37, and the NYC Central Labor Council. Rather than requiring prevailing wages (which can be $100/hr or more for certain workers), the law creates a combined wage and benefit floor of $40/hr for workers on subsidized affordable housing projects that create or preserve more than 150 housing units.[66] The law also

[61] "Background on Prevailing Wages and How They Currently Apply To Affordable Housing Development in New York City," NYC Independent Budget Office, February 2016, www.ibo.nyc.ny.us/iboreports/2016background-on-prevailing-wages-and-how-they-currently-apply-to-affordable-housing-development-in-new-york-city.pdf.
[62] Campion, "Why It Costs So Much To Build in New York City."
[63] "The Construction Sector in New York City: Post-Pandemic Trends," Office of the New York State Comptroller, July 2025, https://www.osc.ny.gov/files/reports/pdf/report-8-2026.pdf.
[64] NYC HPD generally does not require prevailing wages for affordable housing projects it subsidizes, though prevailing wages are required for projects with federal grant funding.
[65] "The Impact of Prevailing Wage Requirements on Affordable Housing Construction in New York City," NYC Independent Budget Office, February 2016, https://www.ibo.nyc.ny.us/iboreports/the-impact-of-prevailing-wage-requirement-on-affordable-housing-construction-in-new-york-city.pdf
[66] "File #: Int 0910-2024," The New York City Council, December 18, 2025, https://legistar.council.nyc.gov/LegislationDetail.aspx?ID=6702327&GUID=94AEFE97-8AC0-4D3E-934A-8414BB48F0C7.

requires developers to engage in best efforts to hire 30 percent of their construction workers locally, which should encourage developers to use M/WBE construction firms and increase access to good union jobs for residents of high-poverty NYC neighborhoods and for residents who live in NYCHA public housing.

It is not yet clear if the Construction Justice Act will apply to affordable housing production work completed in IC factories. If it does not change wage rates in IC factories, the law would raise the relative cost of affordable housing projects built with traditional construction methods. This could push more affordable housing developers to use IC products built with non-unionized labor from lower wage states. To counter this risk, the Mamdani administration could work to support high-road jobs from its IC suppliers, including by potentially requiring wage floors for IC factory workers.

If a $40/hr wage floor were applied to both workers on-site and in factories, it also could improve the relative economics of operating a local IC factory in NYC, since the higher productivity enabled by IC methods should lead to lower construction costs per home. However, NYC should rigorously model traditional construction versus IC methods to understand the potential cost and wage tradeoffs.

A potential path forward: Project labor agreements tied to wages at the IC factory location

As shown by the ongoing debate between labor unions and affordable housing developers, there is active political conflict about how to set construction wages and when to use union labor in NYC. This same tension exists when considering whether to use union labor in IC factories. However, past project labor agreements between IC factories and NYC unions show a potential path forward.

When the Capsys factory opened in Brooklyn Navy Yard in 1996, it partnered with the Carpenters Local 2790 via a project labor agreement that covered all workers within the facility through the same union contract.[67] Similarly, when Forest City (the developer of the B2 Tower at Atlantic Yards) set up its factory in Brooklyn in 2012, it also signed a project labor agreement that covered all workers at the factory under a single union local.[68] This agreement with Forest City prompted the Building

[67] "Legoland: Are Modular Units the Future of Construction?," New York City District Council of Carpenters, Spring 2014, https://nycdistrictcouncil.com/wp-content/uploads/2023/04/2014-Spring-Carpenter-Magazine.pdf.
[68] Nadine Post, "Green Light for Proposed Record-Tall Modular Building at Atlantic Yards," *Engineering News-Record*, December 5, 2012, https://www.enr.com/articles/374-green-light-for-proposed-record-tall-modular-building-at-atlantic-yards.

and Construction Trades Council (BCTC), the overarching union body representing NYC construction workers, to create a new modular division that allowed electricians, plumbers, ironworkers, carpenters, painters, and other trades to work together in cross-trade teams at the factory.

While wages in the Brooklyn IC factories were lower than wages for on-site construction work, the factory jobs provided safer working conditions and year-round employment with benefits. These features won the support of BCTC President Gary LaBarbera, who stated that IC methods "will be a job creator, not a reducer, and will increase our market share in residential work."[69] The key to gaining BCTC support appears to have been guaranteeing that IC methods would use union labor under fair wages for NYC. The Mamdani administration could repeat this approach by requiring project labor agreements for any new IC factories receiving subsidies or housing orders from NYC.

This same project labor agreement approach could potentially be used to win unions' support for developing new unionized IC factories located elsewhere in New York state. Empire State Development (ESD), the State's economic development agency, controls a wide portfolio of 130 vacant and underutilized sites that could host IC factories for significantly lower land costs than in NYC.[70] ESD support for such factories could be conditioned on project labor agreements that ensure union labor and fair wages based on the local labor market. NYC would support these new IC factories by providing a guaranteed pipeline of orders for affordable housing, and the new factories could also provide housing to other communities throughout the state. Because Mayor Mamdani and Governor Hochul both view affordable housing as a top priority, NYC and the State of New York could partner to deliver good union jobs, M/WBE opportunities, and lower housing costs through IC methods.

Options for NYC to support union labor, use M/WBE construction firms, and achieve IC cost reductions

While considering how to potentially use IC methods for affordable housing, the Mamdani administration will need to navigate competing priorities of ensuring high wages and safe conditions for union workers, increasing opportunities for M/WBE construction firms, and reducing the costs of building housing. As shown below,

[69] Post, "Green Light for Proposed Record-Tall Modular Building at Atlantic Yards."
[70] "Empire State Development: Real Estate Portfolio," Office of the New York State Comptroller, August 2024, https://www.osc.ny.gov/files/state-agencies/audits/pdf/sga-2024-22s14.pdf.

there are opportunities for NYC to support union workers and M/WBE firms throughout the three phases proposed in this paper.

Phase 1: Involve unions in the optimal IC pathways study and empower M/WBEs to lead onsite assembly work for ADUs produced with IC methods

Given the Building Trades' expertise and experience, they should be directly involved in the Phase 1 study on IC pathways.[71] Union leaders could give valuable feedback on wage structures, project labor agreements, and potential tradeoffs between cost, scale, and job quality across IC housing approaches.

NYC can also find ways to empower small M/WBE construction firms to lead assembly efforts for ADUs produced with IC methods. Prefabricated ADUs could provide an initial entry point for M/WBE firms for IC projects and help them prepare to assemble larger multifamily buildings in later phases.

Phase 2: Use union labor and M/WBEs for on-site assembly for the IC housing products procured through the first NYC framework agreement

Because there are virtually no currently unionized IC factories in the Northeast and standing up new factories is capital-intensive and risky, NYC may need to rely on non-union factory labor for its first framework agreement for IC housing. However, NYC should guarantee union labor is used for all site preparation work and on-site assembly, with at least 30 percent of on-site work reserved for unionized M/WBEs. In addition, NYC could consider requiring that its selected IC factory partners commit to neutrality during union organizing drives, which could in turn help to unionize those factories.

Phase 3: If subsidizing new IC factories, consider three pathways to use union labor in the factories through project labor agreements

Once the initial framework agreement has delivered its first IC housing products successfully, the City will need to decide if it wants to subsidize new IC factories. If yes, the City could pursue three potential pathways with different levels of wages for unionized factory workers.

[71] As an example of this type of collaborative research with unions, the Massachusetts Building Trades Council, the Carpenters Union, and the Greater Boston Labor Council are working group members of the "Greater Boston Regional Offsite Construction Strategy," available at https://www.mapc.org/resource-library/housing-offsite-construction-strategy/.

For the highest-wage local jobs, highest-cost path, the City could use NYCHA (which is subject to federal prevailing wage requirements) as a public developer to directly procure IC housing products. If the City helps to develop a new local IC factory, housing built for NYCHA would require NYC-level prevailing wages within the factory, ensuring workers are very well compensated. However, this approach would result in NYCHA spending considerably more than other entities on IC housing.

For a high-road local jobs, middle-cost path, the City could help establish a new factory in NYC that utilizes a project labor agreement modeled on the agreements previously used by Capsys and FullStack. While wages would remain below prevailing levels, this model would still guarantee high-road union jobs with relatively safer working conditions and year-round employment with benefits. However, operating a factory in NYC would inevitably be more expensive than in other rural locations with existing IC factories throughout the Northeast.

Finally, for a high-road jobs, lowest-cost path, NYC could work with the State of New York to develop a new unionized IC factory elsewhere in the state that has less-expensive labor and lower space costs. In exchange for subsidies or other public support, NYC and the State could require such a factory to enter into a project labor agreement with good wages for the local labor market. This pathway could potentially win the support of statewide construction unions as part of a broader State of New York housing and jobs initiative, but it would not provide direct employment benefits for NYC workers beyond site assembly.

Conclusion: A new era for building housing is possible

This paper provides a vision of how industrialized construction approaches could accelerate building high-quality affordable housing for lower costs in New York City. By emulating the model of Sweden's Kombohus program, the Mamdani administration can aggregate demand and deliver reliable low-rise and mid-rise housing products built with IC methods. The first framework agreement for 1,000 homes would be rather modest—just 0.5 percent of the 200,000 new affordable units that Mayor Mamdani aims to build over the next 10 years. However, after the first framework agreement is executed, it can then be replicated and scaled to unlock faster construction timelines and lower costs for more affordable housing, market-rate developments, and social housing throughout the five boroughs.

If this IC initiative for affordable housing succeeds, it could be a breakthrough moment for New York City and prove that the public sector can truly deliver a more affordable city. By investing in innovative industrialized construction methods, NYC can deliver high-quality, lower-cost housing and reinvest in New York's workers and communities. Achieving these outcomes will not be easy, and NYC would need to overcome significant challenges. But as Mayor Mamdani said in his inaugural address: "City Hall will deliver an agenda of safety, affordability, and abundance, where government looks and lives like the people it represents, never flinches in the fight against corporate greed, and refuses to cower before challenges that others have deemed too complicated." New York should embrace this grand challenge and pursue the affordability agenda by launching a new era for building housing.

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Appendix: IC policy innovation in Singapore, Japan, and Canada

Singapore's Housing & Development Board: Singapore provides an example of an IC strategy that succeeded because of the public sector's procurement standards. Since the 1960s, the Singapore Housing & Development Board (HDB) has built over 1 million publicly owned homes that house about 80 percent of Singapore's residents. Starting in the 1980s, HDB embraced prefabrication and standardization to speed up construction of its new apartments.[72] Prefabrication is used both for new construction and for adding expansions of new units to existing buildings.

HDB continuously innovates, which allowed it to improve construction productivity for its new housing projects by 25 percent between 2010 and 2020.[73] Because the government serves as the developer of public housing, it invests directly in R&D for prefab technology, maintains contracts with factories, and sets "buildability" standards that incentivize IC methods that achieve lower construction costs.

Japan's "type approvals" from the Building Center of Japan: In 1973, Japan adopted a housing system certification that allows companies to receive broad "type approvals" to repeatedly use IC prefabricated technology systems under the Japanese building code.[74] The Building Center of Japan (BCJ), a quasi-public standards entity, issues these type approvals and then inspects IC factories for compliance.[75] Once approved by the BCJ, IC factories can repeatedly use standardized housing systems across many projects, reducing repetitive code review and inspection and enabling faster permitting and construction. This policy framework enabled large private companies to invest in IC housing methods, and those companies now provide the highest-quality housing available in Japan.

[72] "Prefabrication Technology," Housing & Development Board, July 3, 2025, www.hdb.gov.sg/about-us/research-and-innovation/construction-productivity/prefabrication-technology.
[73] "HDB Pilots Advanced Construction Technologies to Design and Build Flats in Further Push to Raise Construction Productivity," Housing & Development Board, October 11, 2022, www.hdb.gov.sg/about-us/news-and-publications/press-releases/11102022-HDB-Pilots-Advanced-Construction-Technologies-to-Design.
[74] Ivan Rupnik and Ryan Smith, "MOD X Japan Webinar," August 27, 2020, https://www.modx.network/education/mod-x-japan-webinar.
[75] "Evaluation," The Building Center of Japan, https://www.bcj.or.jp/en/what/evaluation/.

Canada's Rapid Housing Initiative and Build Canada Homes: Canada has used public-sector bulk procurement to accelerate the use of IC methods for affordably built housing. Launched in 2020, the Rapid Housing Initiative (RHI) was a $1 billion fund to create 3,000 housing units for vulnerable populations that could be built in less than a year.[76] The program's requirement for short construction timelines incentivized the use of IC methods, and dozens of Canadian cities and non-profits responded by ordering prefabricated housing modules. The initiative was later expanded to $4 billion and has completed nearly 10,000 homes, with another 6,000 homes under construction.[77]

Building on the success of RHI, in 2025 the Canadian Government unveiled a new national housing accelerator agency called "Build Canada Homes."[78] The agency was granted $13 billion to build affordable housing at scale, especially through "cost-efficient and modern methods of construction such as factory-built, modular, and mass timber" that prioritize using low-carbon materials and energy-efficient designs. Build Canada Homes was also given control over substantial amounts of urban public land, which it will use to construct 4,000 factory-built homes with IC methods for six sites across Canada. After it completes these homes, the agency has additional land available which it can use to build up to 45,000 more homes.

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[76] "The Rapid Rise of Affordable Modular Housing in Canada," Modular Building Institute, September 26, 2022, https://www.modular.org/2022/09/26/the-rapid-rise-of-affordable-modular-housing-in-canada/.
[77] "Progress on the National Housing Strategy - September 2025," Housing, Infrastructure and Communities Canada, November 18, 2025, https://housing-infrastructure.canada.ca/housing-logement/ptch-csd/reports-rapports/prog-nhs-sept-2025-sept-snl-eng.html.
[78] "Prime Minister Carney Launches Build Canada Homes to Supercharge Homebuilding across the Country," Prime Minister of Canada, September 14, 2025, https://www.pm.gc.ca/en/news/news-releases/2025/09/14/prime-minister-carney-launches-build-canada-homes.