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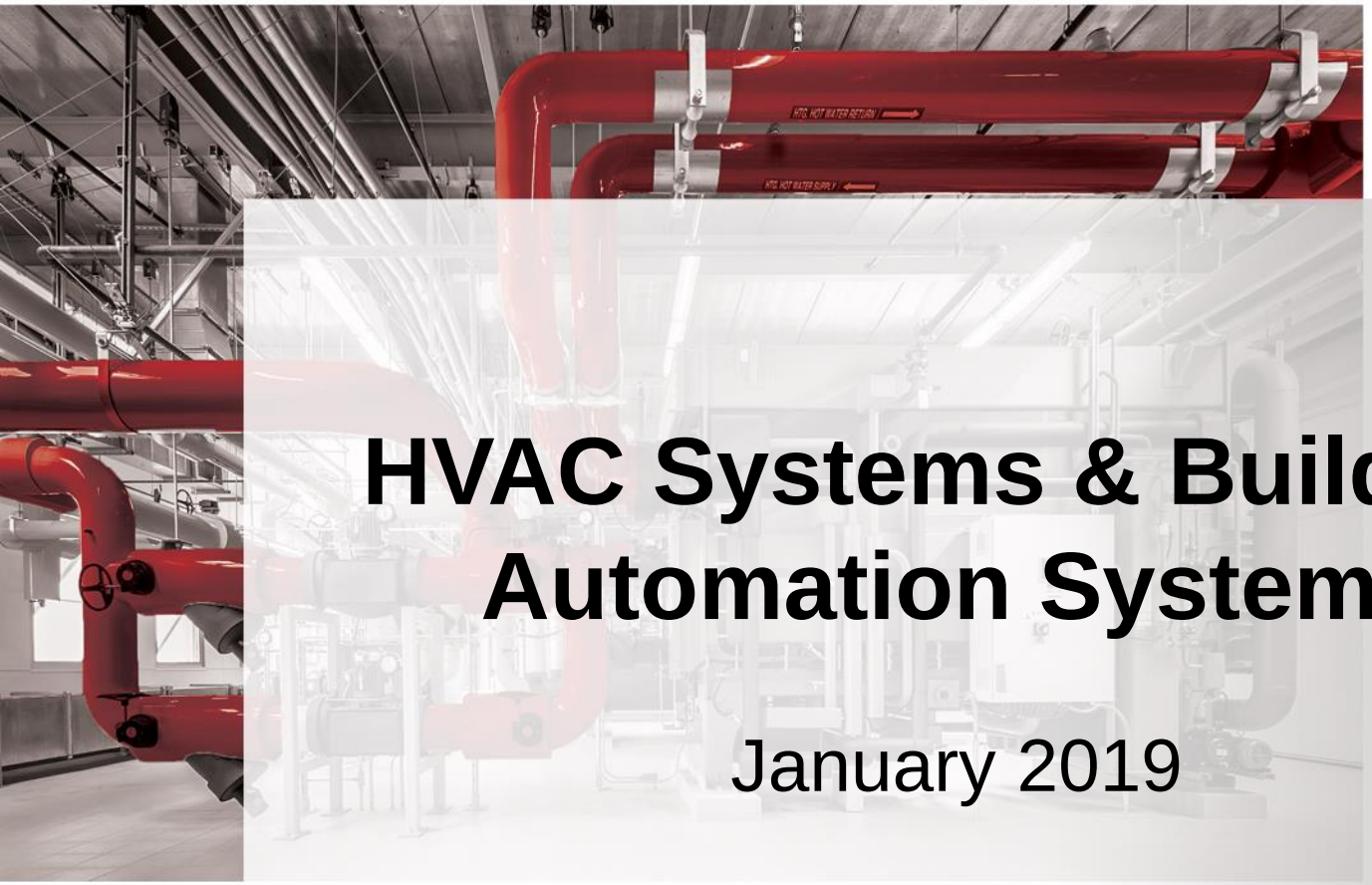

HVAC Systems & Building Automation Systems

January 2019

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Introduction and methodology

Objective

This study was completed by *Consulting-Specifying Engineer* to evaluate the use of heating, ventilation, and air conditioning (HVAC) and building automation systems (BAS) and products by consulting engineers. By gathering data about the dollar amounts of HVAC systems and BAS specified, the types of HVAC systems and BAS selected, and the challenges that HVAC system and BAS designers face, *Consulting-Specifying Engineer* provides a snapshot of the engineering community's outlook on HVAC systems and BAS.

Sample

The sample was selected from recipients of *Consulting-Specifying Engineer* for whom email addresses were available. Only respondents involved in the selection of HVAC systems, equipment, and controls were asked topic-related questions.

Method

Subscribers were sent an email asking them to participate in this study. The email included a URL linked to the questionnaire.

- **Data collected:** October 12, 2018, through October 29, 2018
- **Number of respondents:** 215
  - *Margin of error: +/- 6.7% at a 95% confidence level*
- **Incentive:** Survey participants were offered the opportunity to enter a drawing for a $100 Amazon.com gift card.

Summary of findings

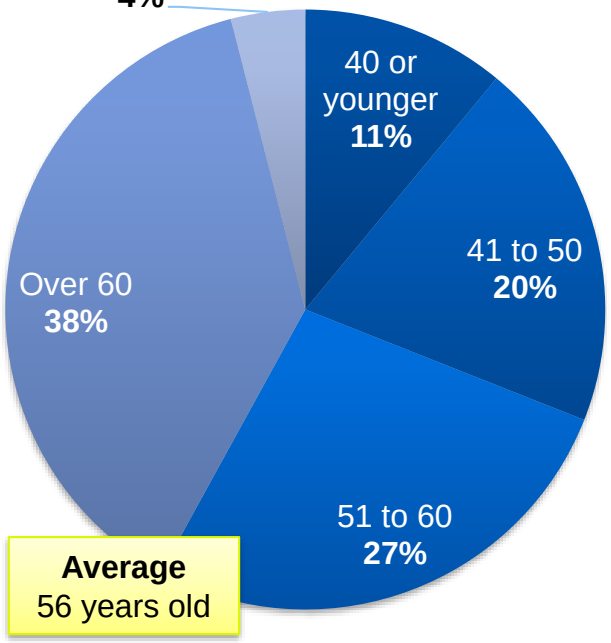
- **HVAC, BAS revenue:** The average engineering firm specifies about $2.6 million annually for HVAC and building automation/control products in new and existing buildings, up 2.2% over 2017 data.
- **Systems specified:** Seven in 10 engineers currently specify HVAC controls, fans and air movement, and air handlers. Engineers expect to specify more commissioning and demand-controlled ventilation systems over the next year.
- **Selection involvement:** Seventy-seven percent of respondents determine the requirements/write the specifications for HVAC systems, equipment, and controls when included on projects; 72% research and evaluate the options, and 69% supervise or consult on projects.
- **Specifications:** Of the total HVAC and controls specifications issues by respondents' firms, 39% always write performance specifications and 21% always write prescriptive specifications.
- **Design factors:** Ninety-six percent of engineers agree that product quality is the most important factor to their specification of one HVAC product over another, followed by energy efficiency (91%), design support (90%), and service support (89%).
- **Top challenges:** Eighty-seven percent of engineers agree that an inadequate budget for high-quality design is a difficult challenge affecting the future of HVAC systems or BAS, engineers, and/or the industry; other top challenges include speed of project delivery (73%) and energy consumption and operating cost (69%).
- **Building types:** The top building types for which respondents specify, design, or make product selections are office buildings, college/university buildings, hospitals/health care facilities, and industrial/manufacturing facilities/warehouses.

Respondent profile

Age, primary job function, experience

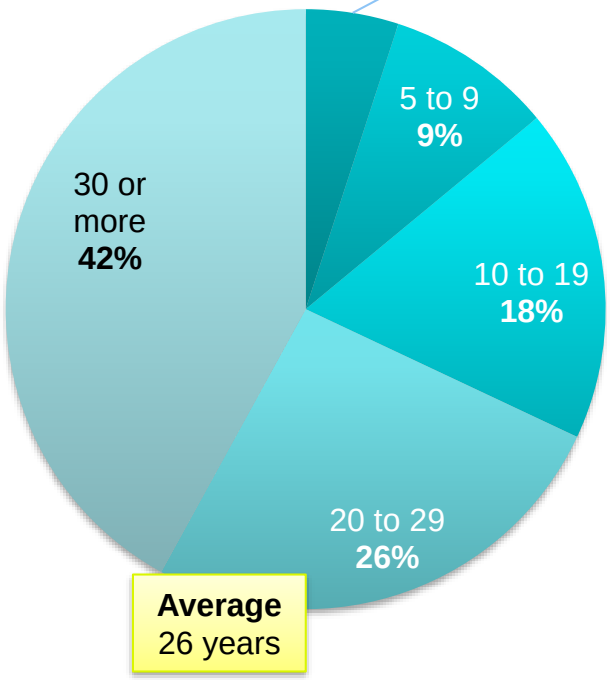
The average respondent is 56 years old, with 26 years of industry experience. Fifty-nine percent of respondents have senior administration or engineering management primary job functions; 30% are professional engineers.

Age
Years



Primary job function

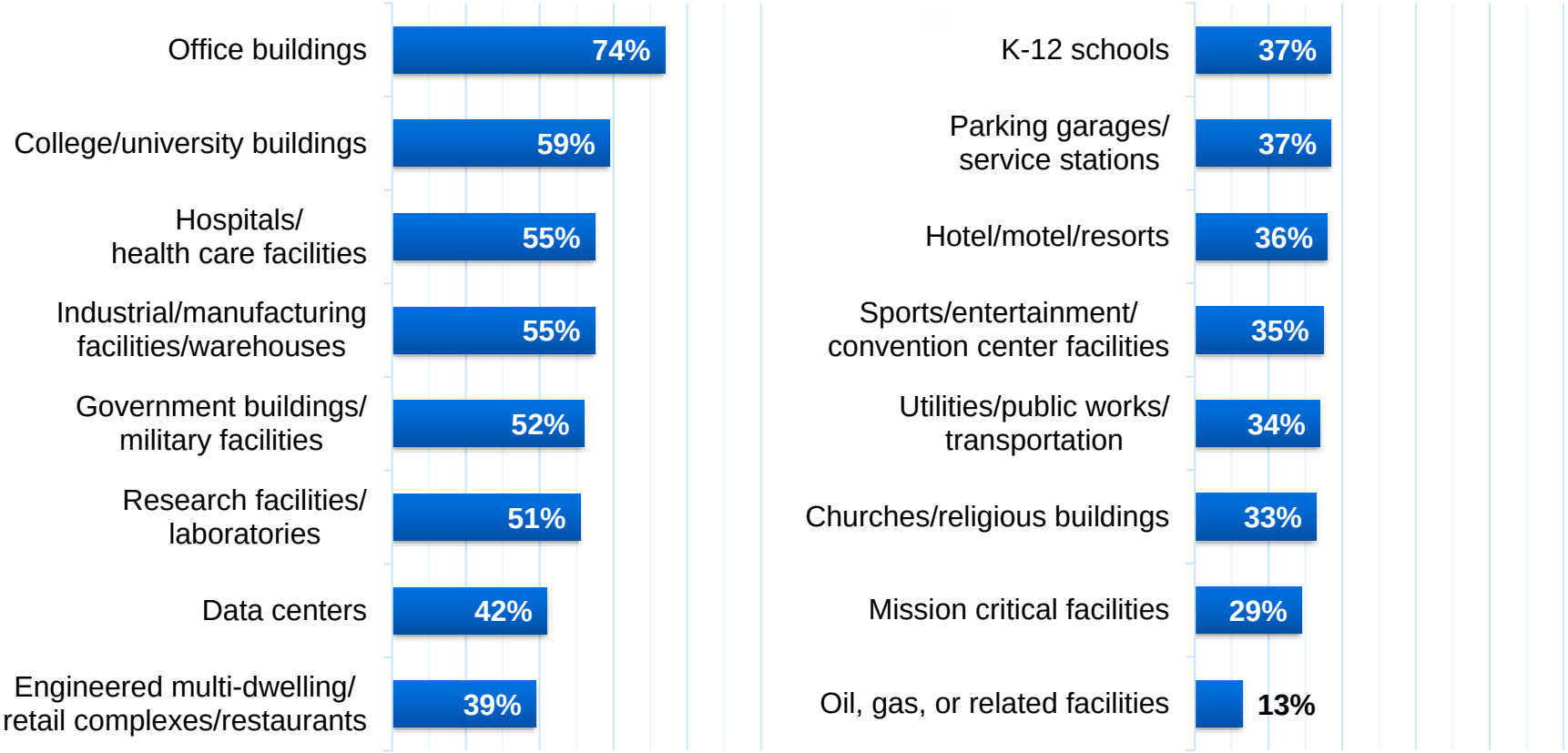
Industry experience
Years



Q: Which of the following ranges includes your current age? (n=201);
Q: Which of the following best describes your job title? (n=215); Q: For approximately how many years have you been involved in HVAC systems, equipment, and controls? (n=201)

Building structures

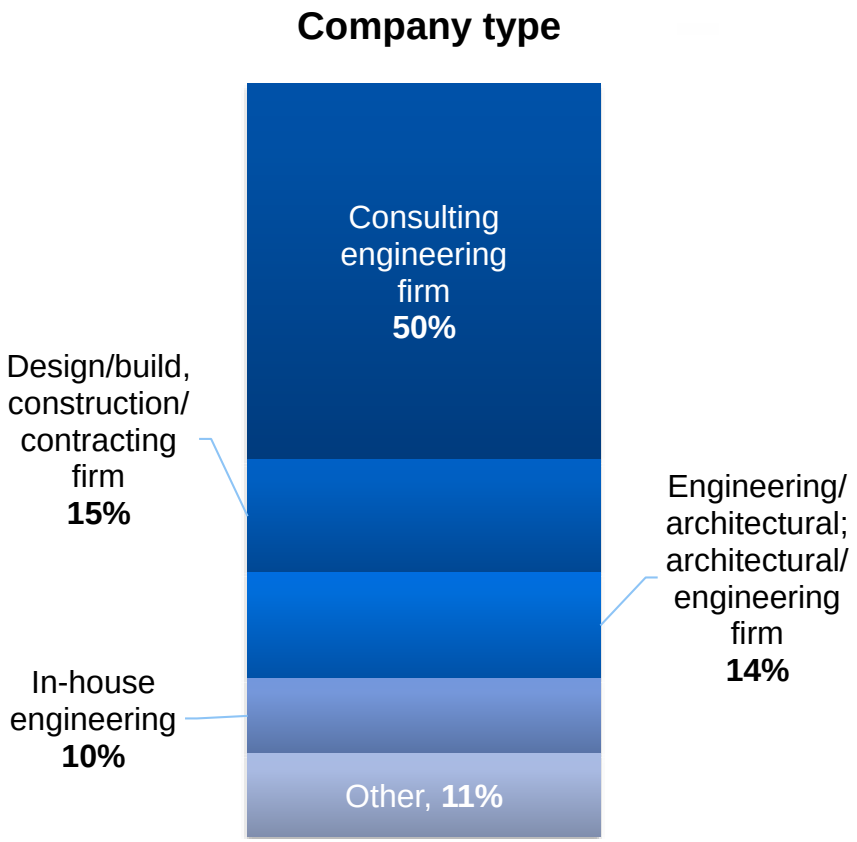
The top structures that respondents specify, design, or make product selections for are office buildings (74%), college/university buildings (59%), hospitals/health care facilities (55%), and industrial/ manufacturing facilities/warehouses (55%).

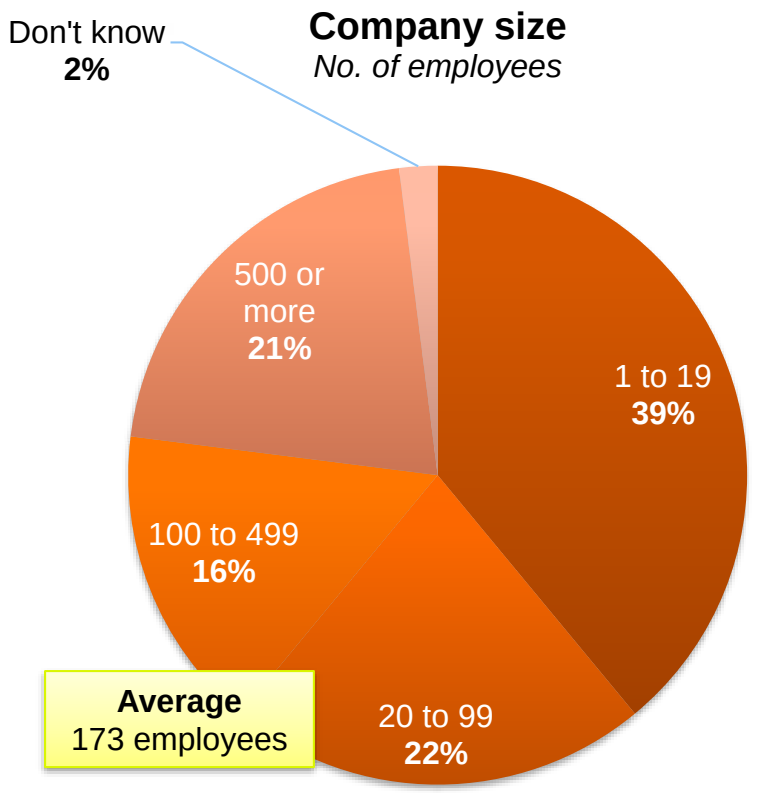


Q: For which of the following types of building structures do you specify, design, or make product selections? Check all that apply. (n=215)

Company profile

Half of respondents work for a consulting engineering firm, and 61% indicated that their firm employs fewer than 100 people; the average firm employs 173 people.

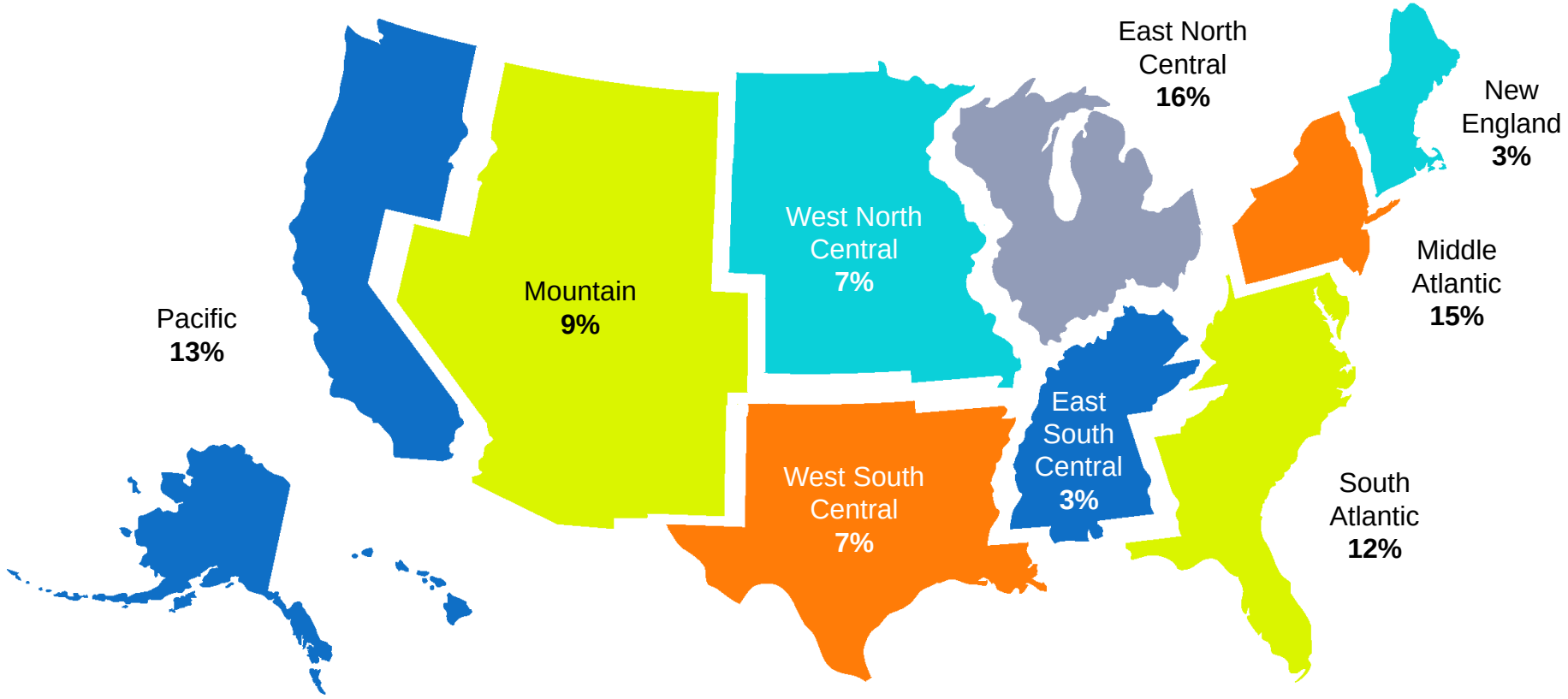




Q: Which of the following best describes your company? (n=215); Q: Approximately how many people are employed by your firm? (n=201)

Location

Thirty-percent of respondents are located along the East Coast of the U.S., and another 15% reside beyond the U.S. border. Other countries represented include Canada, India, Pakistan, and Venezuela.

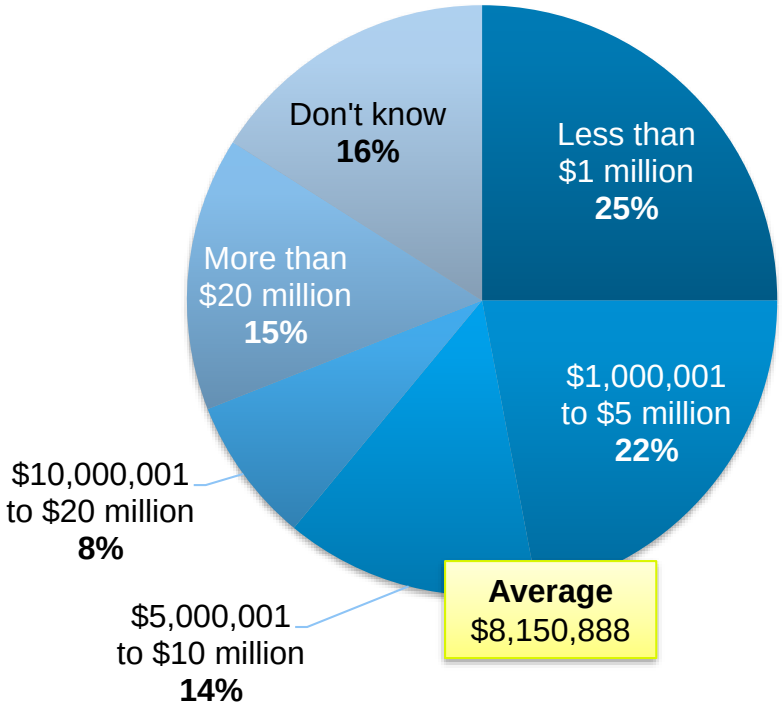


**Data gathered by matching respondents to their* Consulting-Specifying Engineer *audience profile.*

Annual MEP/FP design revenue

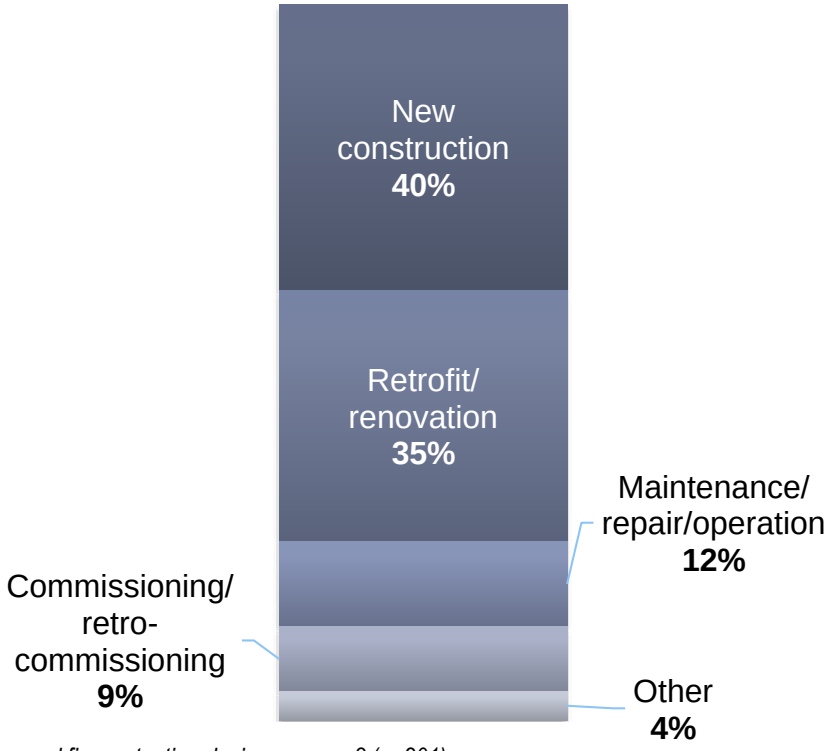
The average firm generated $8.15 million in mechanical, electrical, plumbing, and fire protection (MEP/FP) design revenue in 2018. Most MEP/FP design projects in 2018 were new construction or retrofit/renovations.

Total MEP/FP design revenue



MEP/FP design billings

Average

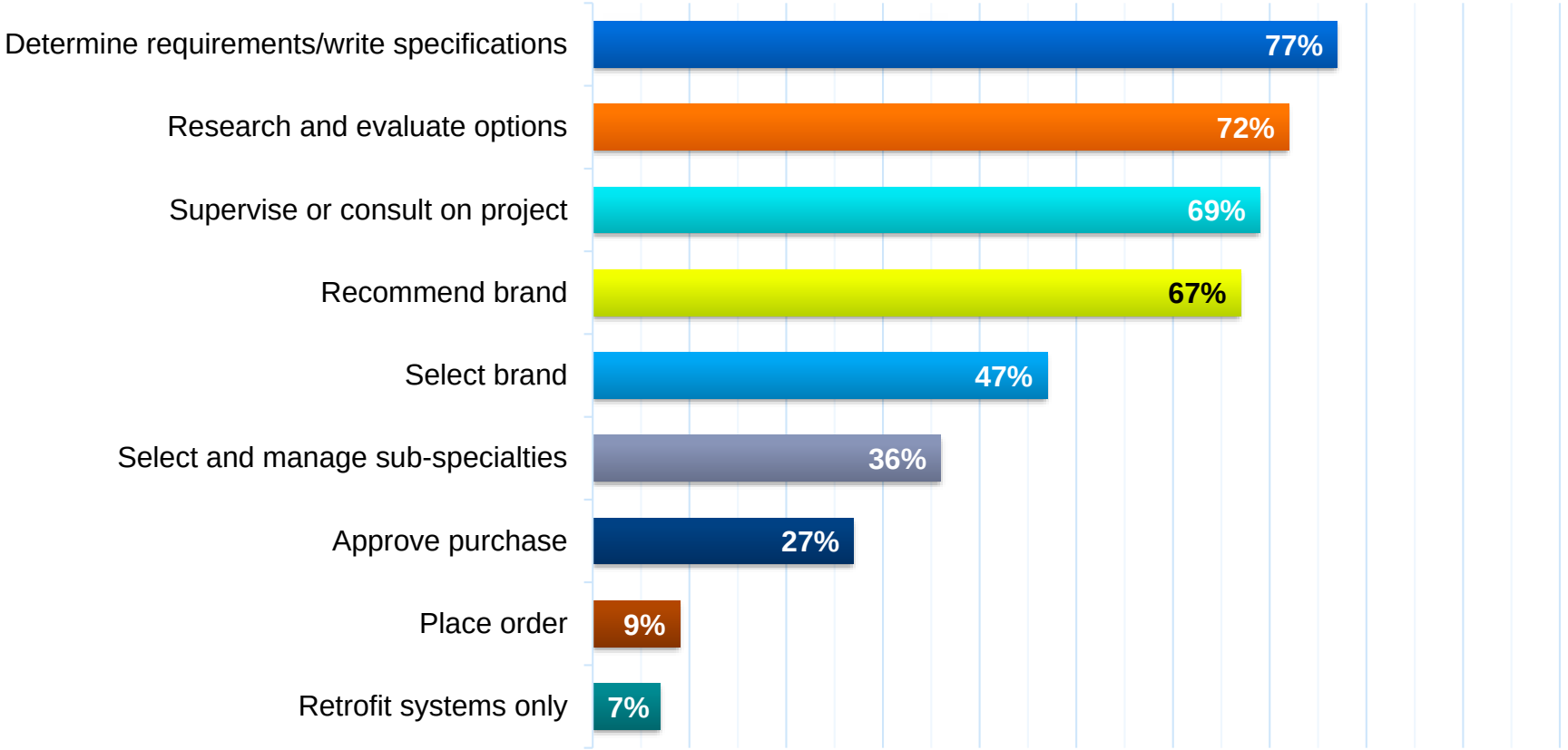


Q: Which of the following ranges best describes your firm's annual mechanical, electrical, plumbing, and fire protection design revenue? (n=201);
Q: Define the percentage of last year's design revenue that was spent in each of the areas shown. (n=189)

HVAC systems and building automation systems

Involvement in product selections

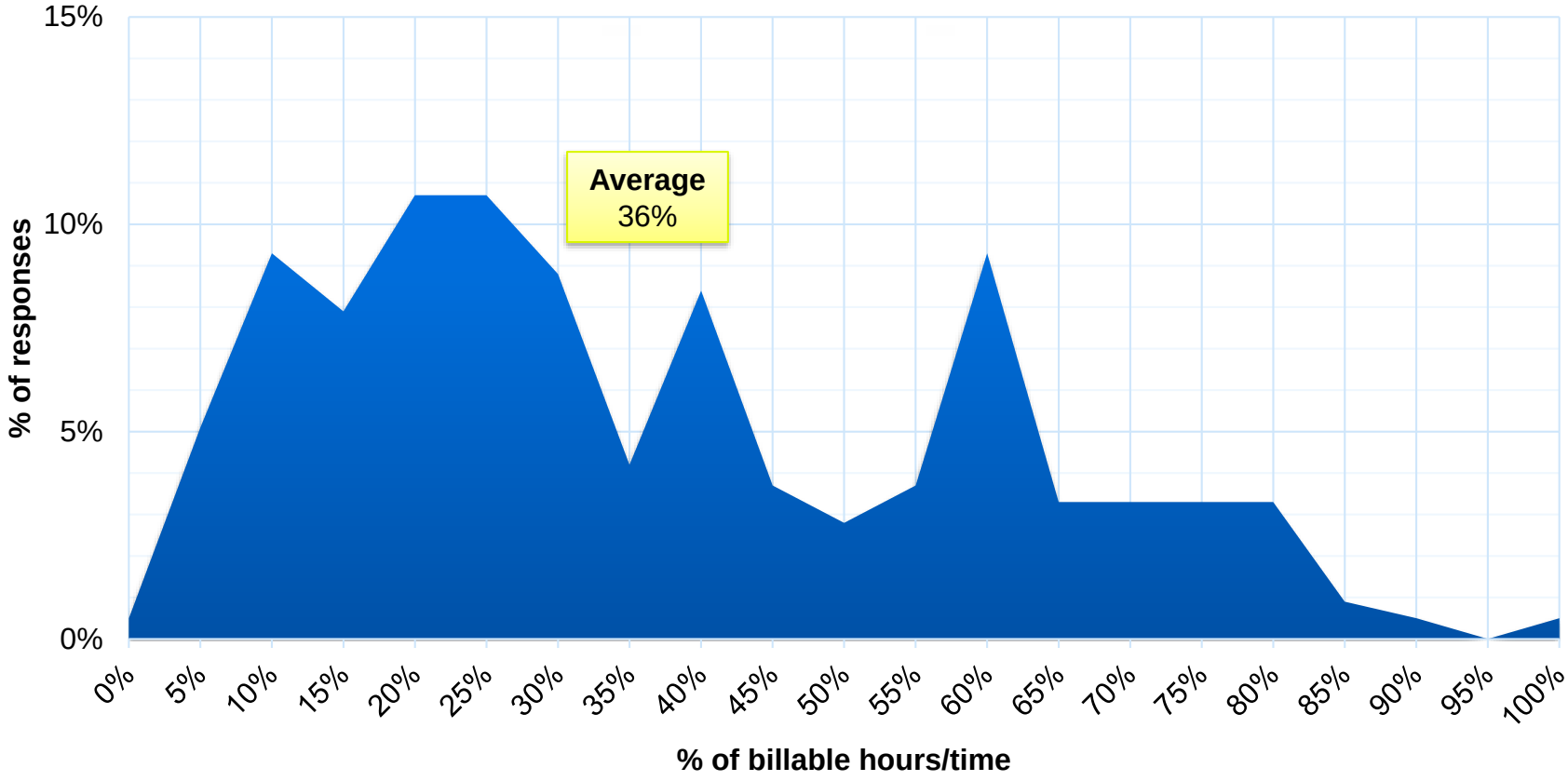
Seventy-seven percent of engineers are involved in determining requirements/writing specifications in the selection of HVAC systems, equipment, and controls.



Q: In what ways, if any, are you involved in the selection of HVAC systems, equipment, and controls? Check all that apply. (n=215)

Time spent researching/specifying

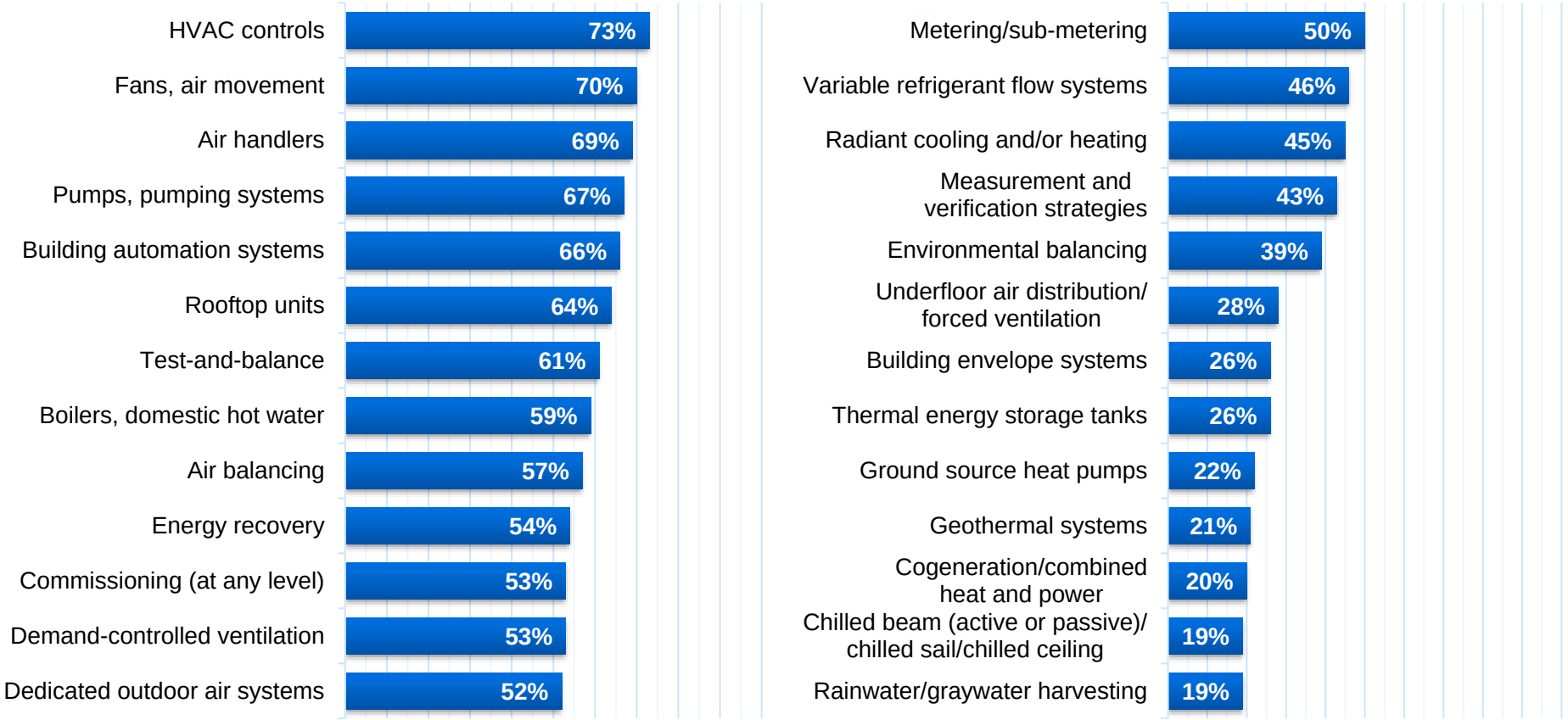
On average, engineers spend 36% of their billable hours/time at work researching and/or specifying HVAC equipment or controls systems.



Q: What percentage of your billable hours/time at work is spent researching and/or specifying HVAC equipment or controls systems? (n=215)

HVAC equipment, BAS specified

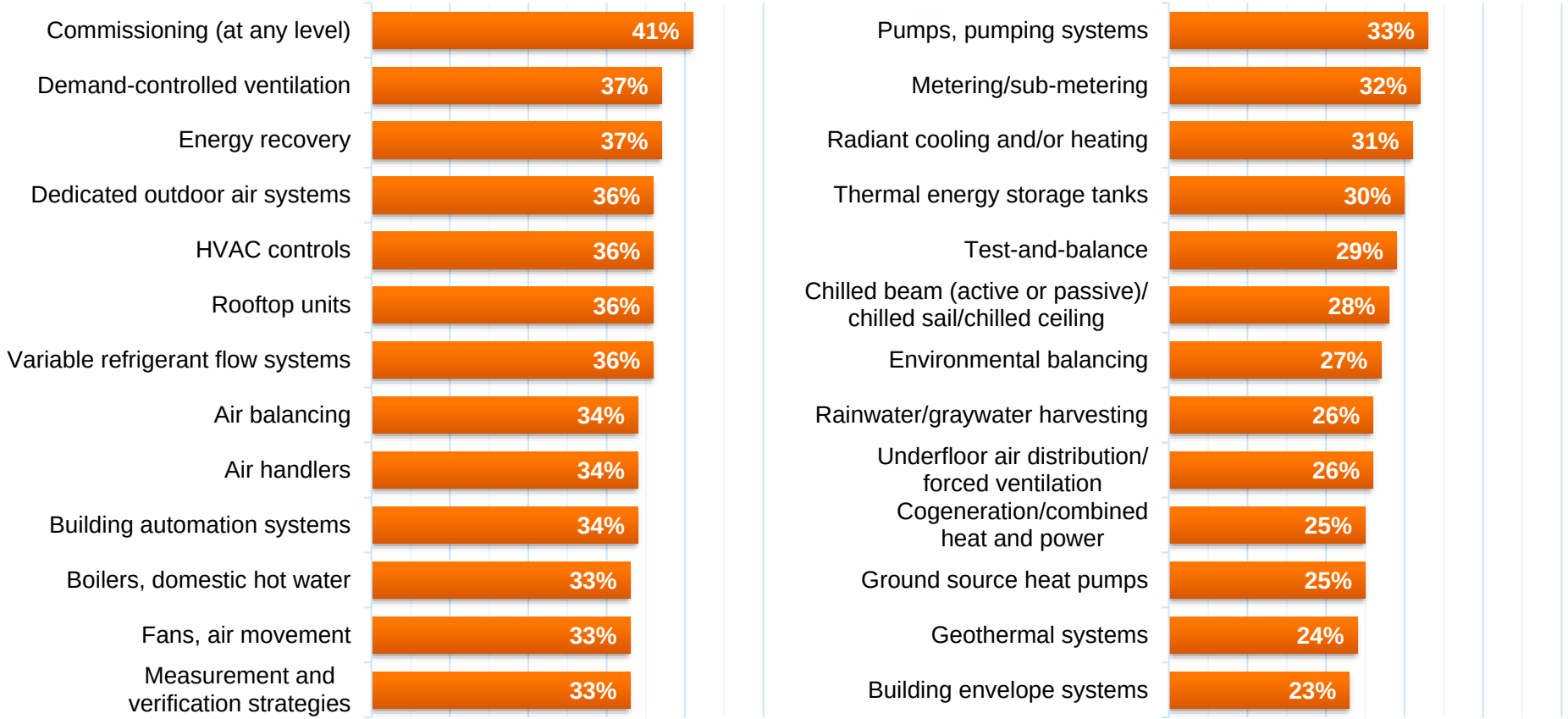
The top types of HVAC equipment, controls systems, and related services currently being specified by engineers are HVAC controls (73%), fans and air movement (70%), and air handlers (69%).



Q: What types of HVAC equipment, controls systems, or related services do you currently specify? Check all that apply. (n=215)

HVAC equipment, BAS expected to specify

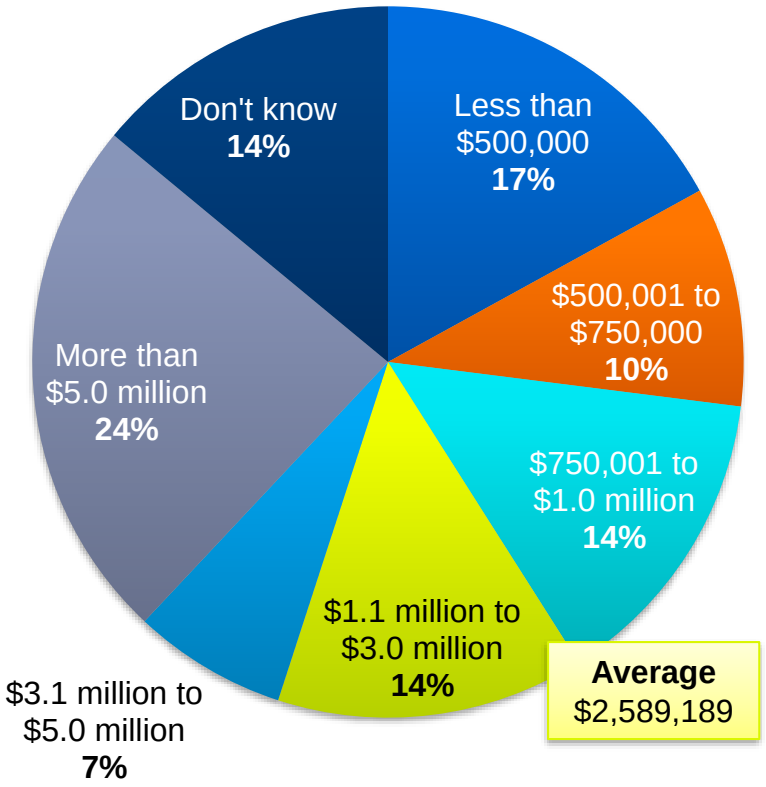
Looking ahead to the next 12 to 24 months, the top HVAC equipment, controls systems, and related services engineers anticipate specifying are commissioning (41%), demand-controlled ventilation (37%), and energy recovery systems (37%).



Q: What types of HVAC equipment, controls systems, or related services do you expect to specify in the next 12 to 24 months? Check all that apply. (n=215)

Dollar amount specified for HVAC, BAS

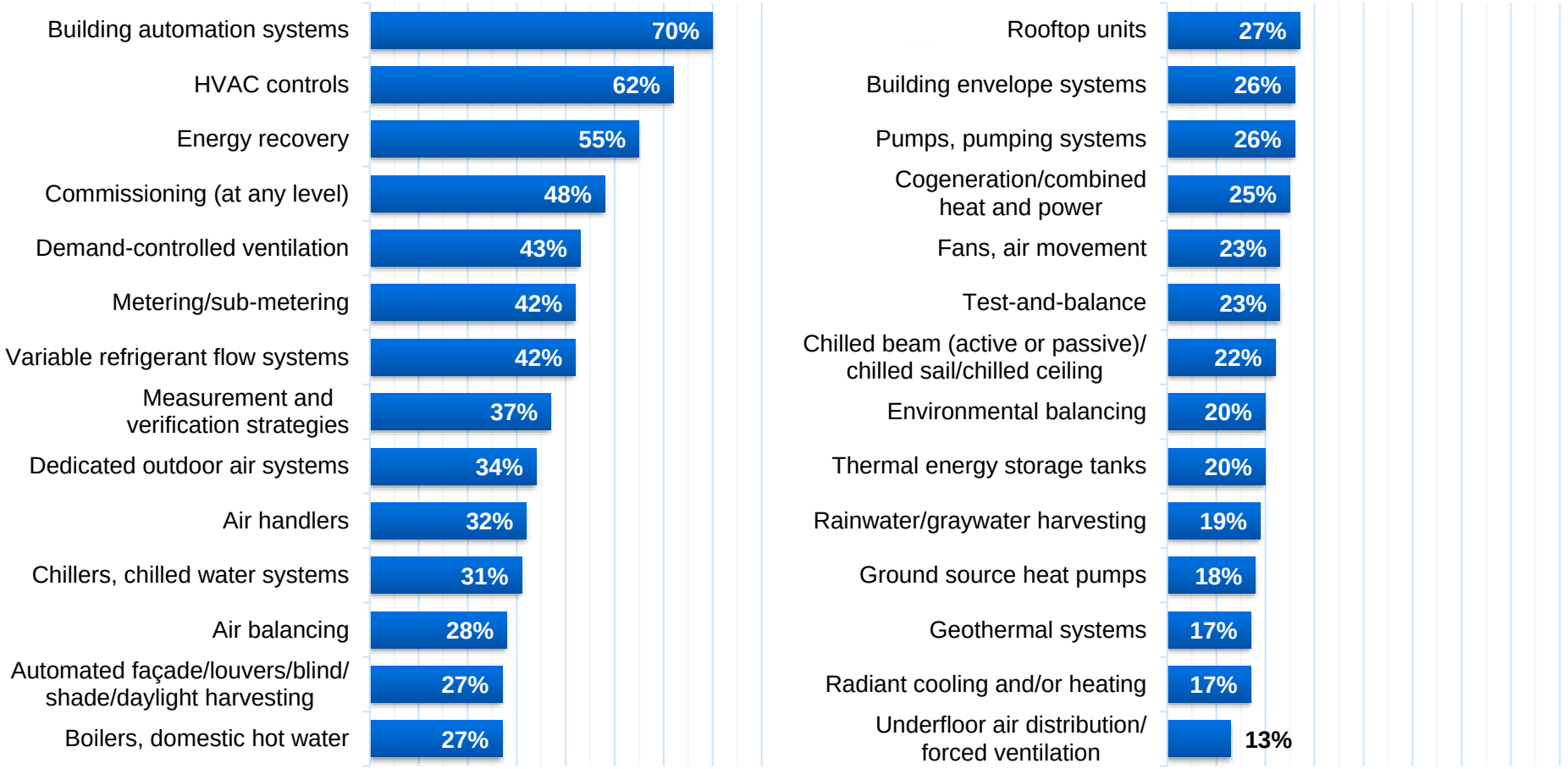
Forty-five percent of HVAC and building automation/control products specified on an annual basis by engineering firms for new and existing buildings are valued at more than $1 million.



Q: What is the total annual dollar amount of HVAC and building automation/control products specified by your engineering firm for new and existing buildings? (n=215)

Technologies in demand

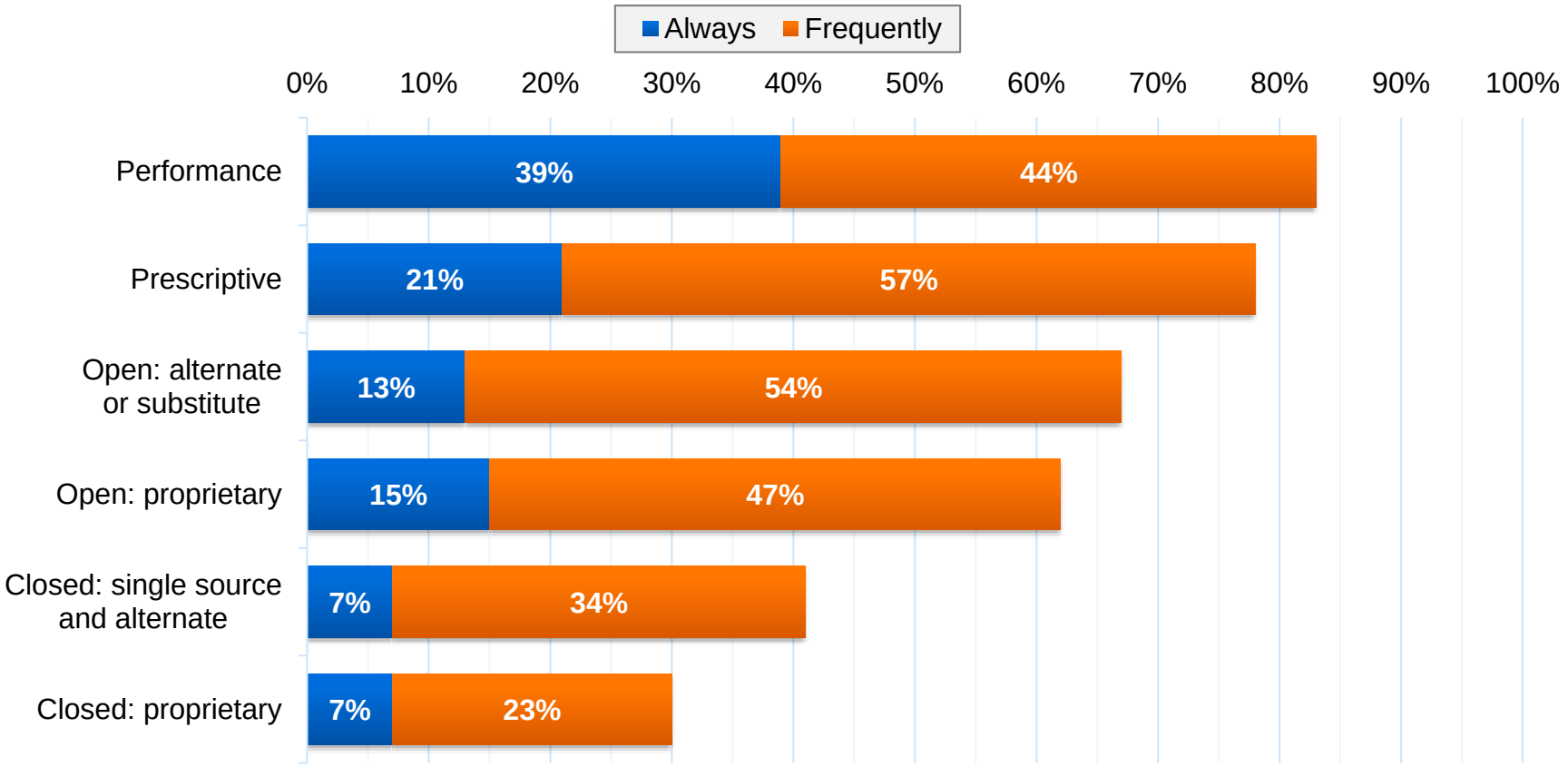
More than half of engineers expect to see an increase in building automation systems, HVAC controls, and energy recovery systems in upcoming projects.



Q: For which technologies and services do you expect to see an increase in projects? Check all that apply. (n=215)

Types of HVAC, BAS specifications written

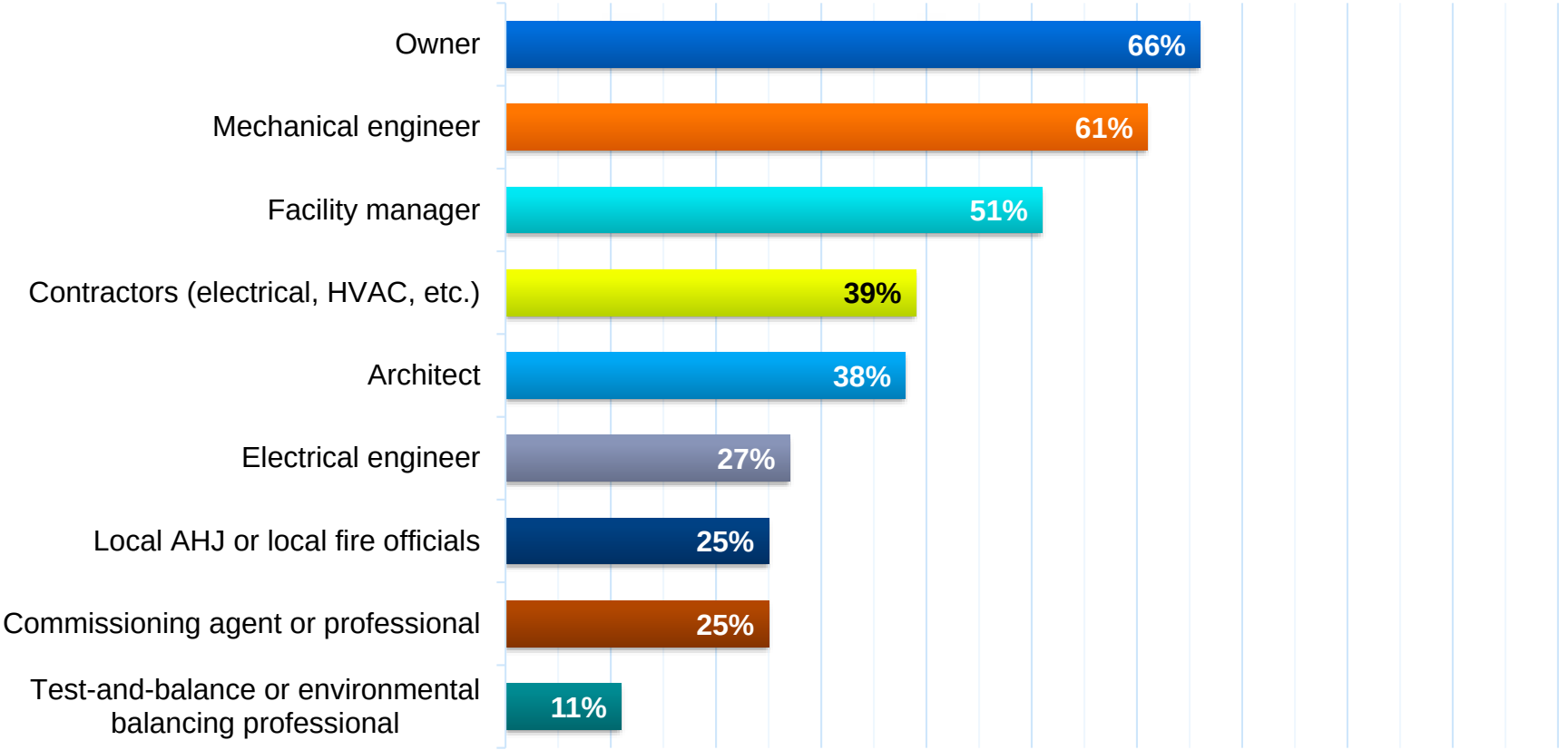
Performance HVAC and controls specifications—those in which the text is restricted to stating the performance that must be achieved by the completed work—are used by 83% of engineering firms, and 78% generally issue prescriptive specifications.



Q: Of the total HVAC and controls specifications issued by your firm, how often are you using each of the following? (n=215)

Design coordination

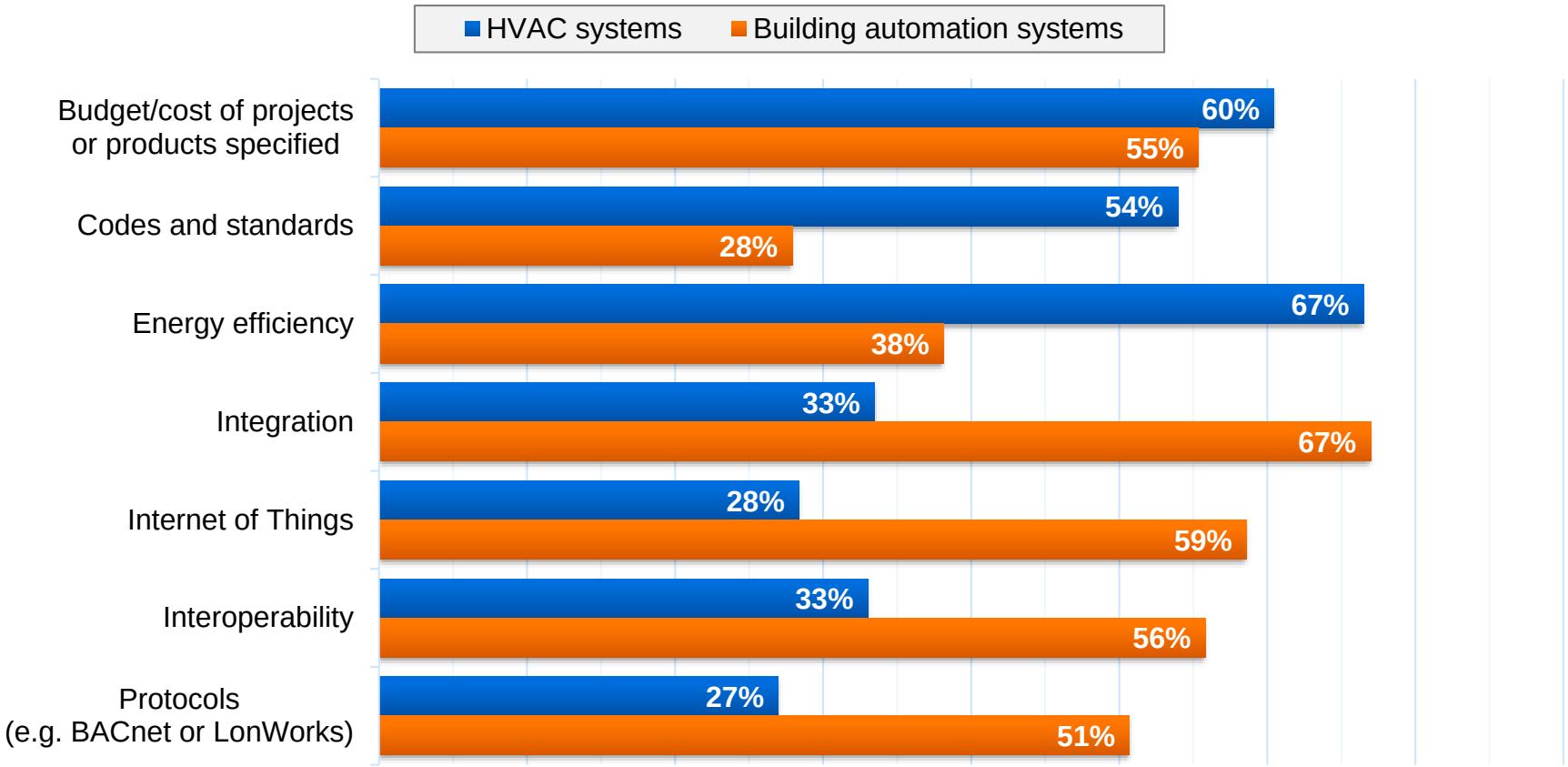
Six in 10 engineers reported owners or mechanical engineers as having the most input and impact on HVAC and controls systems design.



Q: Which of the following disciplines have the most input and impact on your HVAC and controls system design? Check all that apply. (n=215)

Recent changes in HVAC, BAS design

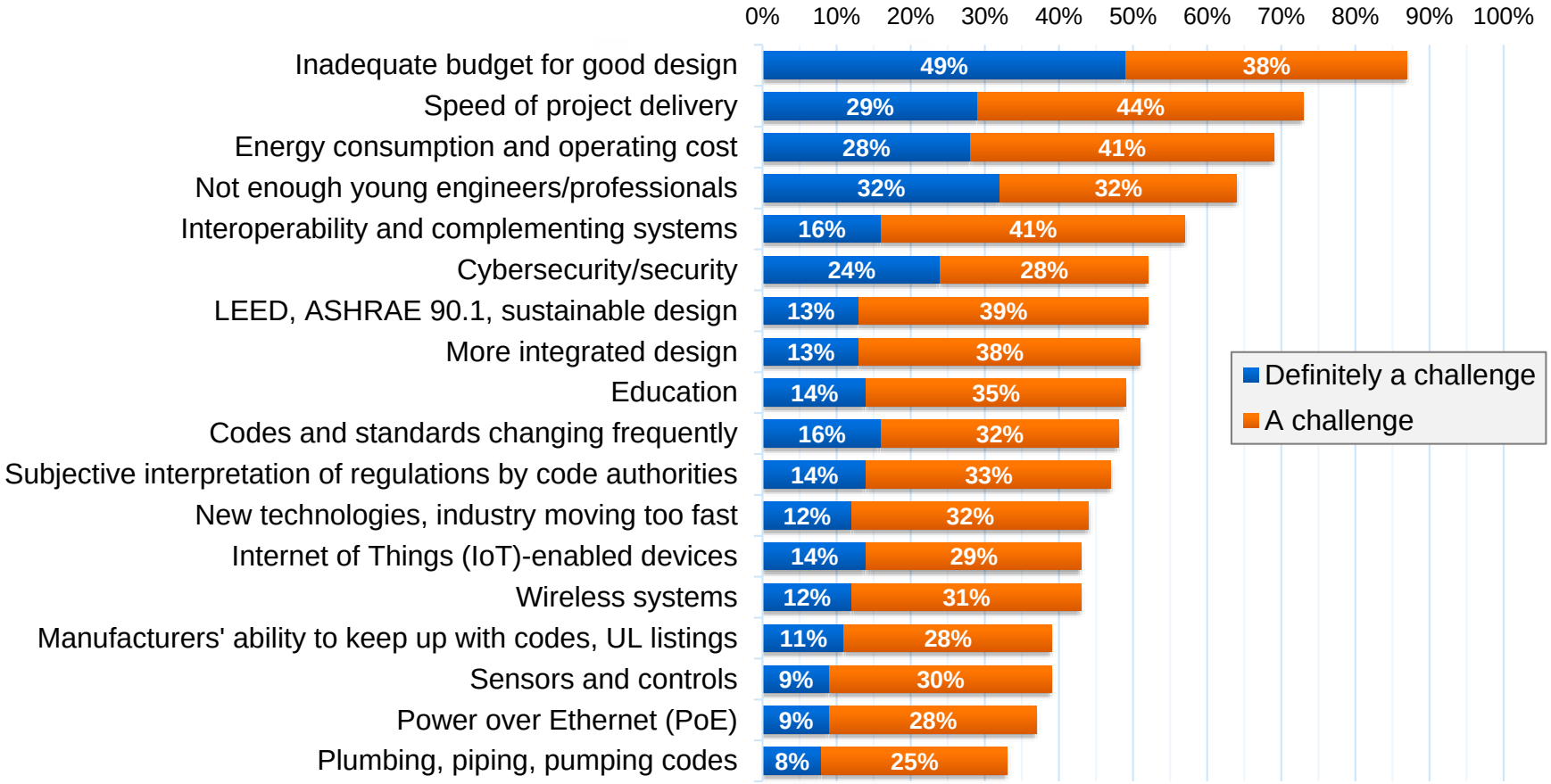
The demand for energy-efficient HVAC systems has changed significantly in the past 12 to 18 months, according to 67% of engineers, as well as the need for integrated building automation systems.



Q: What are the biggest changes in HVAC systems and building automation systems that you've observed during the past 12 to 18 months? Check all that apply. (n=215)

Challenges facing engineers

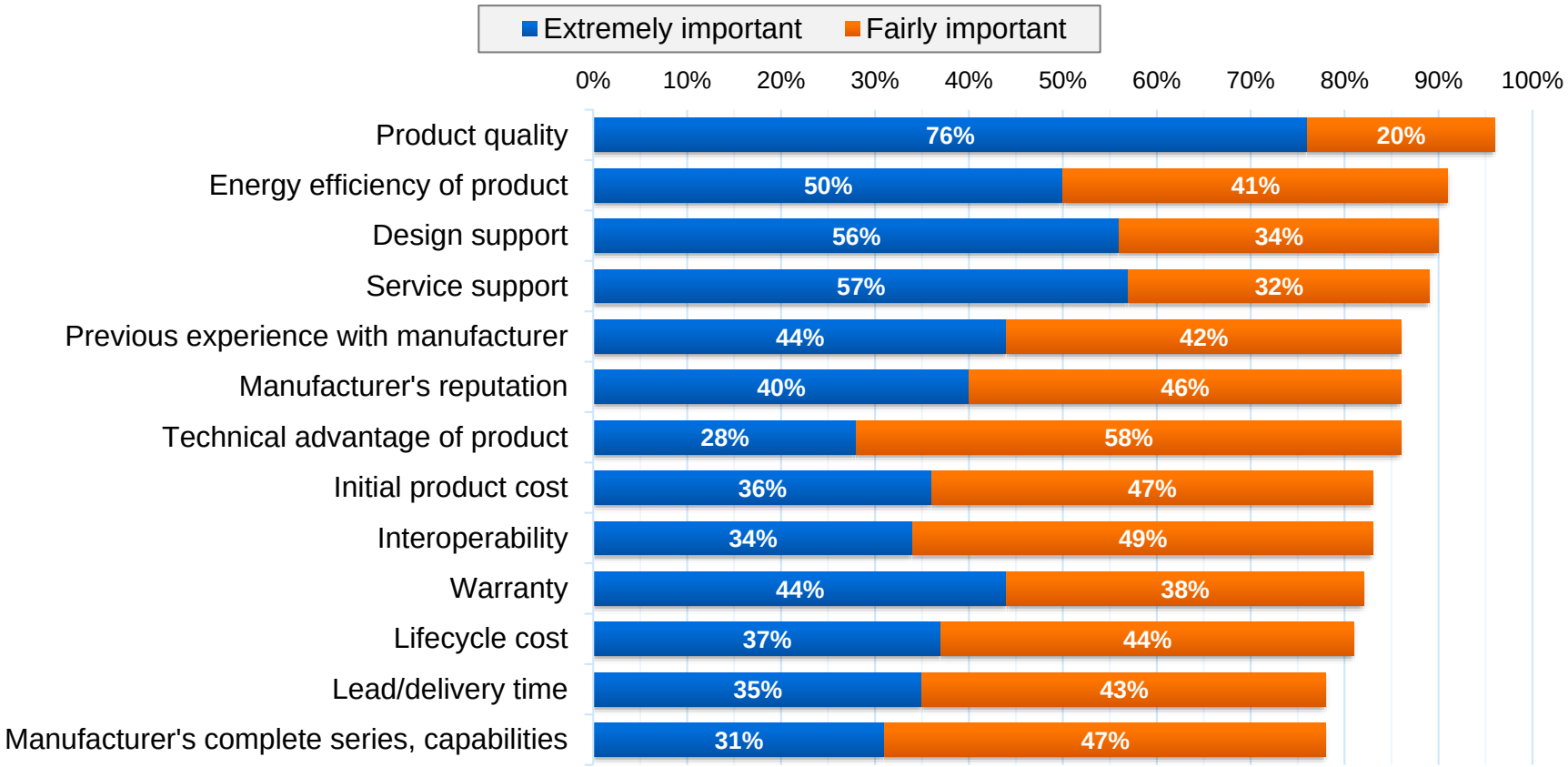
Inadequate budgets and the speed of project delivery remain critical challenges faced by engineers when specifying HVAC systems or building automation systems.



Q: What are critical challenges or issues affecting the future of HVAC systems or building automation systems, engineers, and/or the industry? (n=214)

Important product factors

The most important factors to respondents' selection of HVAC products are quality (96%), energy efficiency (91%), design support offerings (90%), service support offerings (89%), and previous experience with a manufacturer (86%).



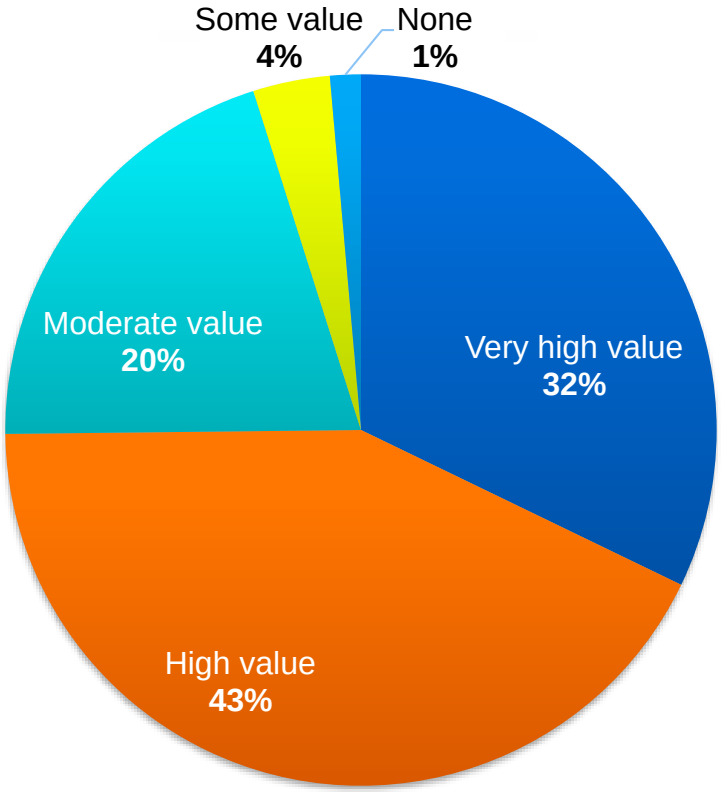
Q: In your design/specification activity, how important is each of the following factors to your selection of one HVAC product over another? (n=215)

Test-and-Balance, Environmental Balancing, Commissioning

The following data was collected from survey respondents who currently specify test-and-balance systems, environmental balancing systems, or commissioning (at any level).

Role of balancing or commissioning firms

Thirty-two percent of engineers place a very high value on the role of the balancing or commissioning firms on their projects.

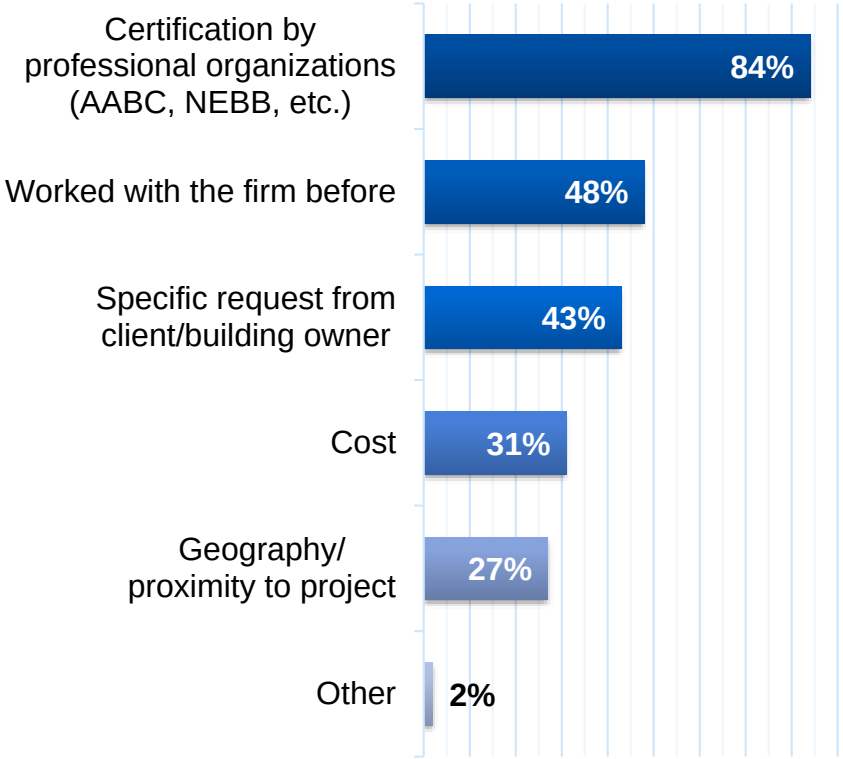


Q: How much value do you place on the role of the balancing or commissioning firm on your project? (n=143)

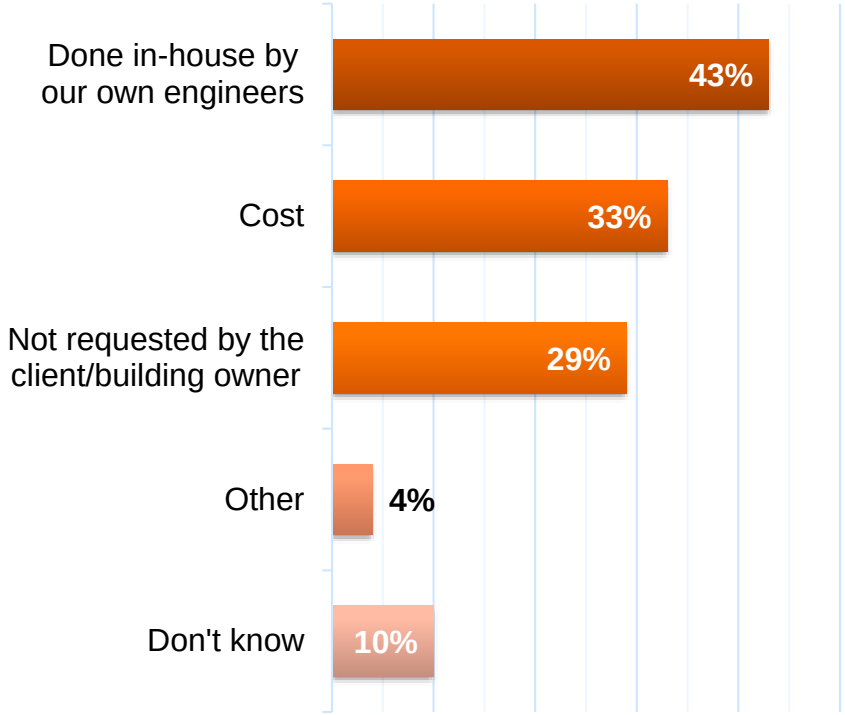
Balancing air and environmental systems

When deciding on which balancing firms to include in a specification, 84% of engineers lean towards those who are certified by professional organizations.

Deciding on balancing firms



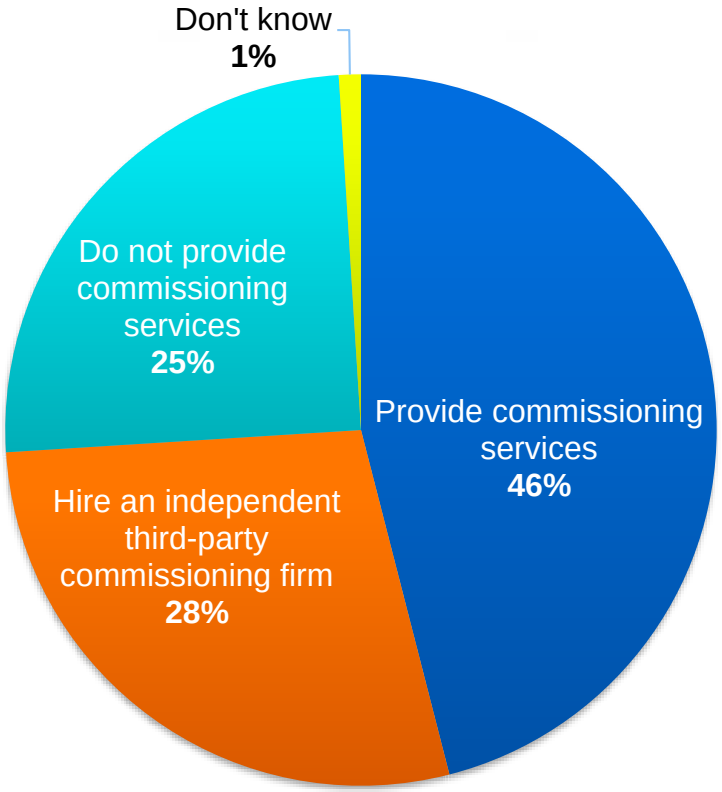
Why some companies don't require certifications from balancing firms



Q: How do you decide what balancing firms to include in a specification? Check all that apply. (n=143);
Q: If you don't require certifications (AABC, NEBB, etc.) from firms who balance air and environmental systems, why? (n=51)

Commissioning services

Forty-six percent of engineering firms provide commissioning services in-house, and 28% hire independent third-party commissioning firms; 25% do not provide commissioning services.

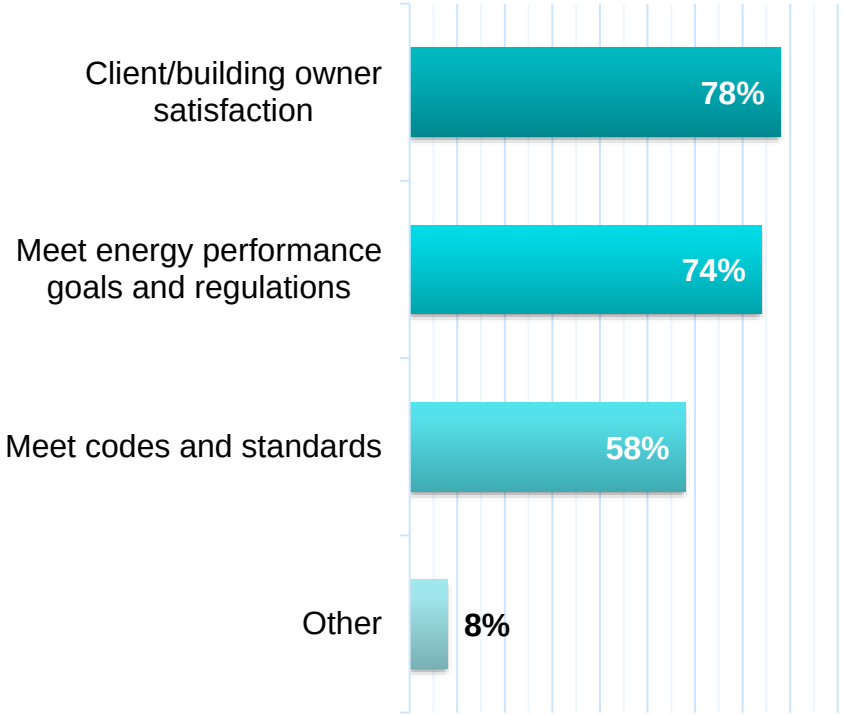


Q: Does your business include commissioning, and if so, is it done by an independent third-party or is your firm doing it? (n=143)

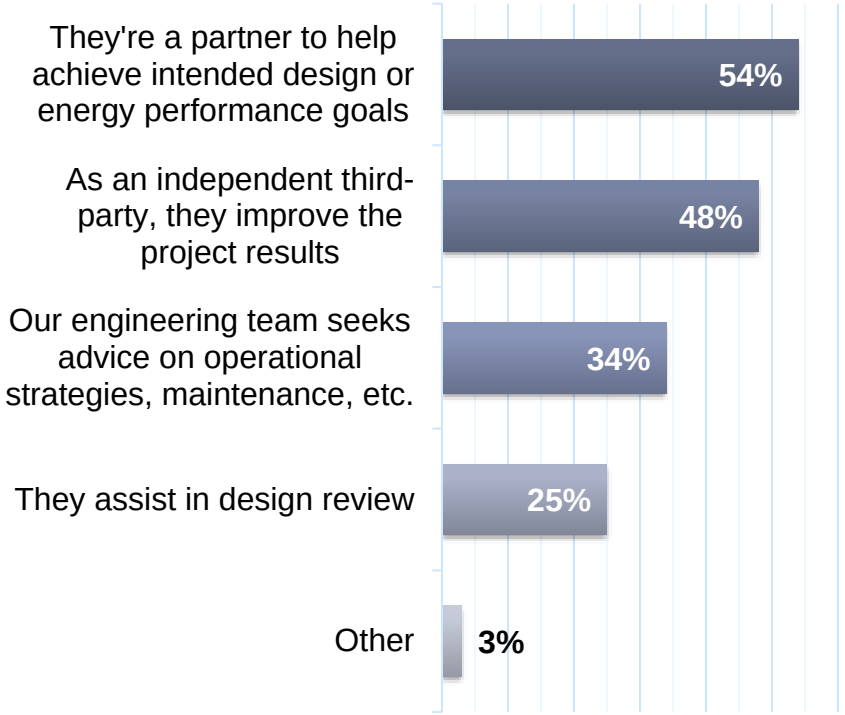
Benefits of balancing, commissioning firms

The satisfaction of the client/building owner is the top benefit to including a balancing or commissioning firm in specifications, followed by meeting energy performance goal and regulations.

Benefits to including balancing, commissioning firm in specifications



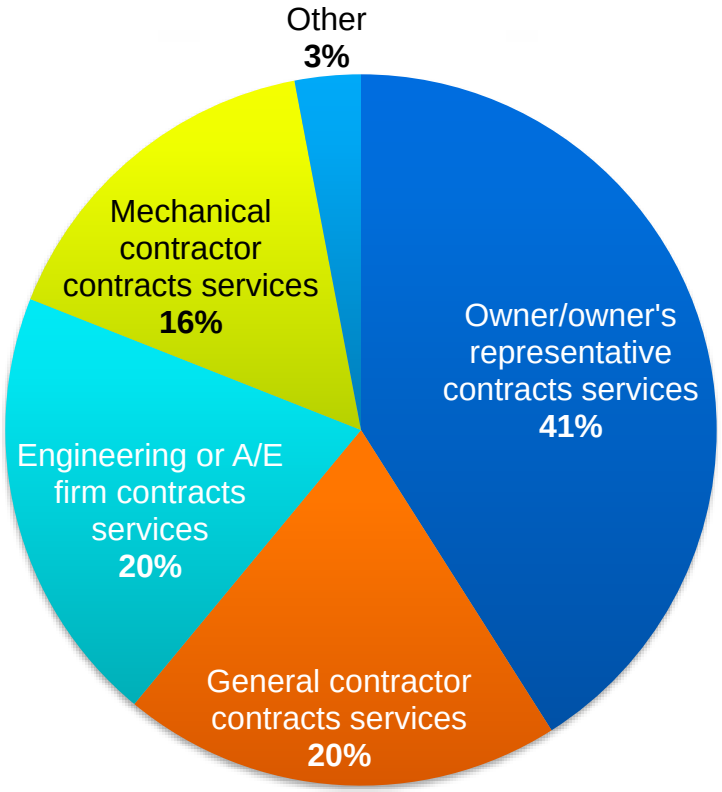
Leveraging skillsets, benefits of balancing, commissioning firm



Q: What benefits are there to including a balancing or commissioning firm in the spec? Check all that apply. (n=143);
Q: How do you leverage the skillsets and benefits of the balancing or commissioning firm? Check all that apply. (n=143)

Contracting a third-party professional

When working with a third-party professional, like a balancing firm or commissioning professional, the building owner or their representative will contract the services, according to 41% of survey respondents.



Q: When you work with a third-party professional, like a balancing firm or commissioning professional, which contracting method do you use or see the most? (n=143)

Additional resources

Thank you for downloading the *Consulting-Specifying Engineer* 2019 HVAC Systems & Building Automation Systems Study. Use the links below to access additional information on HVAC and BAS news, products, and research.

News, articles, products

- Automation, controls
- Building envelope
- Codes and standards
- Energy efficiency
- HVAC
  - Boilers, chillers
  - Heating and ventilation
  - Plumbing, pumping
  - Integration
- New Products for Engineers

Online training

- CFE Edu
- Upcoming webcasts
- On demand webcasts

Resources

- Career Smart
- Case studies
- Ebooks
- Newsletters
- White papers
- Videos

Editorial research studies

- 2018 Electrical & Power
- 2018 Salary Survey
- 2018 Fire & Life Safety
- 2018 Lighting & Lighting Controls
- Additional studies available at www.csemag.com/research

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