

Integrated Process and Product Innovation

Are you interested in partnering with NREL's Industrialized Construction Innovation team?

We're looking for construction innovators, modular construction factory operators, and developers to work with us on **process and product innovation through optimized improvements in industrialized construction.**

Partnership Benefits

High-performing partners will be able to:

- Leverage NREL's advanced time-and-motion study and process-based digital twin capabilities to improve existing and upcoming modular construction factories and built products
- Achieve optimal integration of energy efficiency strategies and advanced controls with little or no additional cost, labor, and lead time
- Receive recommendations, energy modeling assistance, and more from NREL experts to help reduce costs, improve efficiencies, and save energy in high-performance buildings
- Leverage discrete event simulations to measure and optimize baseline performance of modular construction factories



Photo by Ankur Podder, NREL



Better Process & Better Product

Streamline analyses from the Building Information Model, Building Energy Model, and Discrete Event Simulation Model into a **Factory Information Model**. The Factory Information Model enables our partners to make more informed decisions for cost-effective integration of energy efficiency, integrated grid-interactive controls, and renewables into their built products.

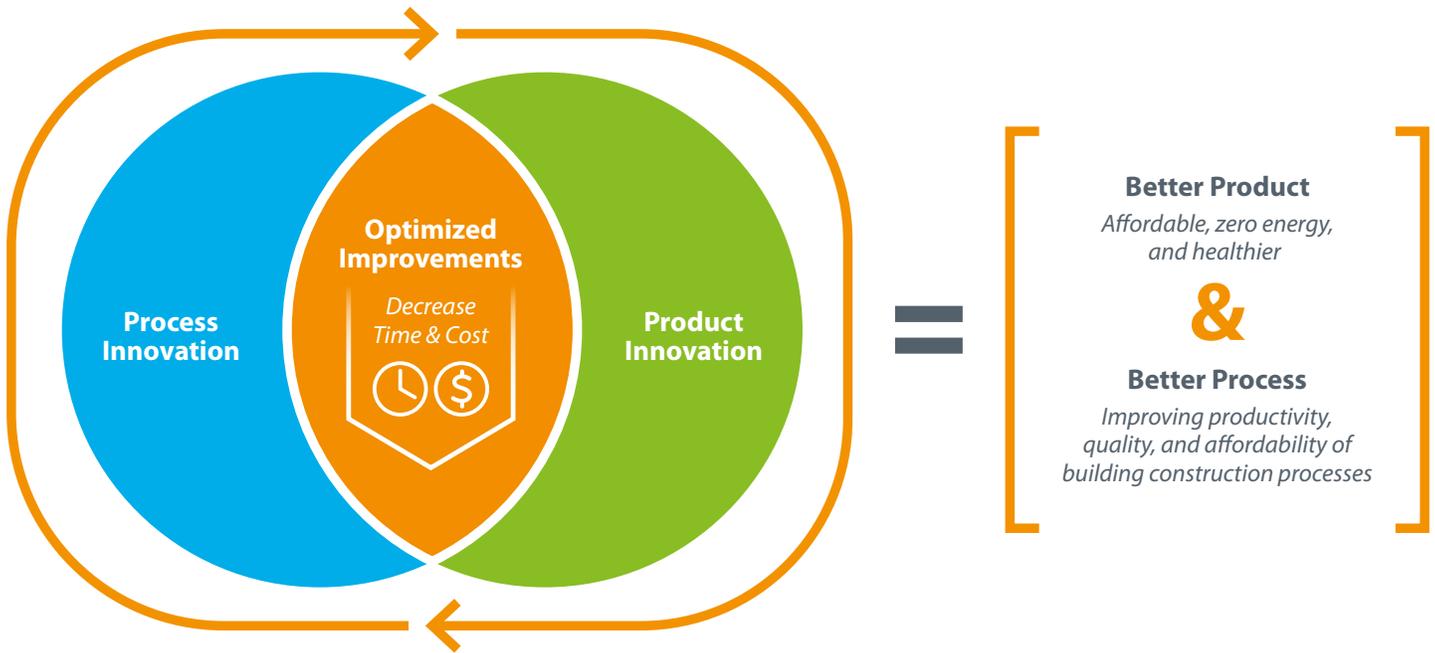
- Provide insight into production processes, access to prototypes for study, and connections to real-world developments for validation.

Applications

Affordability, resilience, and zero energy modular solutions are being integrated into:

- Multifamily apartments
- Hospitality
- Health care
- Housing
- Student housing
- Retrofits
- MEP systems
- Smart controls
- Solar plus storage

Integrated Design For Manufacturing And Assembly



Work

NREL has developed the innovative capability of a **Process-Based Digital Twin** for multi-objective optimized improvements to integrate energy efficiency strategies, as well as decrease life cycle cost and total lead time, at both the module level and component level.

NREL **addresses barriers** to whole-building system integration, such as:

- Problematic on-site installation, commissioning, and configuration of controls
- Poor installation quality of thermal and air barriers
- Lack of modular heating, ventilating, and air-conditioning (HVAC) systems and domestic hot water
- Lack of cost-effective integration for grid-friendly design and emerging technologies.

Impacts

By tapping into lean manufacturing principles adopted by other industries (e.g., automotive and aviation), advanced manufacturing technologies, and early wins from industrialized construction, the building industry can collectively:

- Reduce financial risks, decrease costs, fast-track occupancy rates, and accelerate overall return on investment
- Reduce building energy consumption considerably
- Take advantage of full, seamless technology integration
- Be less susceptible to labor shortages
- Fulfill various building needs, such as the need for healthy and affordable buildings.



Partner With Us

Contact Shanti Pless at Shanti.Pless@nrel.gov to learn more.