



Modular Construction

Possibilities and Realities

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What is modular construction?

IT'S NOT TRAILER HOUSES!



What is modular construction?

IT'S NOT TRAILER HOUSES!



What is modular construction?

IT'S NOT CONTAINER HOUSING



What is modular construction?

IT'S NOT CONTAINER HOUSING



What is modular construction?

IT'S NOT TINY HOMES



What is modular construction?

IT'S NOT PANELIZATION



What is modular construction?

IT'S NOT PANELIZATION



So, what is Modular Construction, then?

- Equal or better quality than site built
- Equal code as site built
 - IRC
 - IBC
- Built in off-site facility
- Regulated by State, not Local
- Faster build-time
- Permanent
- Volumetric modules, finished in factory

Processes and Methods



Processes and Methods



Processes and Methods



Processes and Methods



Processes and Methods



Processes and Methods



Processes and Methods



So, what is Modular Construction, then?

Residential Categories

- Residential Single Family
 - Custom, Semi-Custom
 - Production - Subdivision
 - Production - Rural
- Townhomes
- Apartments
- Recreational - Cabins

Residential Modular



Residential Modular



Residential Modular



Residential Modular



Residential Modular



Residential Modular



Residential Modular



Residential Modular



Residential Modular



Residential Modular



So, what is Modular Construction, then?

Commerical Categories

- Hospitality
 - 1-5 story hotels
 - Vacation Cabins
 - High-rise hotels
- Gas stations / restaurants
- Offices
- Schools
- Anything else you can think of

Commercial Modular



Commercial Modular



Commercial Modular



Commercial Modular



Commercial Modular



Commercial Modular



Commercial Modular



Commercial Modular



Commercial Modular



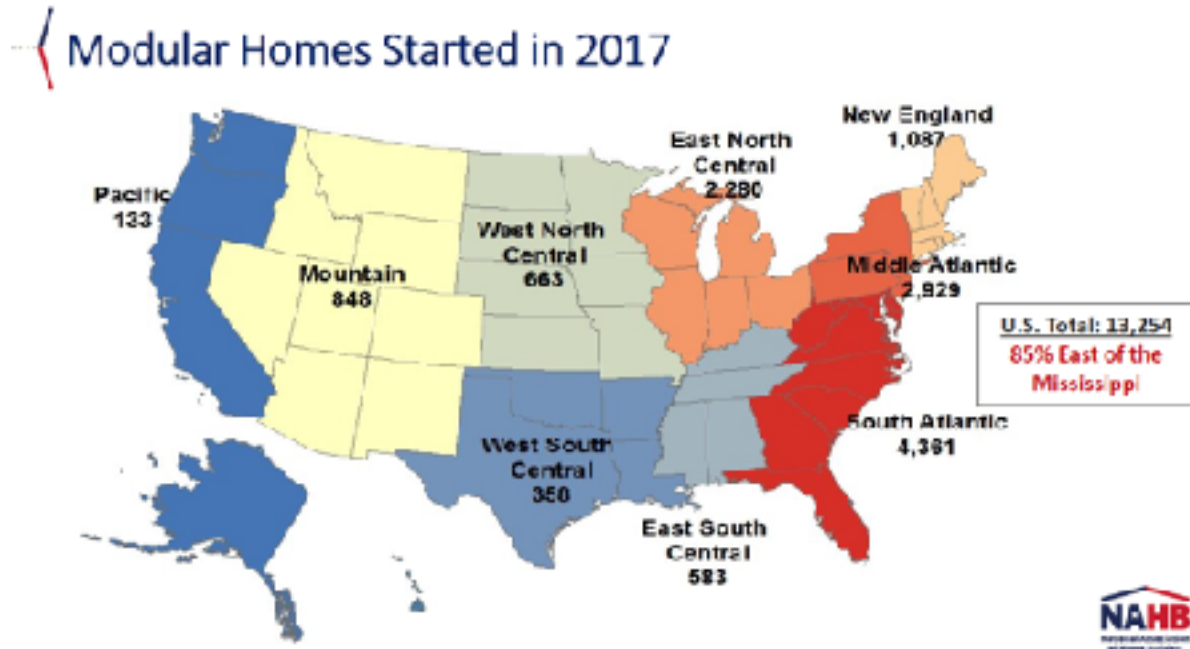
Commercial Modular



Commercial Modular



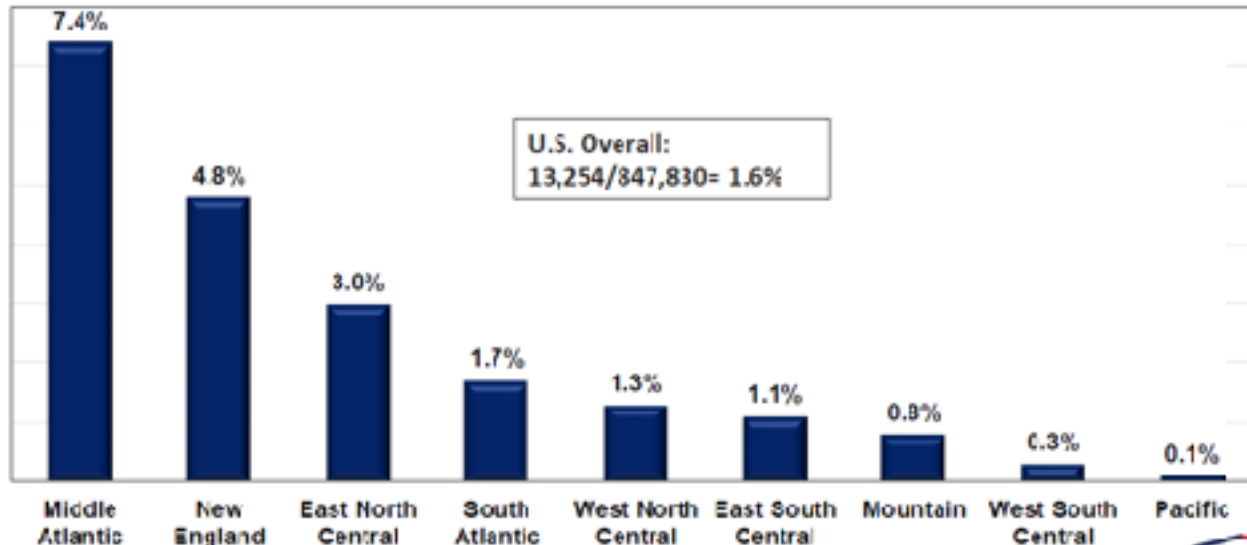
How common are modular homes?



Source: NAHB tabulation of data from the Survey of Construction, U.S. Census Bureau.

How common are modular homes?

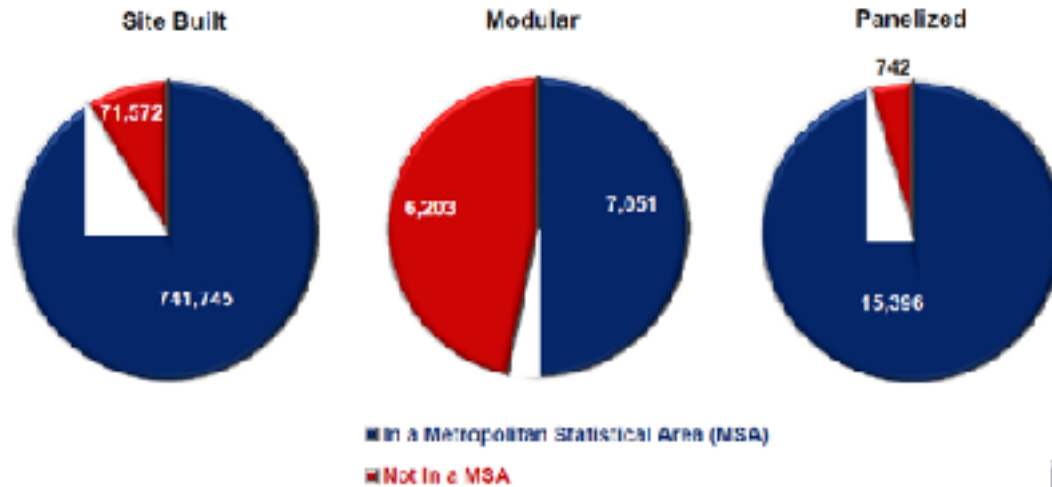
Market Penetration of Modular Construction by Division *Modular Share of All Single-family Homes Started in 2017*



Source: NAHB tabulation of data from the Survey of Construction, U.S. Census Bureau.

Where are modular homes being built?

2017 Single-family Starts Inside and Outside Metro Areas



Source: NAHB tabulation of data from the Survey of Construction, U.S. Census Bureau.

What problems does Modular Construction solve?

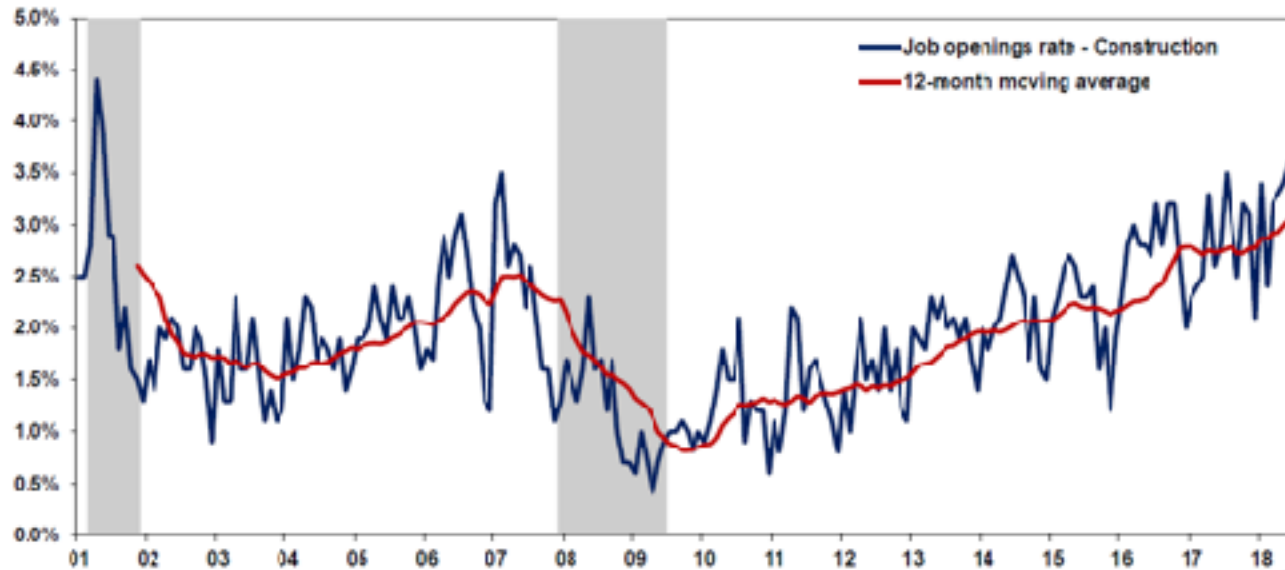


Supply-Side
Issues

What problems does Modular Construction solve?

Labor

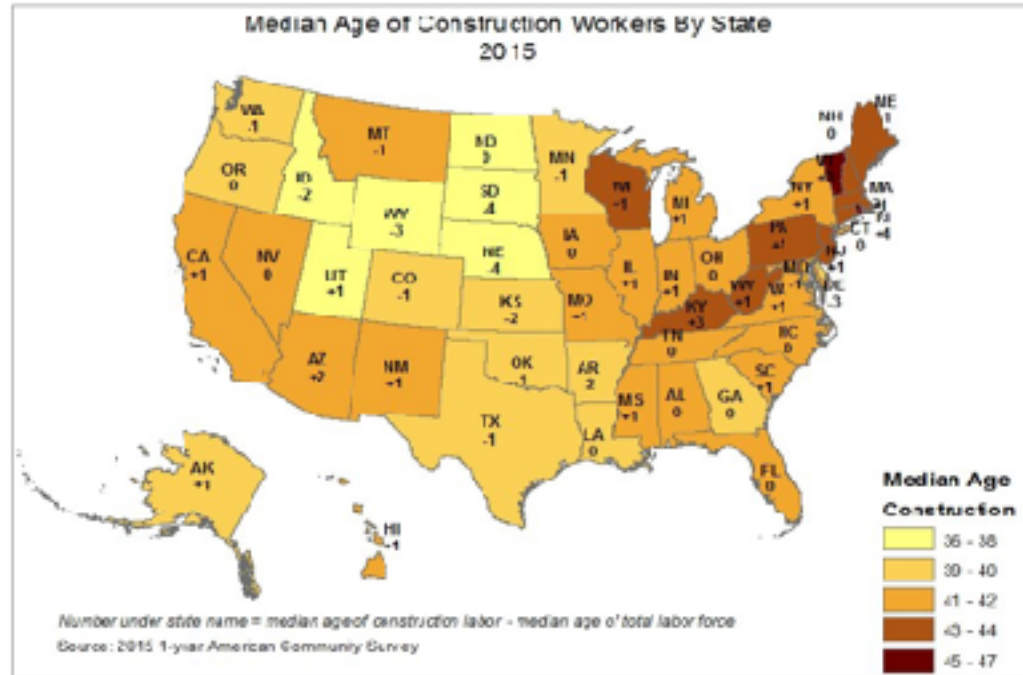
Elevated count of unfilled construction jobs



Source: U.S. Bureau of Labor Statistics (BLS).

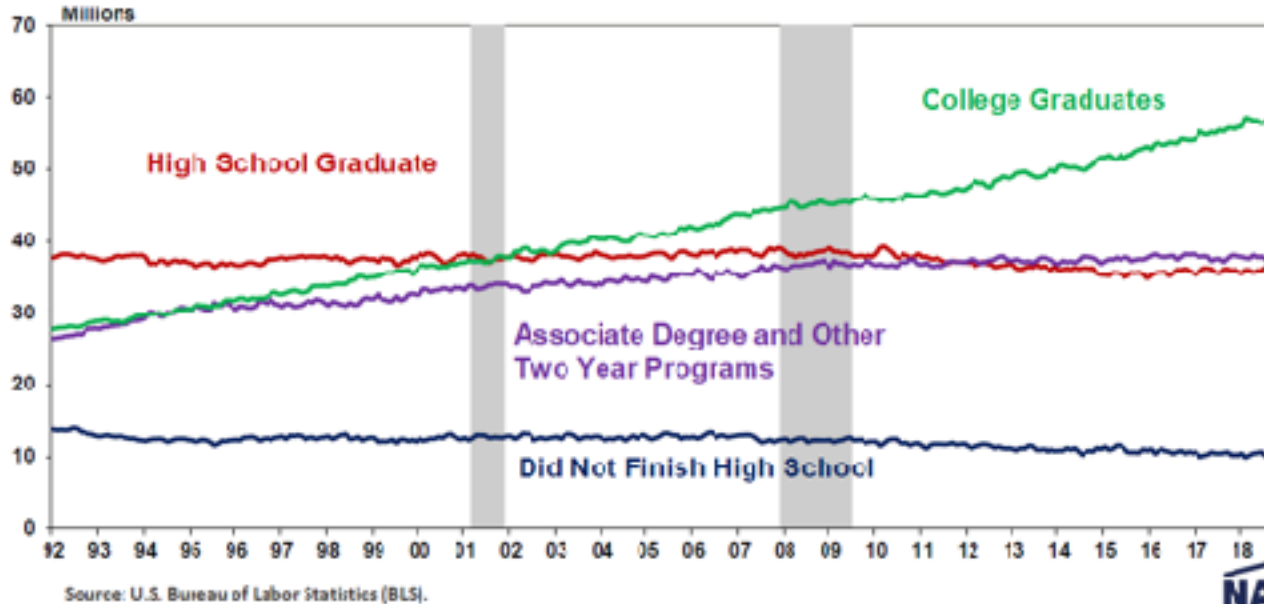
What problems does Modular Construction solve?

Aging Labor Force for Construction



What problems does Modular Construction solve?

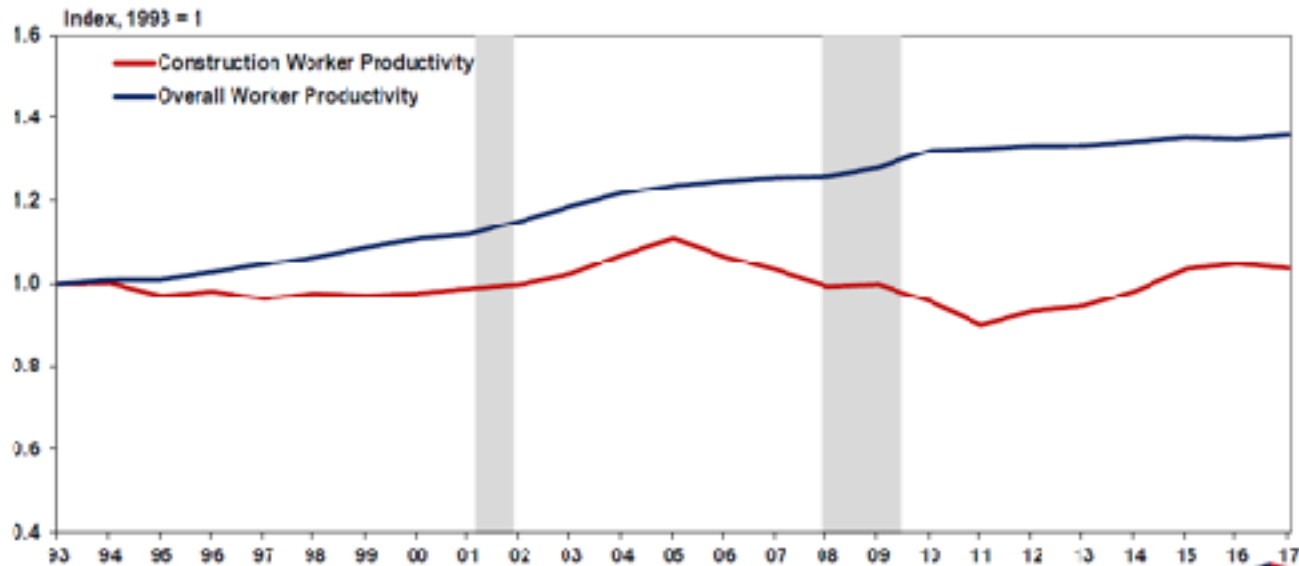
Labor Force
Changing labor force



What problems does Modular Construction solve?

Construction Sector Productivity

Logging overall economy

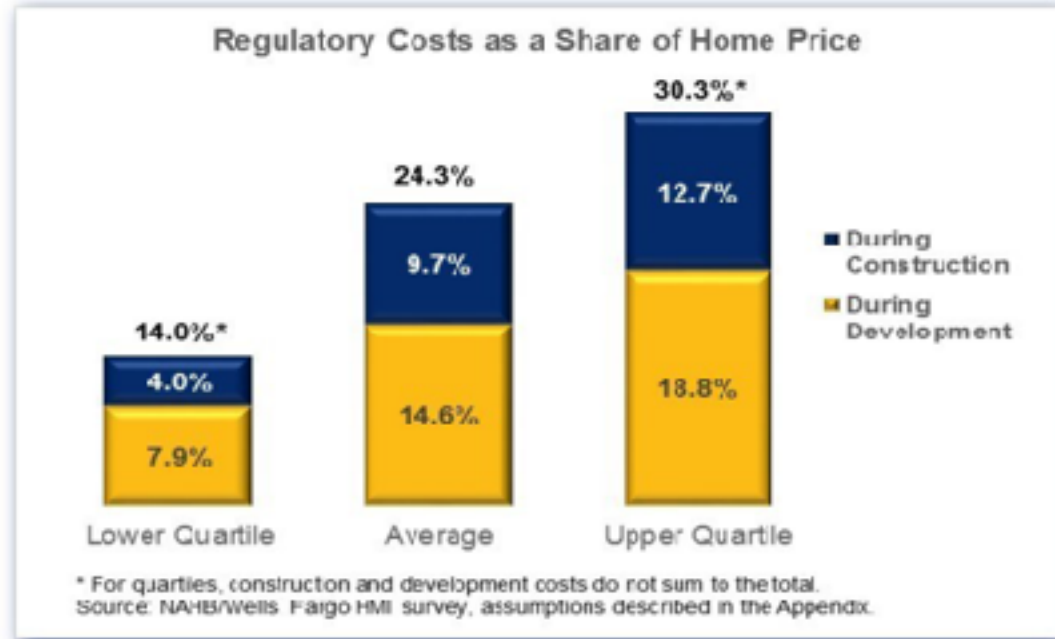


Source: U.S. Bureau of Labor Statistics (BLS).

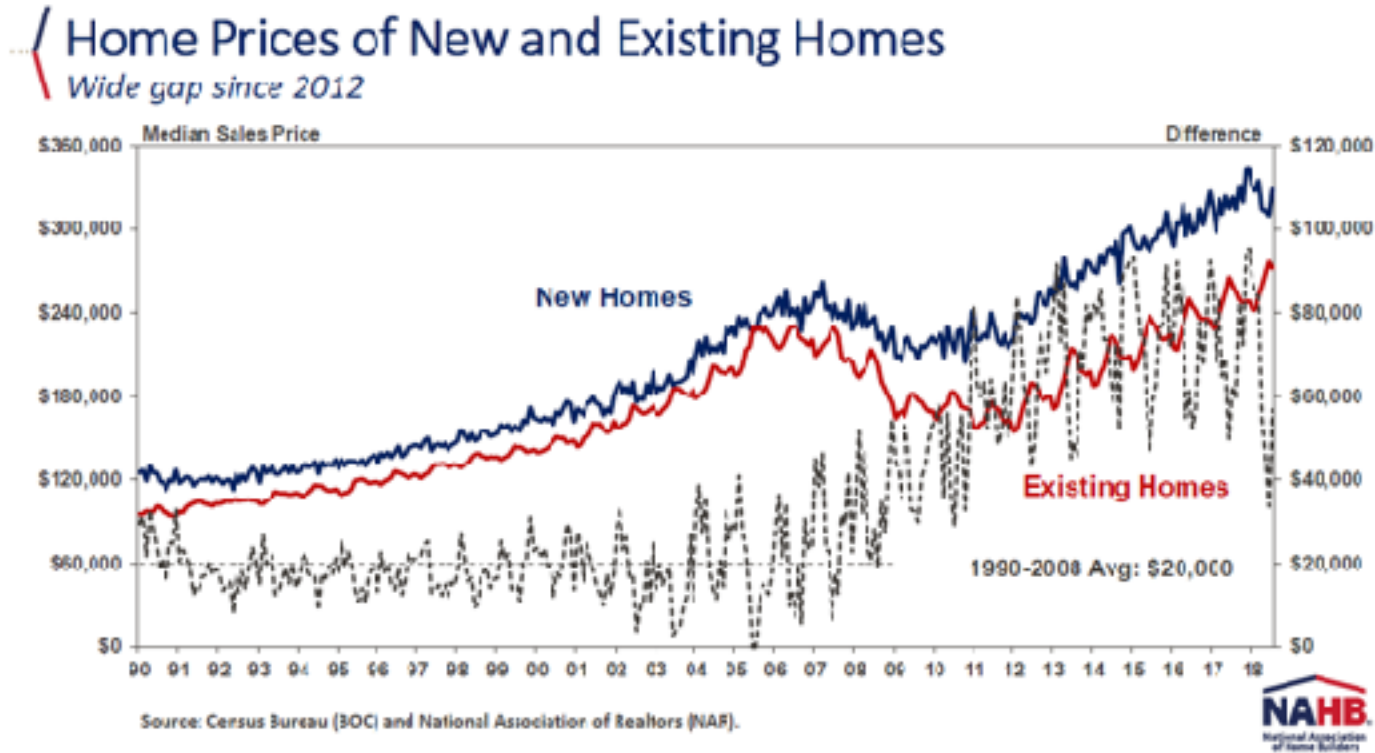
What problems does Modular Construction solve?

/ Regulatory Costs Rising – Up 29% Over Last 5 Years

Total effect of building codes, land use, environmental and other rules



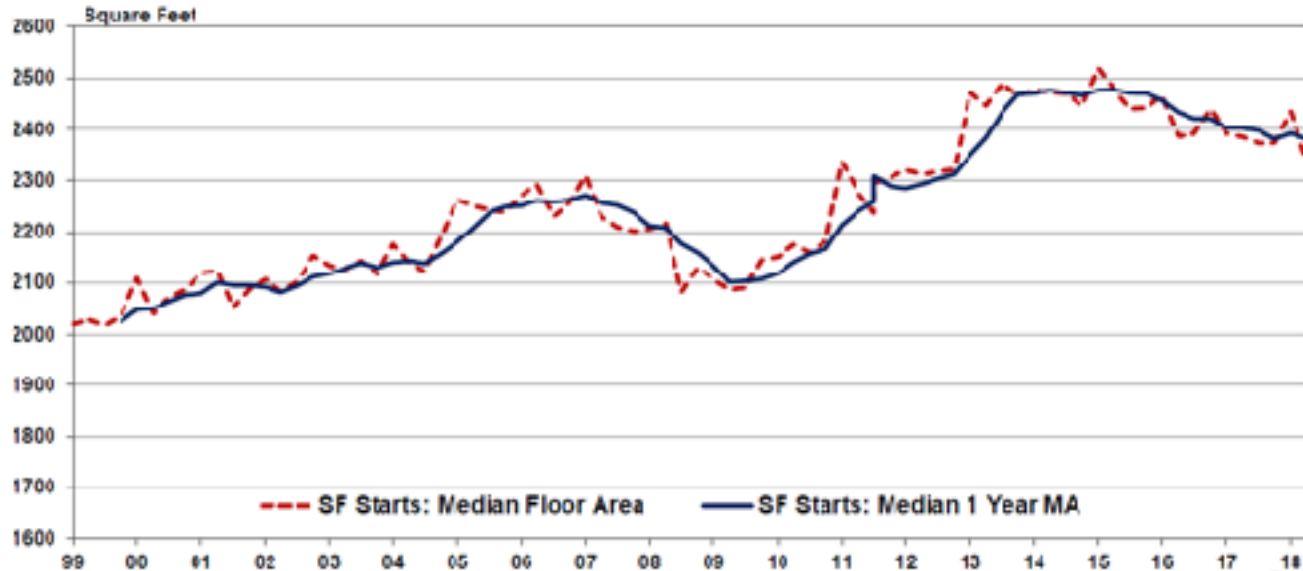
Favorable Market Conditions for Modular Construction



Favorable Market Conditions for Modular Construction

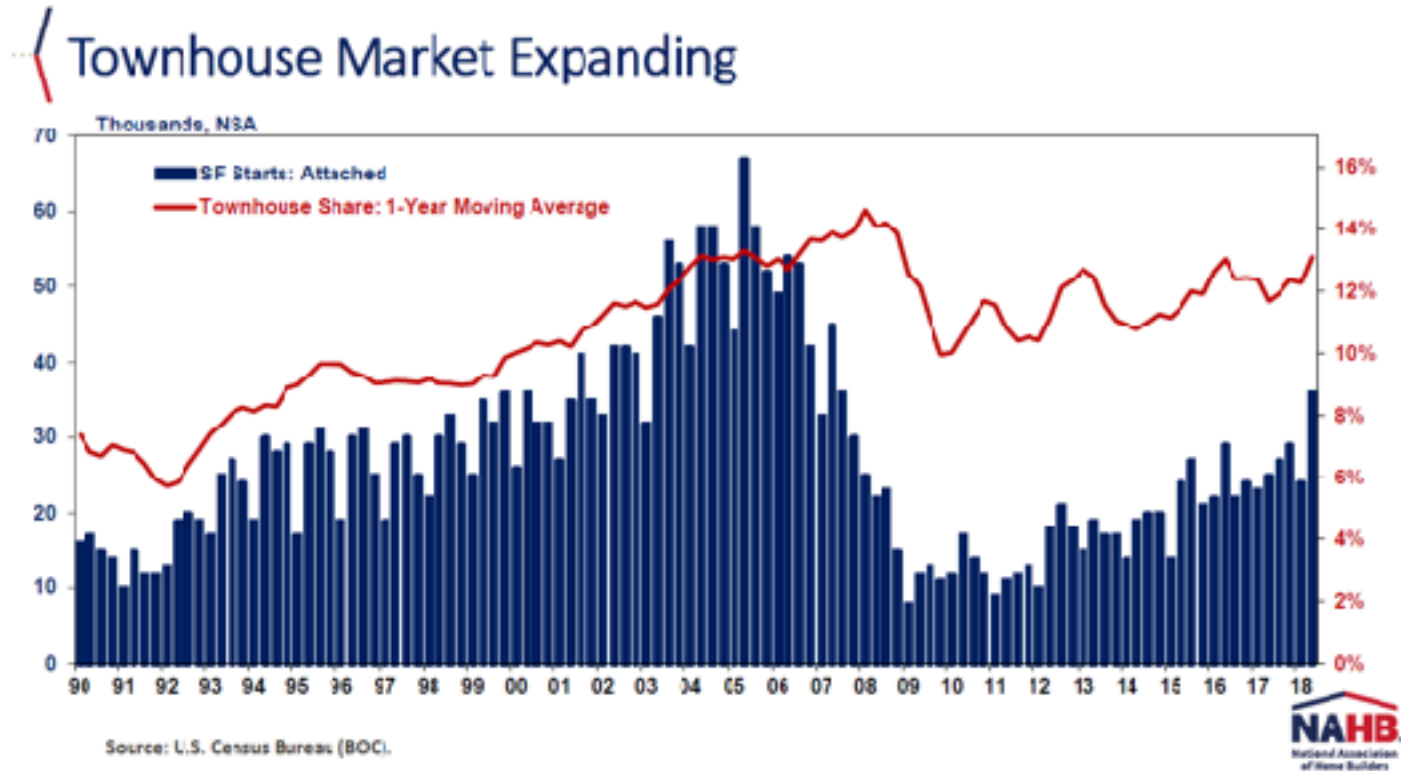
Typical New Home Size

Decline after market shift



Source: U.S. Census Bureau (BOC).

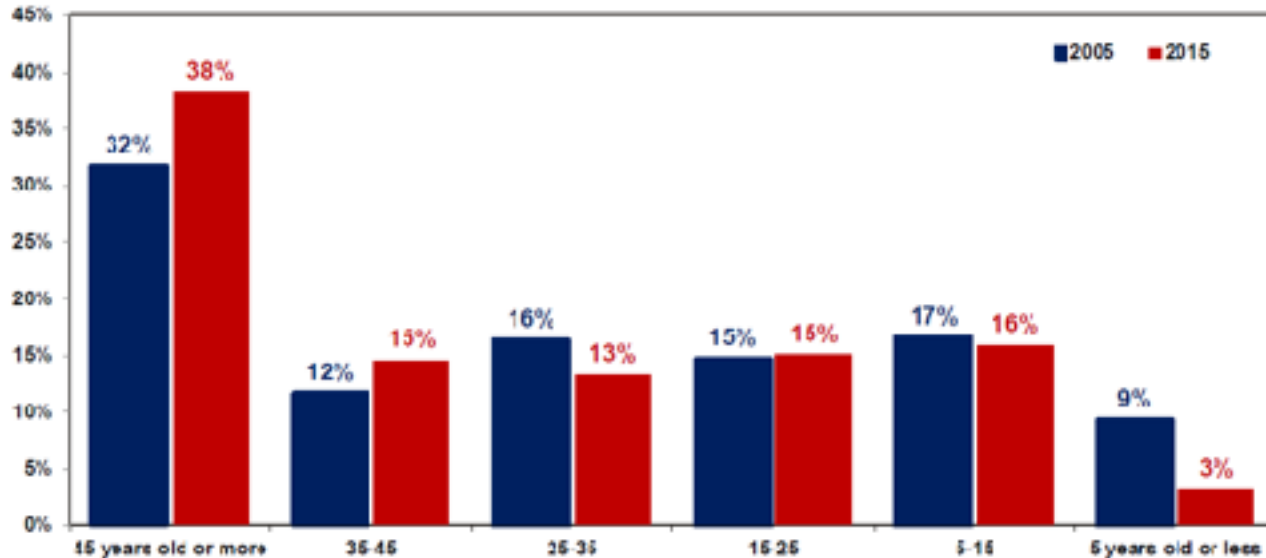
Favorable Market Conditions for Modular Construction



Favorable Market Conditions for Modular Construction

The Age of the Housing Stock

Typical home is almost 40 years old



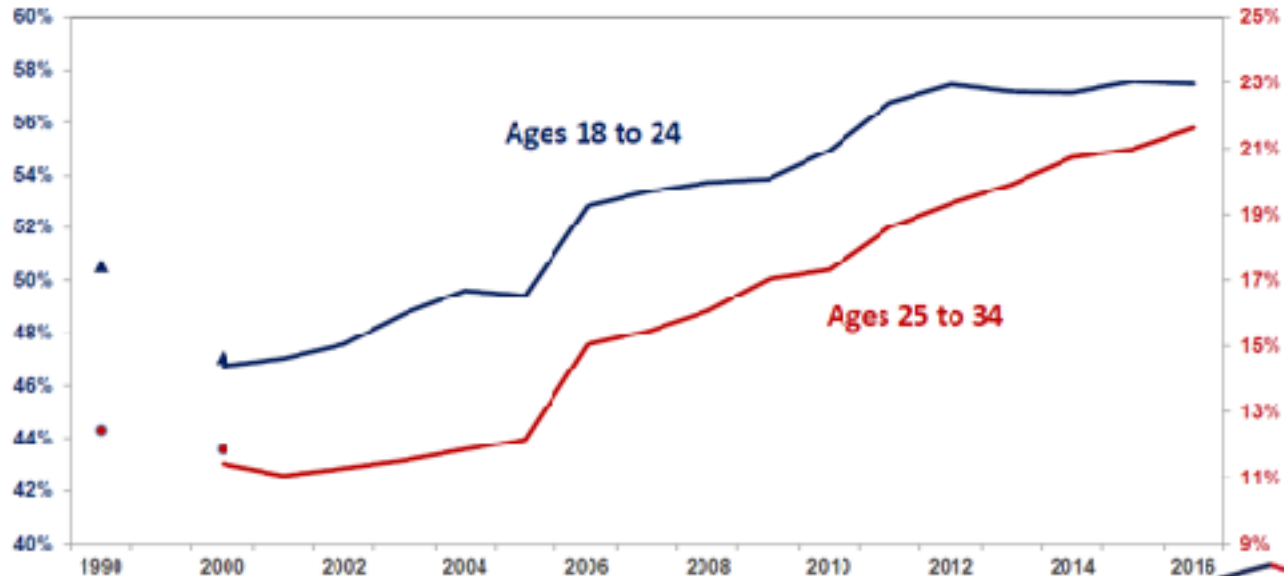
Source: U.S. Census Bureau (BCC), 2005 and 2015 American Community Survey 1-Year Estimates.



Favorable Market Conditions for Modular Construction

Share of Young Adults Living with Parents

Almost doubled



Source: US Census 1990, 2000, PUMS, 2000-2016 ACS, PUMS, NAHB Estimates.

Modular vs. Site Built

Modular - Pros

- Smaller, shorter laydown area
- Shorter Critical Path
- No weather delays
- Workforce commute
 - Predictable, regular
- Factory Processes - faster, better
- Material procurement - bulk
- Less waste, more reuse
- Design / mgt team on premises
- Non union, no Davis-Bacon wages

Site Built - Cons

- Laydown area - Large
- Longer Critical Path
- Seasonal delays / weather
- Location - driven problems
 - Labor, materials, weather
- Remote management
- Travel
- Union Labor
- Wasteful, material exposed to weather, theft, vandalism

Modular vs. Site Built

Modular - Cons

- Abnormal, out of ordinary
- Design restricted by transportation limits
- Double structure (pro?)
- Additional planning required
- Must commit early
- Limited factories, educated teams
- Project access, transport issues

Site Built - Pros

- Flexible
- Design-Build
- More accessible
- Transportation issues - different
- Normal, industry standard

Future of Modular - now

Data center



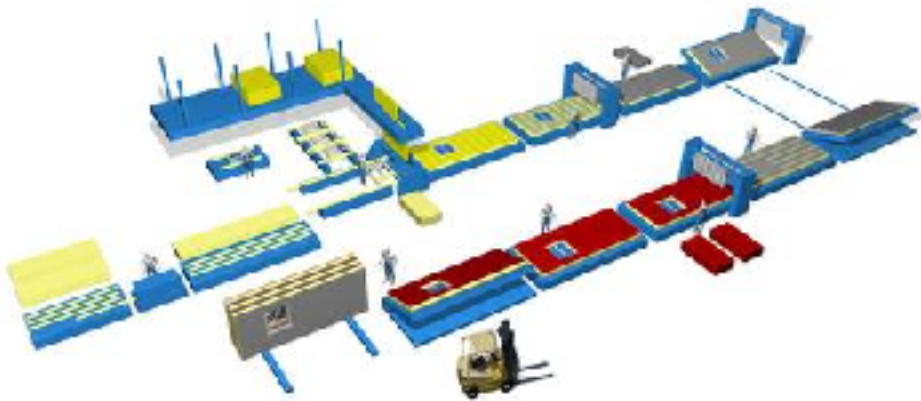
Future of Modular - now

Sweden - Lindbäcks



Future of Modular - now

Sweden - Lindbacks



Future of Modular - now

Poland - DMD Modular



Future of Modular - now

Poland - DMD Modular



Future of Modular - now

Japan - Sekisui Heim



Future of Modular - now

Japan - Sekisui Heim



Future of Modular - now

Japan - Sekisui Heim



Future of Modular - now

Japan - Sekisui Heim



Katerra

- Over \$1billion dollars raised to date
- Vertically integrating the entire process using factories, sub-factories, and in-house land development and general contracting

Katerra





Q and A

