



Home Innovation
RESEARCH LABS

BUILDER ATTITUDES TOWARDS SYSTEMS-BUILT CONSTRUCTION

*Summary of Survey Findings
Presented at Building Systems Week (NAHB)
September 24, 2020*

Finding Innovation a Home

Home Innovation Research Labs

- Founded in 1964 as wholly-owned subsidiary of NAHB
- Independent, for-profit researchers assisting development and commercialization of new building technologies
 - Engineering research
 - Building science
 - Market & installation research
 - Thermal, moisture, structural testing
- #1 in U.S. green home building certification (NGBS)
- Active in building codes and standards development



Basis for Presentation Data: Tracking Studies of Home Builders

Part 1:

- Trends in Offsite housing methods and building components over past decade, fielded in February 2020
 - Annual Builder Practices Survey of ~1,600 U.S. Builders

Part 2:

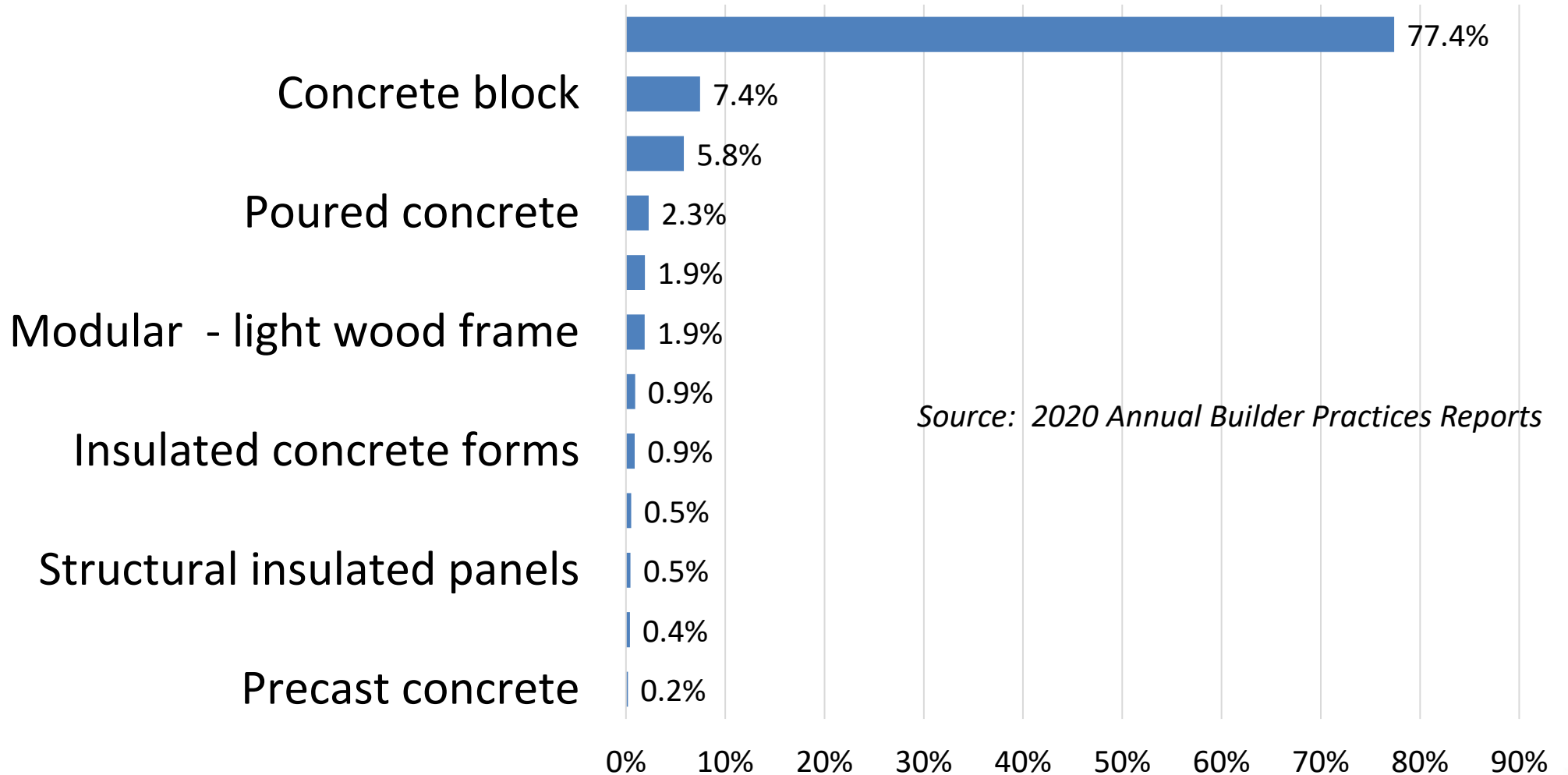
- Benchmark survey of builder attitudes towards skilled labor shortage in April 2020

Part 3:

- Pre- and post-COVID builder attitudes towards offsite methods
 - September 2020 and August 2019 survey findings are analyzed in this section



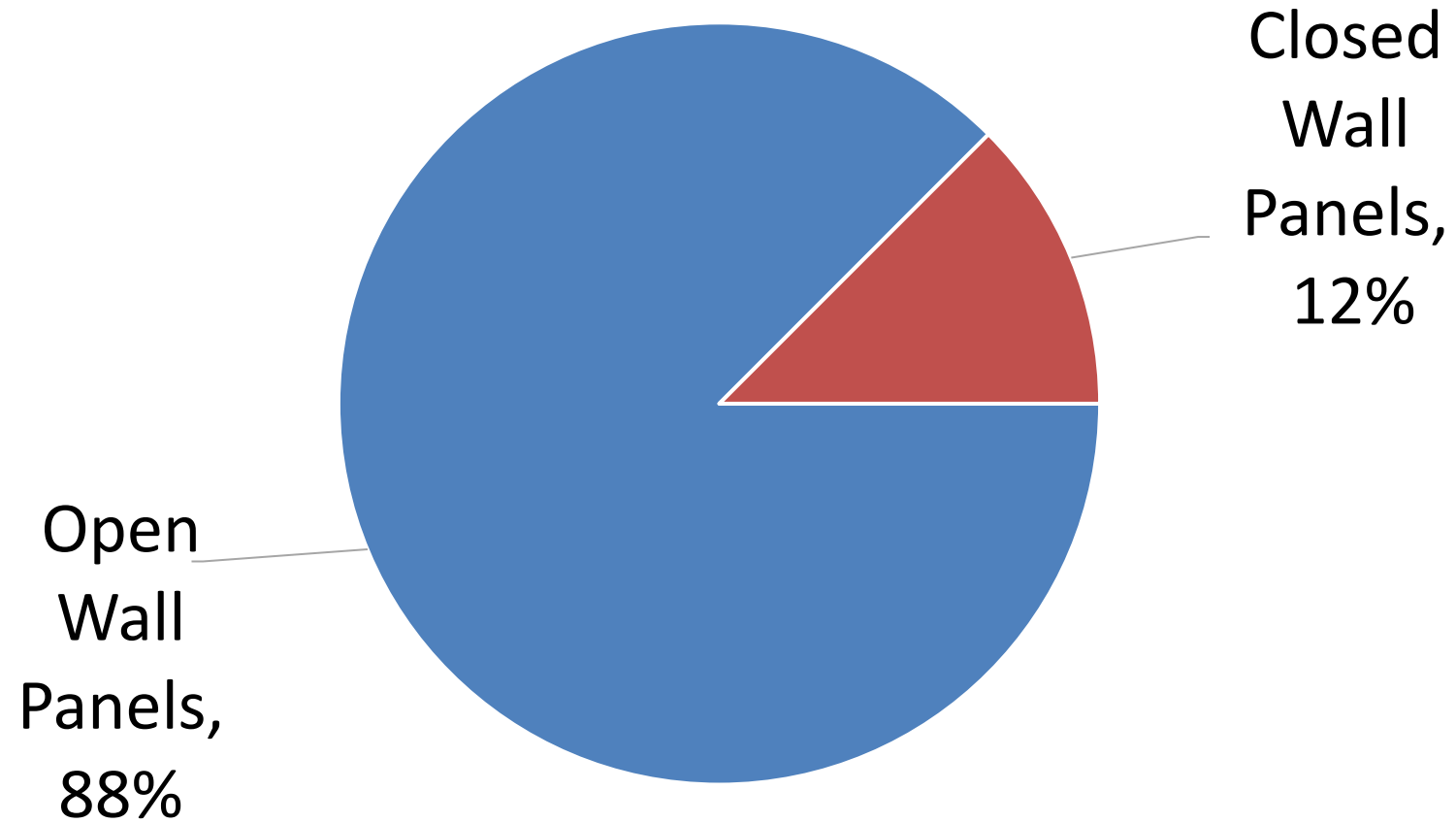
New Home Wall Construction, 2019 Combined Single & Multifamily



Source: 2020 Annual Builder Practices Reports

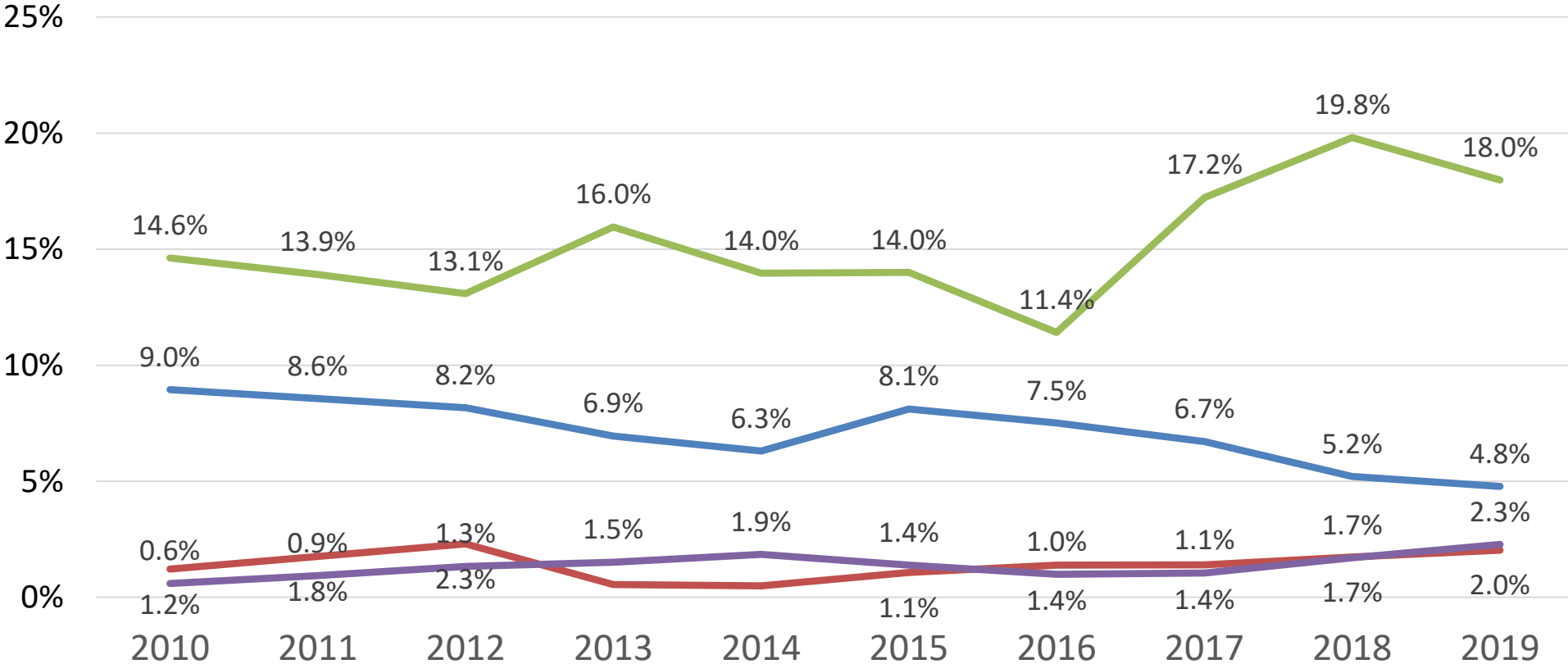


Wall Panels in New Homes (2019) Open vs. Closed



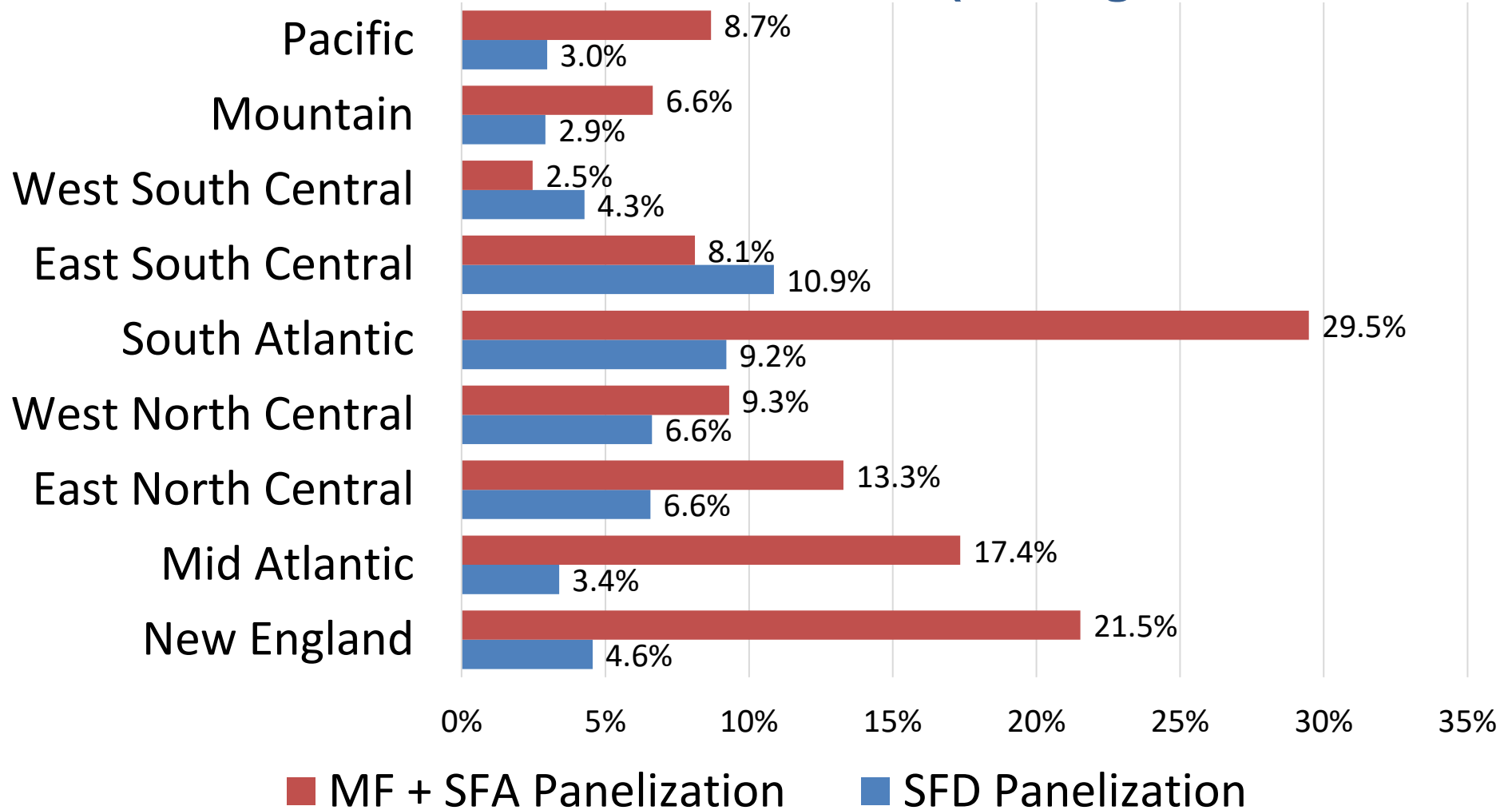
Source: 2020 Annual Builder Practices Reports

Panelized Walls and Modular Shares in New Homes (wood and steel only)



— Single Family Panelized — Single Family Modular
 — Multifamily Panelized — Multifamily Modular

New Home Market Penetration of Wall Panelization (Average Shares 2013 - 2018)



■ MF + SFA Panelization ■ SFD Panelization

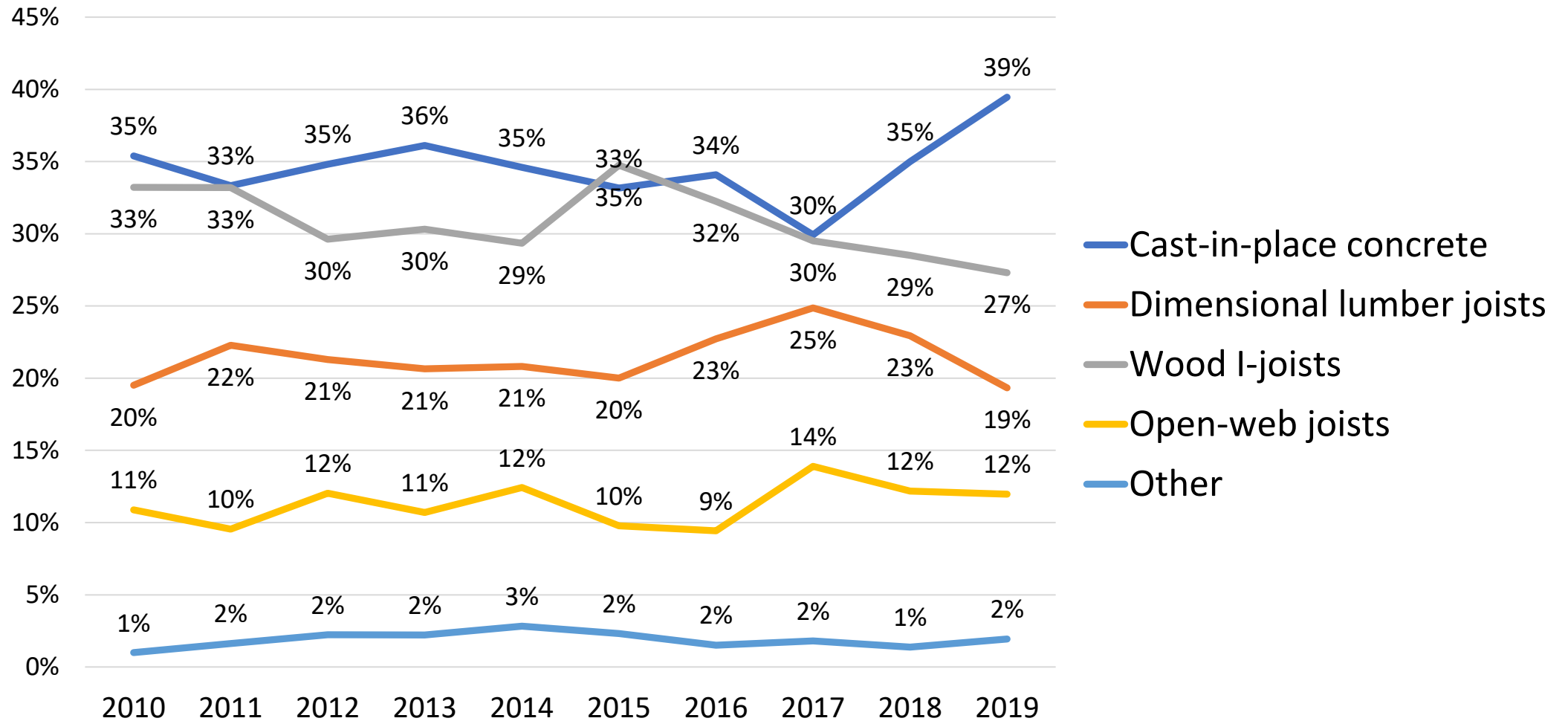
Source: Annual Builder Practices Reports

Summary of “Barriers to Offsite” from August 2019 Survey of Home Builders

- “What we’re doing now works fine”
- Unaware of options, need trustworthy sources for local supply
- Costs more than site-built
- Workforce unwilling / unable to change
- Takes too much time and effort to change
- Offsite requires more pre-planning
- Local logistics issues or shipping
- Negative market perceptions
- Inability to make last-minute changes

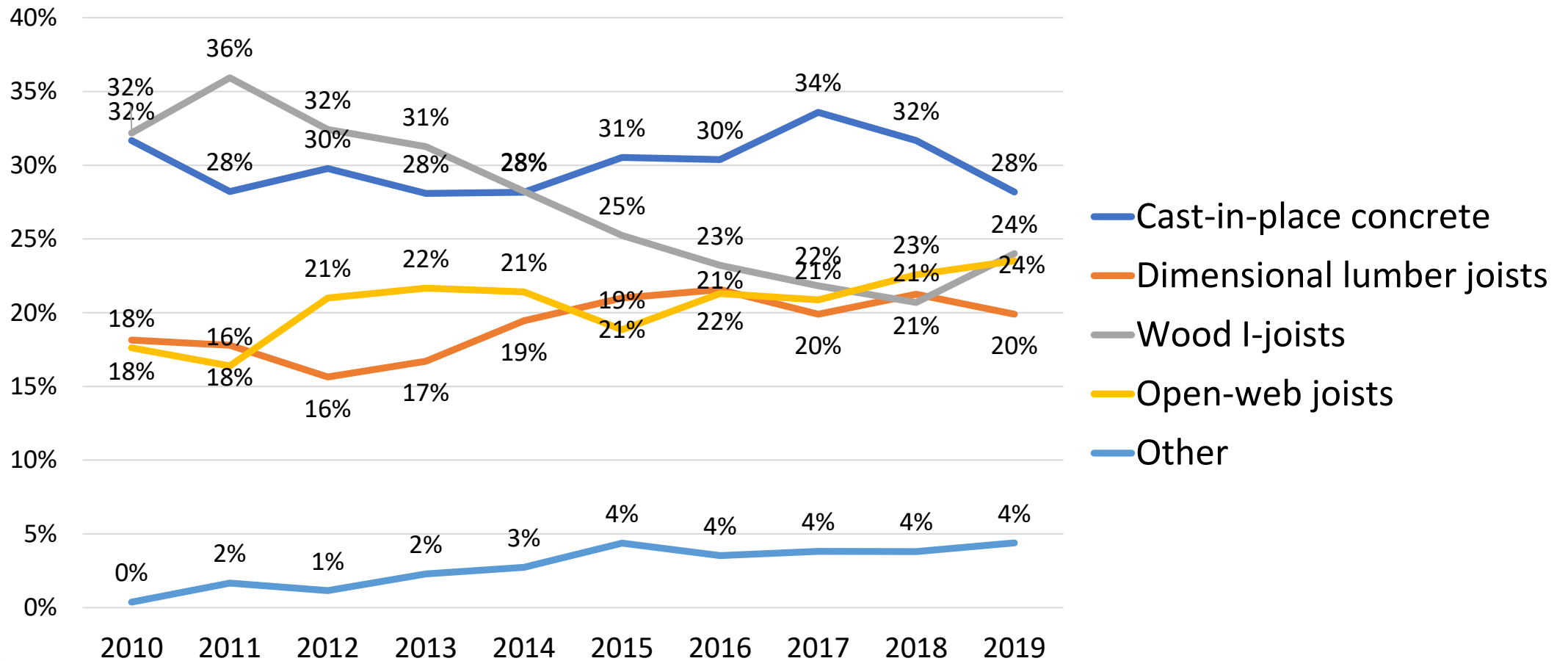


New Single Family Home Floor Construction (% of floor area)



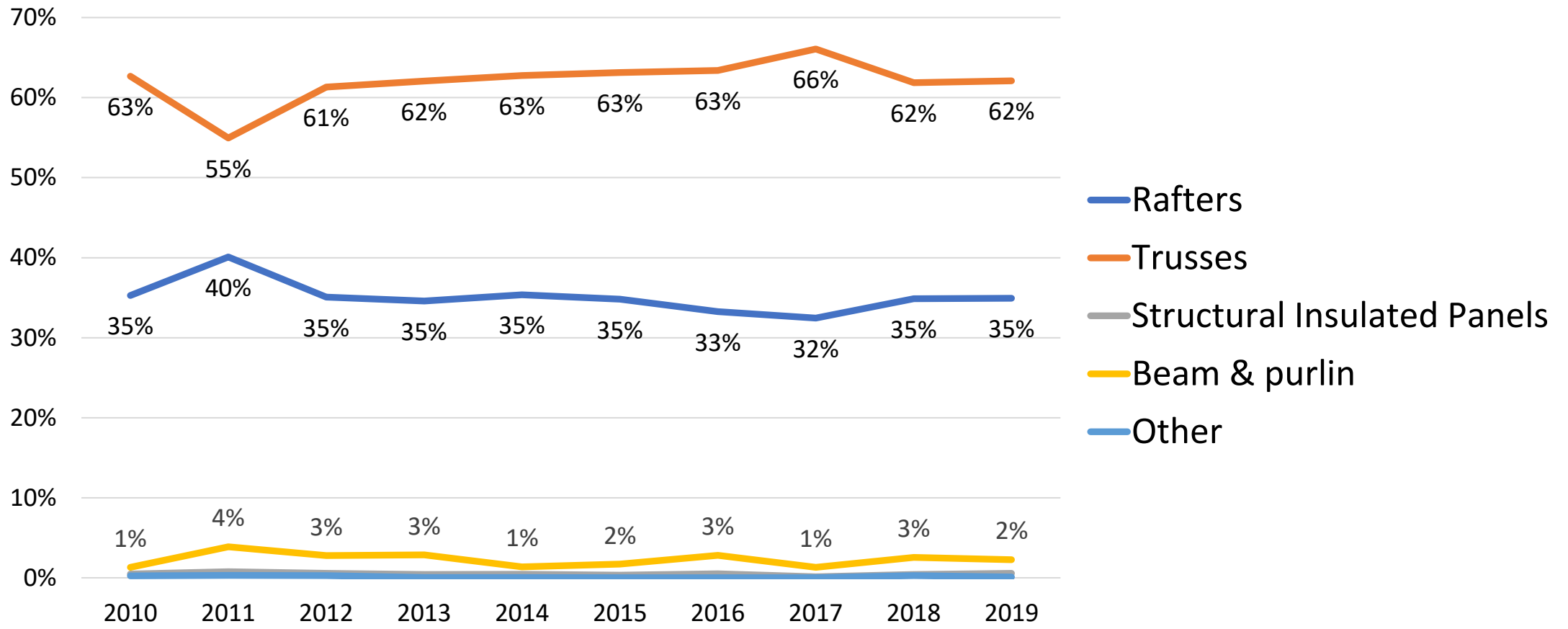
Source: Annual Builder Practices Reports

New Apartment and Townhouse Floor Construction (% of floor area)



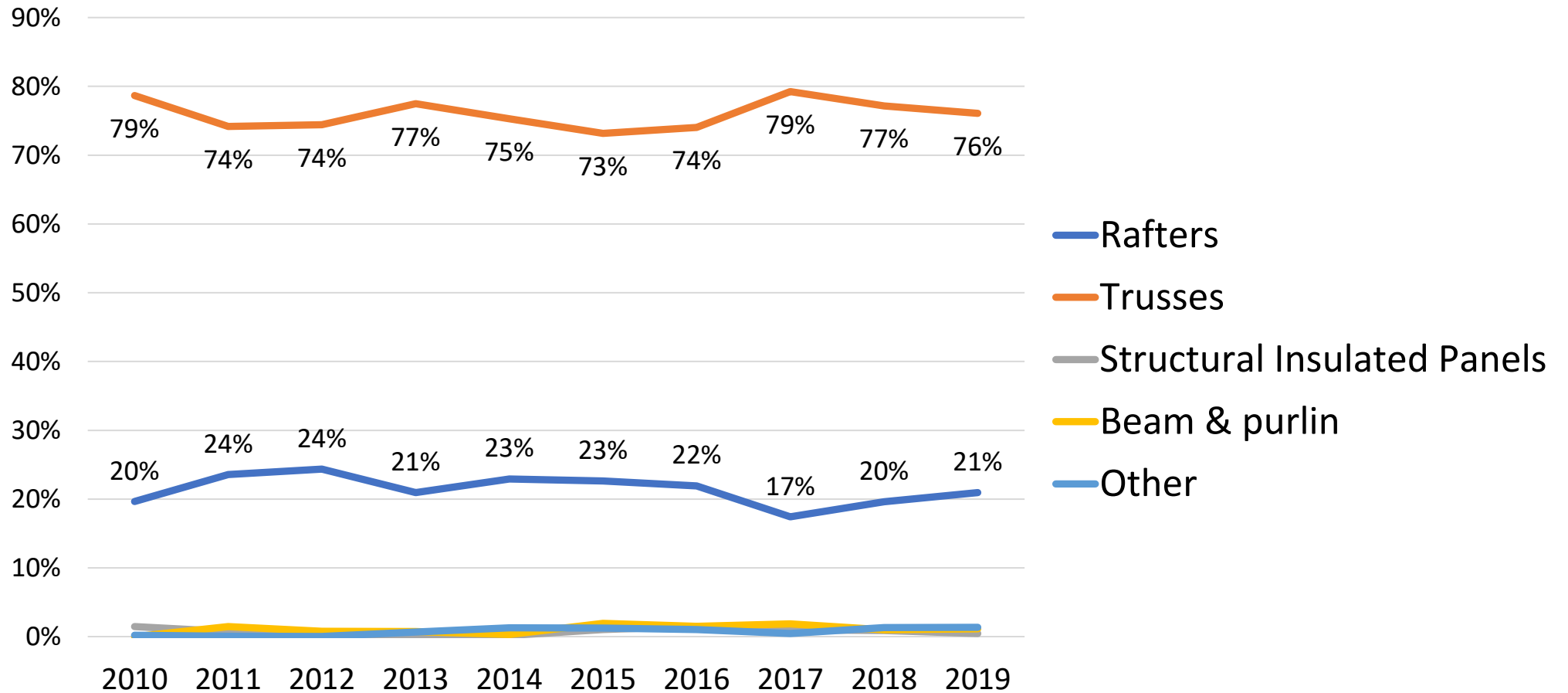
Source: Annual Builder Practices Reports

Roof Construction in Single Family Homes (% of roof area)



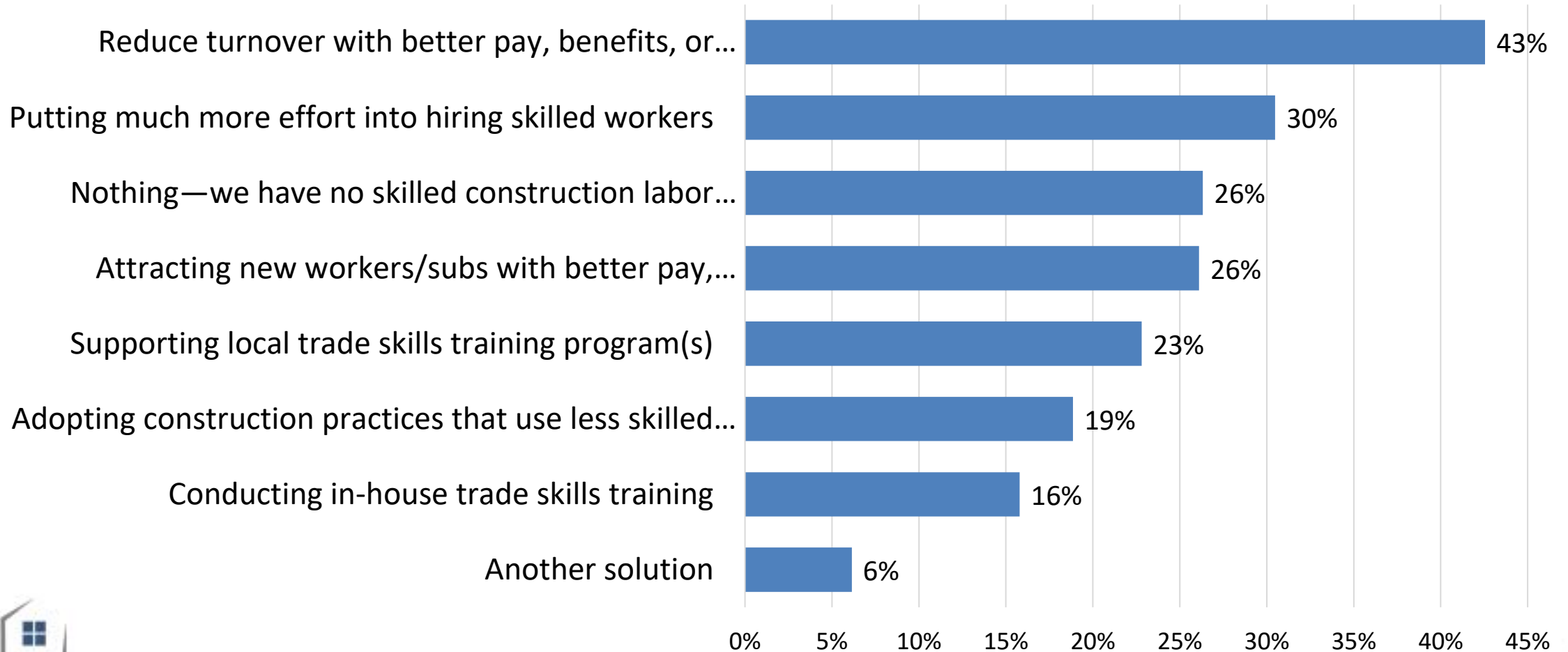
Source: Annual Builder Practices Reports

Roof Construction in New Apartments & Townhomes (% of roof area)



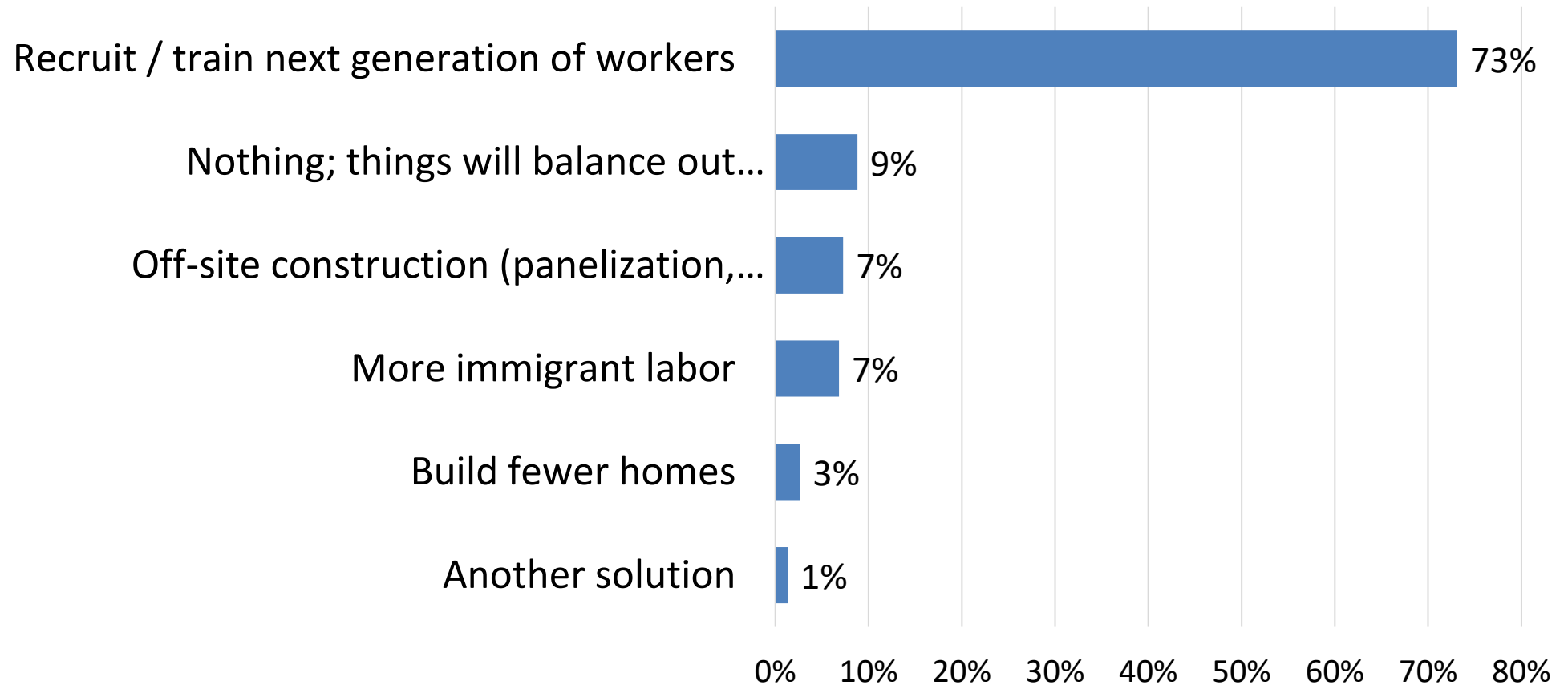
Source: Annual Builder Practices Reports

April 2020 Survey of Builders: “Prior to COVID-19, what had your company done to lessen the impact of the skilled construction labor shortage on your operations?”

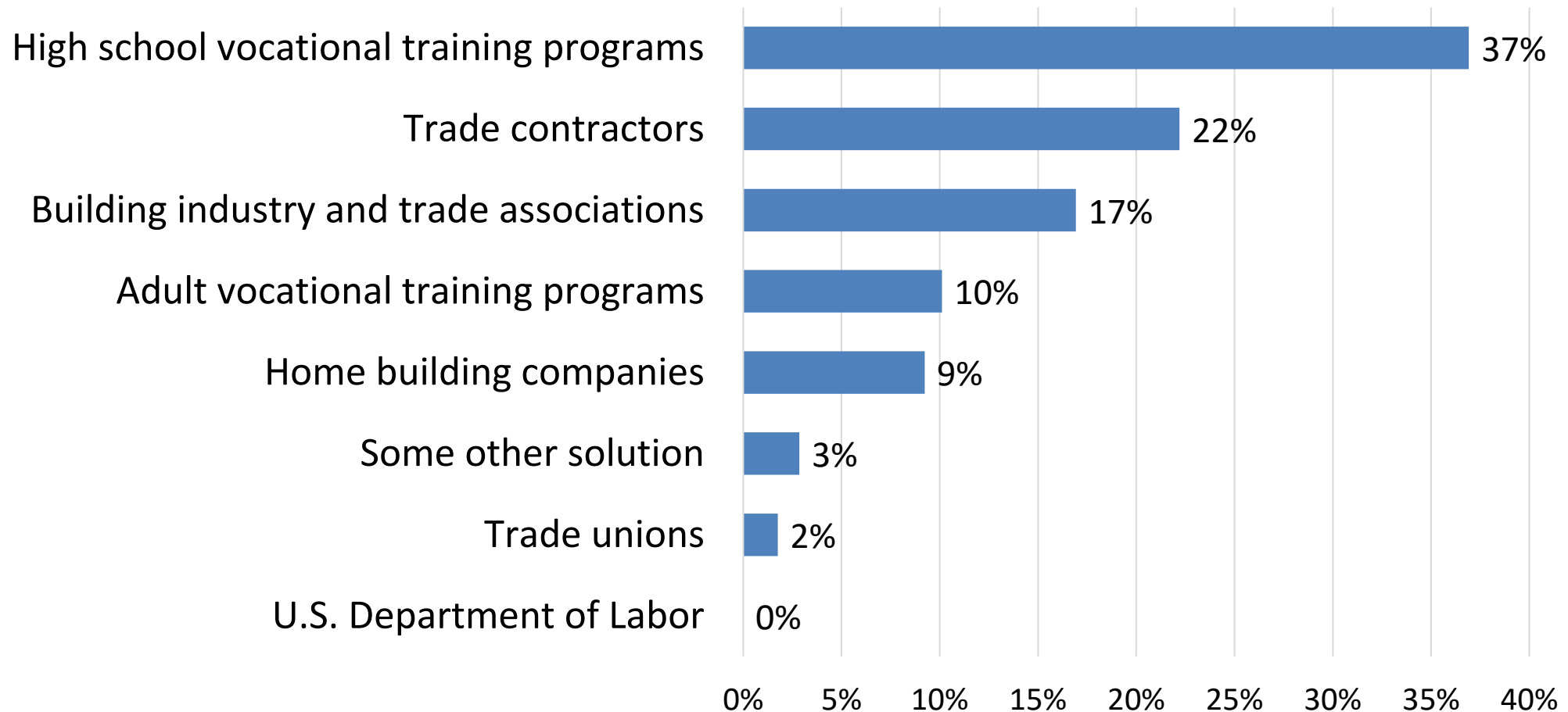


Source: Home Innovation Research Labs

April 2020 Survey of Builders: “Prior to COVID-19, what did you think was the best long-term solution to reduce the impact of skilled construction labor shortages?”



April 2020 Survey of Builders: “Prior to COVID-19, which of the following did you believe was best able to lead the restoration of the skilled construction labor pool in your market area?”

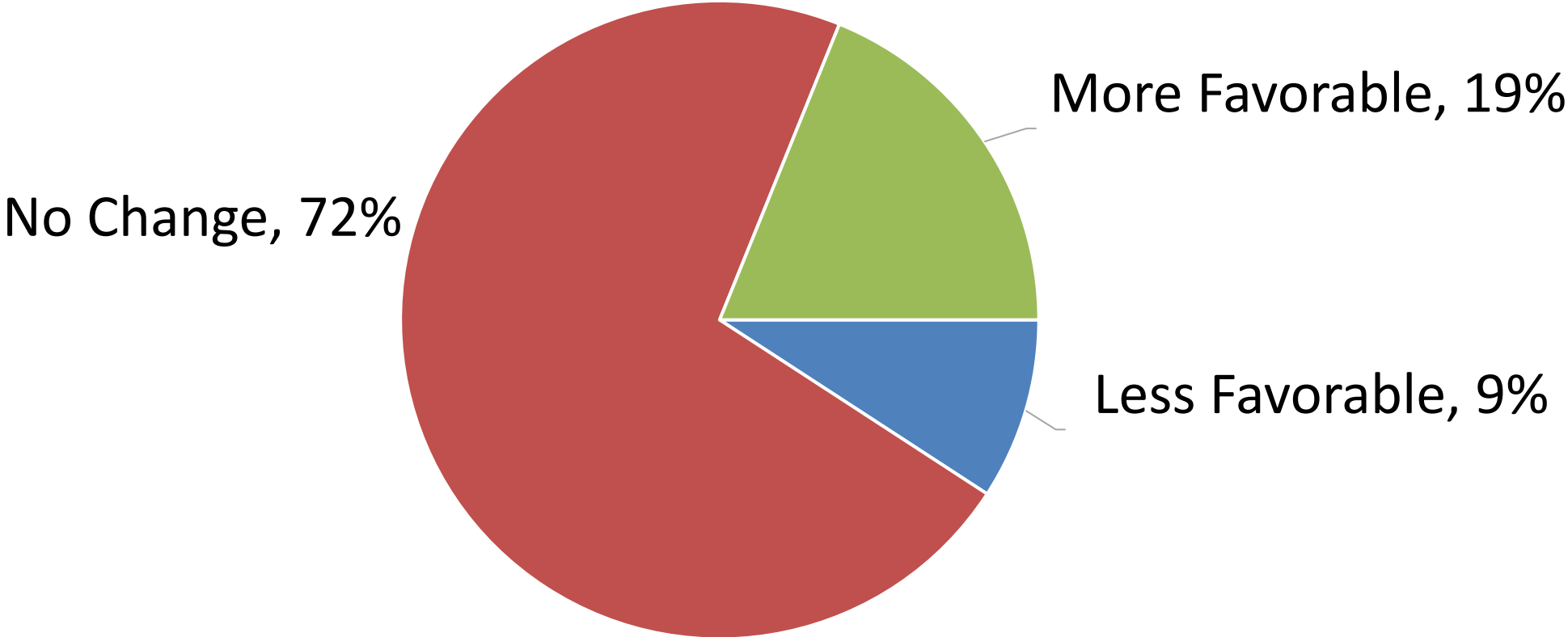


Source: Home Innovation Research Labs

Impact of COVID-19 on Intent to use Offsite Technologies (September 2020 Survey)

Builders were asked: “Since COVID-19, how have your views changed towards adopting or continuing to use offsite building methods such as those mentioned above? Are they more favorable? Less favorable? Please explain why.”

Impact of COVID-19 on Builder Views of Offsite Construction (n=195)



Source: Home Innovation Research Labs

Rationale Behind “More Favorable” and “Less Favorable” Survey Responses

More Favorable

- Easier to maintain social distancing with fewer crews, smaller crews
- Reduce construction cycle time
- Consolidated purchases means fewer vendors to interact with
- Solves supply chain disruptions
- May solve materials cost volatility
- Building has become more complex since COVID-19—offsite offers simplification

Less Favorable

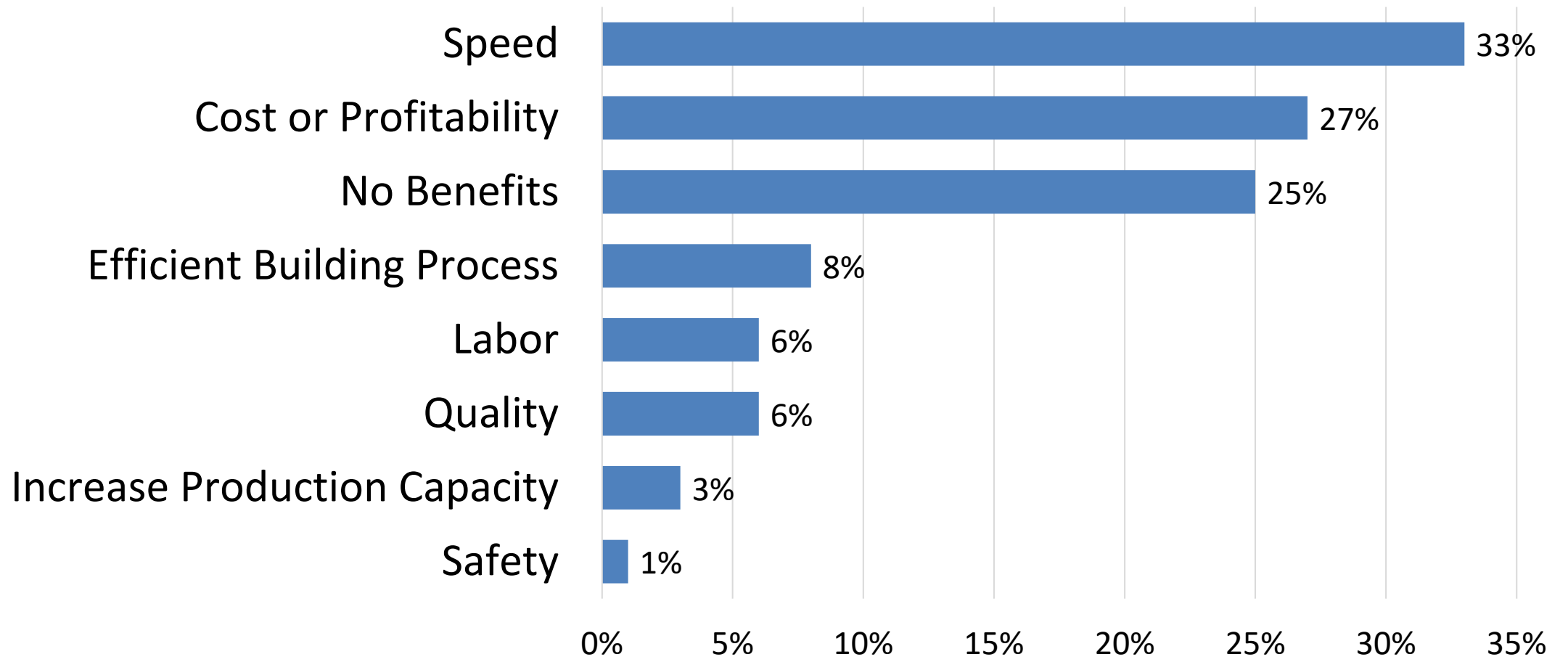
- Things are very uncertain—adopting offsite could increase uncertainty
- Some feel offsite methods give them less control over the construction process
- Less flexibility to respond to issues in this crisis
- Jobsites less likely to be “shut down” than factories



Primary Benefits of Offsite Construction (September 2020 Survey)

Builders were asked: “When you consider beginning, or expanding your use of offsite housing methods described above, what do you think will be the primary benefits to your company? Please explain.”

Builders' View of Primary Benefits of Offsite Construction Methods (n=195)



Source: Home Innovation Research Labs

Primary Benefits of Offsite Construction Methods – Descriptions by Respondents

- **Speed** — faster construction time
- **Cost or Profit** — more stable or lower cost on labor or materials
- **None** — this group sees no advantage to offsite methods
- **Process Efficiency** — tighter scheduling, fewer subs and suppliers, or reduced need for staff or equipment
- **Construction Quality** — Less exposed to elements, higher tolerances, and more energy efficient homes
- **Labor** — cost is increasing and availability declining
- **Increase Capacity** — build more homes each year with same staff
- **Safety** — this group takes COVID-19 and distancing at jobsite seriously



Questions on Offsite and Components Use in Builder Survey (August 2019 & September 2020)

E2

Considering only the new homes your company builds, how often do you anticipate using the following construction practices in five years compared to last year?

	Didn't use and don't plan to use	Plan to use it less often	Plan to use it about the same	Plan to use it more often
Roof trusses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pre-cut framing package	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Factory-built open wall panels (only one side of wall panels enclosed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Factory-built closed wall panels (walls delivered with interior & exterior sides enclosed)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Panelized, pre-assembled floors (floor "cassettes," in sections)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Modular (full wall, floor and roof assembled when delivered to the site)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Turn-key framing services (contractor provides both labor and materials)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Precast concrete floor, wall, or roof panels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manufactured homes (HUD-code)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Builder Anticipation for Coming 5 Years (September 2020, n=265)

	Didn't use and don't plan to use	Plan to use it less often	Plan to use it about the same	Plan to use it more often
Roof Trusses	7%	4%	66%	23%
Open-Wall Panels	51%	4%	28%	16%
Turnkey Framing	37%	7%	41%	16%
Pre-Cut Framing Package	50%	7%	28%	16%
Pre-assembled Floors	60%	4%	23%	13%
Modular	62%	4%	22%	11%
Closed Wall Panels	64%	4%	23%	10%
Precast Concrete	61%	6%	25%	8%
Manufactured Homes	79%	5%	13%	4%



Builders Anticipating Using More Often in 5 Years

	August 2019	September 2020
Roof Trusses	15%	23%
Factory-Built Open Wall Panels	9%	16%
Turn-Key Framing	7%	16%
Pre-Cut Framing Package	12%	16%
Panelized, Pre-Assembled Floors	7%	13%
Modular	7%	11%
Factory-Built Closed Wall Panels	9%	10%
Precast Concrete	7%	8%
Manufactured (HUD-Code)	1%	4%

Source: Home Innovation Research Labs

Builders Anticipating Using More Often in 5 Years (September 2020)

	SFD Builders	Custom Builders	Production Builders
Roof Trusses	23%	23%	24%
Factory-Built Open Wall Panels	16%	12%	21%
Turn-Key Framing	16%	13%	17%
Pre-Cut Framing Package	16%	14%	18%
Panelized, Pre-Assembled Floors	14%	11%	16%
Modular	11%	8%	13%
Factory-Built Closed Wall Panels	10%	7%	14%
Precast Concrete	9%	9%	8%
Manufactured (HUD-Code)	4%	2%	7%



Builders Anticipating Using More Often in 5 Years (September 2020)

	All Builders	Local Builder	Regional or National
Roof Trusses	23%	23%	28%
Factory-Built Open Wall Panels	16%	15%	40%
Turn-Key Framing	16%	15%	28%
Pre-Cut Framing Package	16%	15%	22%
Panelized, Pre-Assembled Floors	13%	12%	22%
Modular	11%	10%	22%
Factory-Built Closed Wall Panels	10%	10%	24%
Precast Concrete	8%	7%	12%
Manufactured (HUD-Code)	4%	3%	0%



Builders Anticipating Using More Often in 5 Years (September 2020)

	SFD Builders	Townhouse Builders	Apartment Builders
Roof Trusses	23%	18%	24%
Factory-Built Open Wall Panels	16%	22%	26%
Turn-Key Framing	16%	16%	18%
Pre-Cut Framing Package	16%	20%	21%
Panelized, Pre-Assembled Floors	14%	18%	12%
Modular	11%	18%	21%
Factory-Built Closed Wall Panels	10%	6%	18%
Precast Concrete	9%	10%	9%
Manufactured (HUD-Code)	4%	10%	12%



Builders Anticipating Using More Often in 5 Years (September 2020)

	SFD Builders	SFD Starter Builders	SFD Move-up Builders	SFD Luxury Builders
Roof Trusses	23%	22%	26%	22%
Factory-Built Open Wall Panels	16%	20%	17%	16%
Turn-Key Framing	16%	16%	17%	12%
Pre-Cut Framing Package	16%	20%	17%	17%
Panelized, Pre-Assembled Floors	14%	20%	14%	13%
Modular	11%	16%	11%	8%
Factory-Built Closed Wall Panels	10%	14%	9%	10%
Precast Concrete	9%	9%	10%	9%
Manufactured (HUD-Code)	4%	6%	3%	4%



Builders Anticipating Using More Often in 5 Years (September 2020)

	Northeast Builders	Midwest Builders	South Builders	West Builders
Roof Trusses	28%	24%	18%	27%
Factory-Built Open Wall Panels	20%	21%	7%	27%
Turn-Key Framing	14%	18%	15%	17%
Pre-Cut Framing Package	14%	17%	15%	17%
Panelized, Pre-Assembled Floors	12%	15%	9%	22%
Modular	14%	11%	8%	17%
Factory-Built Closed Wall Panels	12%	7%	7%	17%
Precast Concrete	12%	8%	7%	7%
Manufactured (HUD-Code)	10%	4%	1%	5%

Source: Home Innovation Research Labs

