

INSIGHTS AND OPPORTUNITIES OF OFF-SITE CONSTRUCTION: ANALYSIS OF INDIANA AND PENNSYLVANIA



By: Dragana Thibault, Tsaemee Osman, Aigal Brown, Northeast Energy Efficiency Partnerships; John Gassman, Midwest Energy Efficiency Alliance

Examining the Impact and Potential of Off-Site Construction:



Insights from Indiana and Pennsylvania

Pennsylvania and Indiana are notable for having many modular building manufacturing facilities, which focus on modular residential and commercial buildings. Our exploration of off-site construction in Pennsylvania and Indiana aims to provide a comprehensive understanding of its prevalence, benefits, challenges, and prospects within these states.

Methodology



- Research Method:** Surveys sent to 52 off-site construction manufacturers, including 33 with manufacturing facilities in PA and IN.
- Questions:** Fifteen qualitative questions covering success factors, advantages, challenges, compliance, and trends.
- Target Audience:** Modular building manufacturers specializing in residential and commercial buildings with national presence and presence in PA and IN.
- Responses:** Nine manufacturers, including four from PA and IN with diverse representation from residential and commercial sectors.

Challenges of Off-Site Construction



Misconceptions and Stigma: Four manufacturers identified public misconceptions about modular construction such as associating modular homes with lower standards or manufactured homes as a significant challenge.

"People often confuse modular with manufactured homes. They are not the same, but people think they are. There is also confusion that modular is different than stick-built and it is not. They are both built to the same local building codes, it is just a different method of building."



Market Acceptance and Industry Resistance: Two manufacturers reported resistance from traditional builders, subcontractors, and homeowner associations (HOAs) towards off-site construction.

"Most traditional builders are very resistant to change, and they often hold the keys to a successful build."



Financial Hurdles and Lack of Incentives: Manufacturers encounter difficulties in convincing banks and financial institutions of the viability and value proposition of modular construction and a lack of awareness about available tax credits.

- "Securing funding for off-site construction projects can be challenging, as not all banks understand or are willing to fund this method of building."*
- "We are not aware of any tax credits or incentive programs."*

Outlook and



Emerging Trends

- Affordable Housing and Younger Demographics:** Two manufacturers surveyed for this study prioritize building affordable housing due to off-site construction's faster completion times and lower labor costs. Millennials and Gen Z are more accepting of modular technologies, driving market growth.
- "More and more housing providers, especially in the affordable housing space, are looking at off-site construction. This market is full of non-profits who have limited workforce capacity, and off-site construction lets them 'do more with less'."*
- "As Gen Z and Millennials tend to accept Modular and Manufactured homes more than older generations, home designs and features are changing to what they prefer compared to older generations."*

Technological Advancements and Sustainability Initiatives: Manufacturers foresee advancements in materials technology and increased adoption of digital tools enhancing efficiency in off-site construction.

"With the advancement of Energy Codes and technology, I look for advancements in envelope materials technology that is lightweight but make the modular homes even more efficient and cost-effective."

Key Findings



Benefits of Off-Site Construction



Expedited Project Timeline: Four manufacturers highlighted the faster completion compared to traditional stick-built methods, emphasizing quicker occupancy and reduced disruptions in urban areas.

"The ability to occupy the building rapidly not only accelerates revenue generation but also minimizes the disruption to surrounding neighborhoods, making off-site construction an attractive option for urban development projects."



Cost Stability and Affordability: Three manufacturers noted the benefit of cost stability throughout the construction process, reducing the risk of budget overruns.

"By providing cost certainty and minimizing the potential for change orders, off-site construction offers greater confidence in project budgeting and financial planning."



Customization Opportunities: Two manufacturers emphasized the flexibility in design and material choices offered by off-site construction, catering to diverse client needs.

"Modular construction allows for a high degree of customization, offering building owners the flexibility to design according to their unique needs and preferences."



Environmental Sustainability: Four manufacturers highlighted reduced waste and carbon emissions as environmental benefits of off-site construction.

"Off-site construction produces near zero waste."



Worker Safety: All manufacturers emphasized the safety advantages of controlled environments in off-site construction, including minimizing exposure to external elements and standardizing processes, reducing accident risks. This is particularly beneficial in regions with harsh weather conditions.

"Building in a controlled environment allows us to keep our workforce out of the elements and standardize processes, reducing the chances of an accident. Working predominantly in the Midwest, our tradespeople are happy to be in a climate-controlled facility and away from the brutal winters we have. Less on-site activities equal fewer safety hazards than you would typically find on a standard project site."



Source: Adapted Software: GRAPHIC COURTESY

Localized Production Benefits and Workforce Development



In-State Production Benefits: Manufacturers in Pennsylvania and Indiana highlighted streamlined regulatory processes, better customer service, and lower transportation costs as benefits of selling modular homes within the states of manufacturing.

"State works better with us on approvals than outside manufacturers. Also, dealers/builders can access the plant easier for tours, meetings on projects, etc. Transportation costs are much lower also."



Local Workforce Development: Off-site construction manufacturers in Pennsylvania and Indiana noted an increased demand for skilled workers and implementation of workforce development programs.

"We have dealt with the labor shortage as long as we've been in existence, same for our competitors. We're very active in our communities and vocational schools to enlighten our youth on the benefits of pursuing a career in construction. We're always looking for more talent."



Regulatory Hurdles and Standardization: Manufacturers noted that selling modular homes beyond state borders presents challenges due to regulatory hurdles and a lack of standardization in state-specific building codes and inspection requirements.

"Building codes change per state or even per city. Need consistency nationwide."

Recommendations Based on the Findings:

To leverage the benefits of off-site construction, we recommend several actions.

Recommendation	Action By	Goal
Demonstrations and Virtual Tours	Manufacturers and industry associations	Showcase the quality and benefits of off-site construction through visual demonstrations and virtual tours
Promote Collaboration	Manufacturers, traditional builders, and industry associations	Facilitate knowledge sharing and the adoption of best practices through collaborative efforts
Education and Outreach Campaigns	Industry associations and educational institutions	Shift public perception, educate mortgage lenders, educate manufacturers about ICC standards and promote the adoption of ICC standards, and increase acceptance of modular homes through targeted campaigns
Invest in Training Programs	Manufacturers and educational institutions	Develop a skilled labor pool to meet the demands of off-site construction through dedicated training programs
Adopt Nationwide Standards	Regulatory bodies and industry associations	Streamline regulatory processes, reduce barriers, and facilitate broader adoption of off-site construction by establishing nationwide standards
Enhance Awareness of Funding Programs	Industry associations and government agencies	Educate manufacturers about existing funding programs, tax incentives, grants, participation in Energy Star new homes program, and low-interest loans available to support off-site construction projects
Advocate for Enhanced Financial Incentives	Industry stakeholders and policymakers	Lobby for targeted government policies that provide increased financial incentives specifically for modular construction, enhancing affordability and promoting sustainability in housing solutions

By implementing these recommendations, the potential of off-site construction to provide cost-effective, sustainable, and customizable housing solutions can be fully realized.