

CONSULTING - SPECIFYING
engineer®

Industry Insights

HVAC & Mechanical Systems: Rooftop Units

March 2024



CFE Media
and Technology™

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Introduction

Objective

The HVAC & Mechanical Systems: Rooftop Units study was conducted by *Consulting-Specifying Engineer* to obtain insights from engineers and engineering management professionals on brand awareness, specifying behavior, and current and future trends related to rooftop units.

Sample

The sample for this study was selected from qualified subscribers of *Consulting-Specifying Engineer* media with valid email addresses who personally select, specify, or design HVAC products for new construction and modernization projects.

Methodology

Subscribers were sent an email from *Consulting-Specifying Engineer* asking them to participate in this study. The email included a URL linked to the questionnaire.

- Data collected: February 19, 2024, through March 5, 2024
- Number of respondents: 117
- Margin of error: +/-9.1% at a 95% confidence level
- Incentive: Drawing for one \$100 Amazon.com eGift Card

Summary of Findings

- Office buildings are the most commonly specified structures for rooftop units (RTUs), with 75% of respondents indicating involvement. College/university buildings, government or military buildings, and industrial/manufacturing facilities/warehouses are also frequently specified.
- Carrier and Trane are the most familiar RTU brands, with 90% and 93% familiarity respectively. Carrier and Trane are also considered industry leaders by 50% and 62% of respondents respectively.
 - ❖ Daikin Applied and York are also well-known brands, with 81% and 88% familiarity respectively.
- Manufacturer lunch-and-learns (68%) and manufacturer/supplier websites (56%) are the most popular sources of information on new products and developments in RTUs. Conferences/seminars (51%) and trade publications (39%) are also commonly used for staying informed.
- Product information, reviews, datasheets, and specifications (67%) and technical articles (56%) are highly regarded forms of marketing or educational efforts from RTU brands, according to respondents. Case studies, application stories (39%) and webcasts/webinars (52%) are also considered impactful.
- Brand reputation is very important to 60% of respondents and important to an additional 37% in the decision-making process for specifying an RTU.
- Compatibility issues (62%) and communication protocols (42%) are the most significant challenges respondents face in integrating an RTU with existing building management systems.
- The most significant challenges respondents encounter regarding RTUs include higher costs, size loading/matching, and equipment efficiency and ratings.
- Improved equipment efficiency and ratings (56%) and integration with BAS or BMS (51%) are the most anticipated future innovations in RTUs.

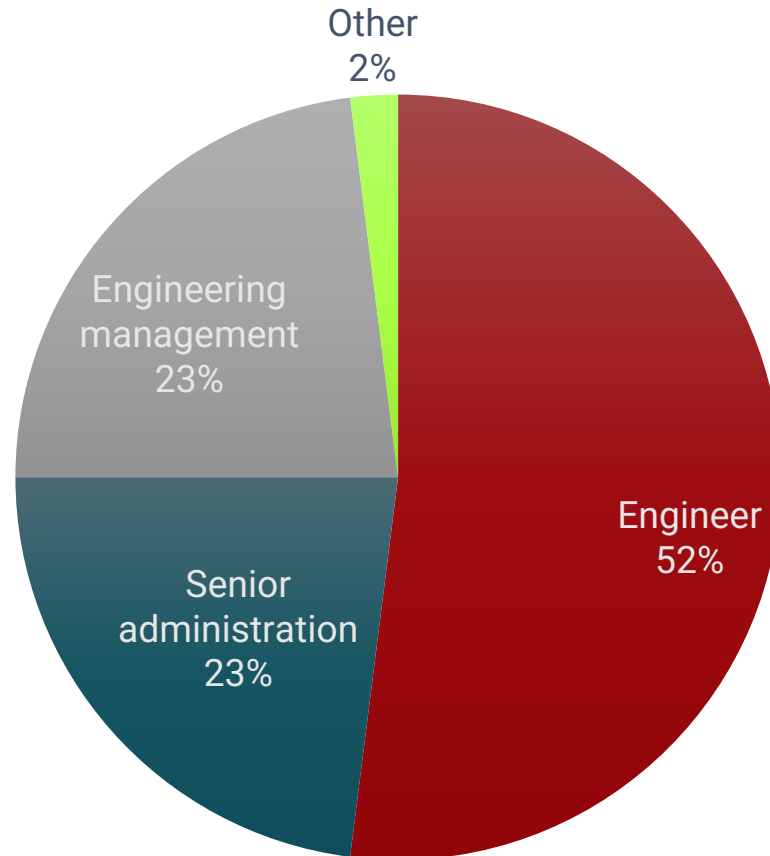


HVAC & Mechanical Systems: Rooftop Units

Respondent Background

Primary Job Function

Which of the following best describes your job title?



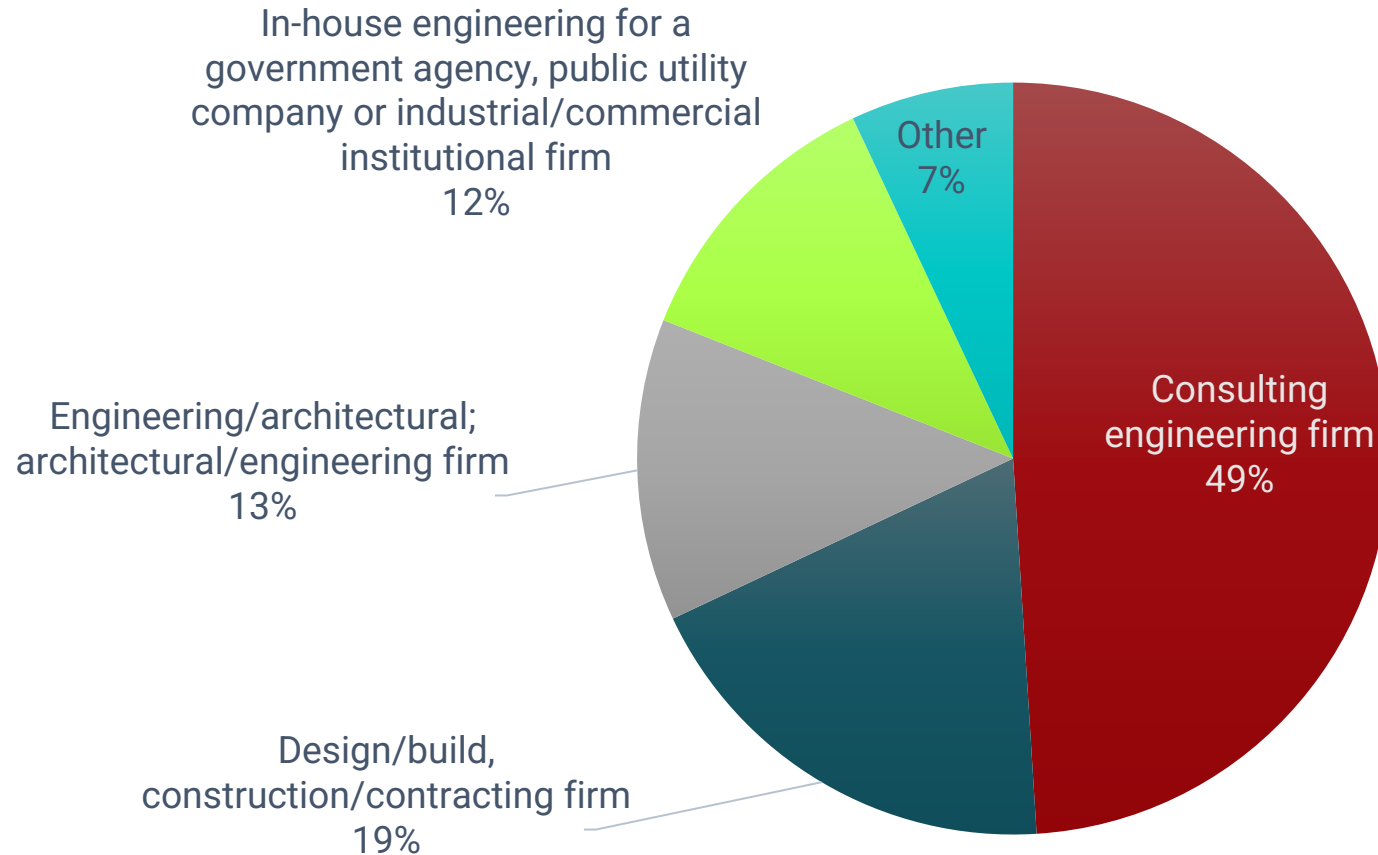
52% of survey respondents hold an engineering job title, such as Professional Engineer, Design Engineer or Consulting Engineer.

46% of respondents are senior administration or upper management staff.

n=117

Company Type

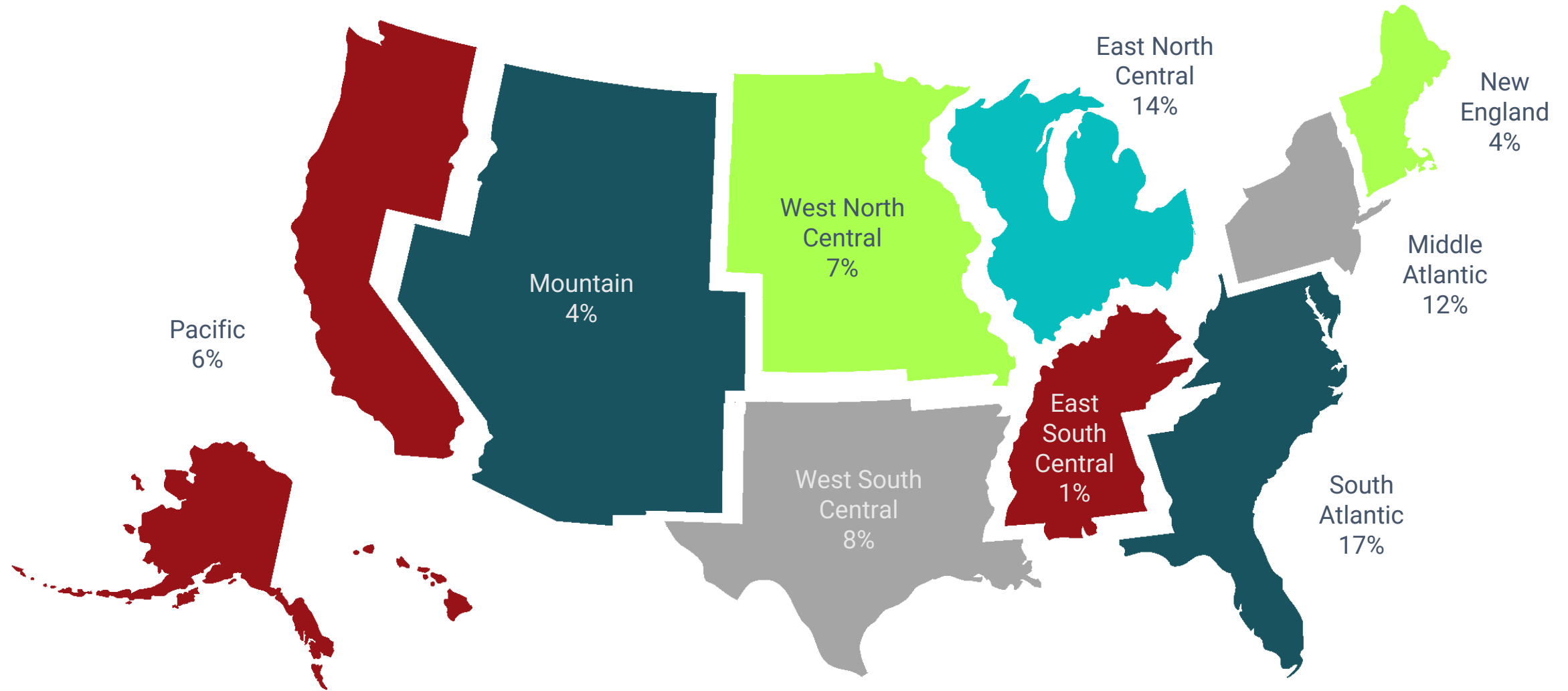
Which of the following best describes your company?



49% of respondents work for a consulting engineering firm and **19%** work for a design/build or construction/contracting firm.

n=117

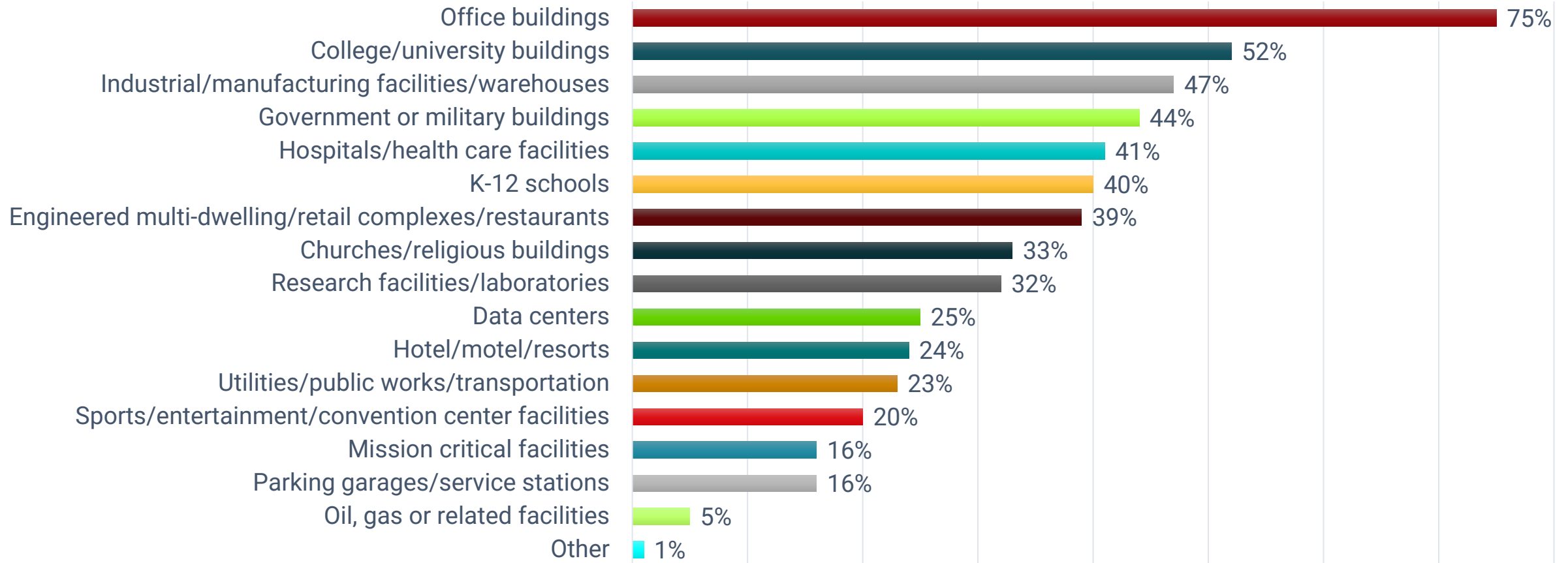
U.S. Location



n=117

Building Structures

For which of the following types of building structures do you specify, design or make rooftop unit (RTU) selections? Check all that apply.



n=117

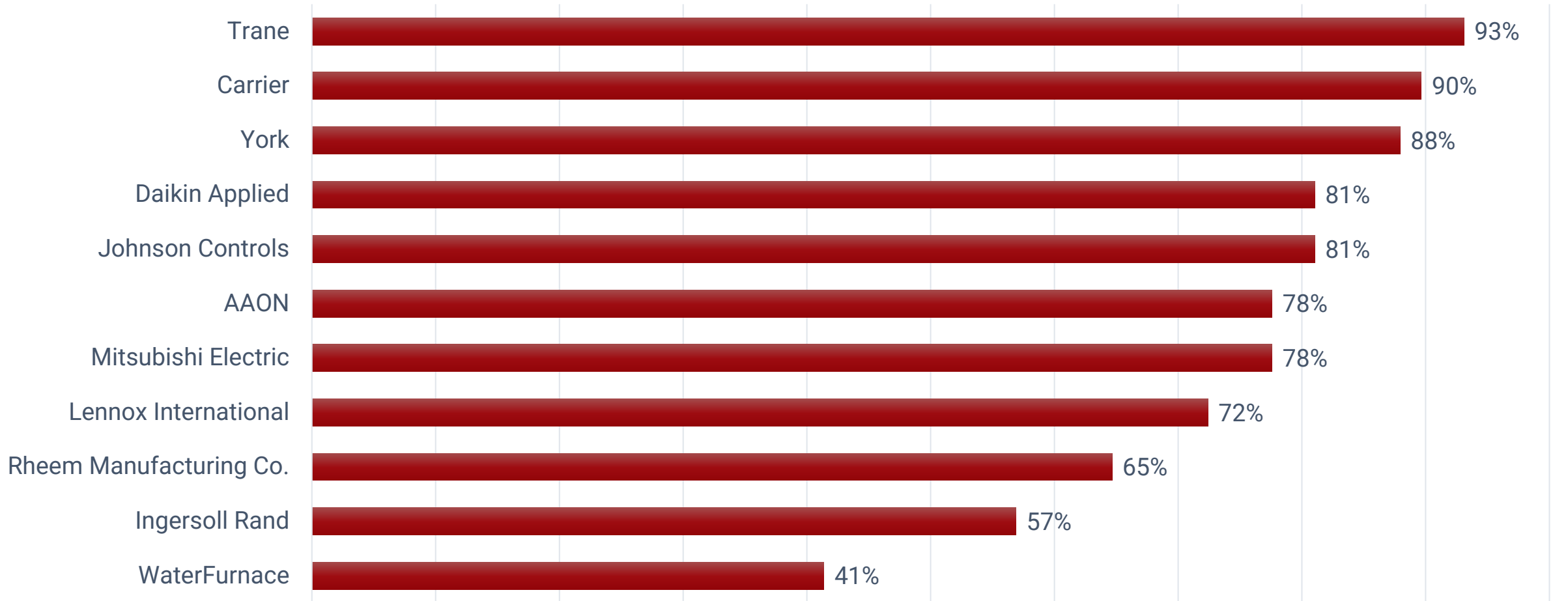


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Brand Awareness

Most Recognized RTU Brands

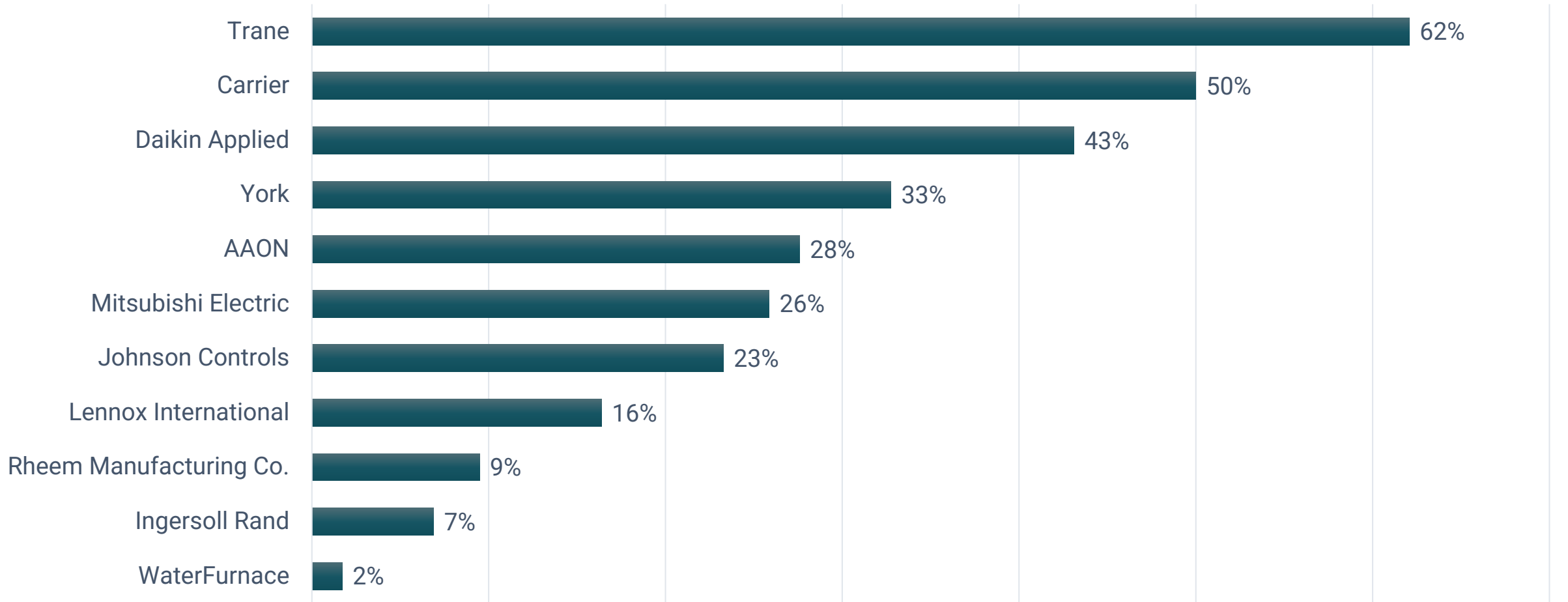
Which RTU brands are you most familiar with?



n=117

RTU Brands Viewed as Industry Leaders

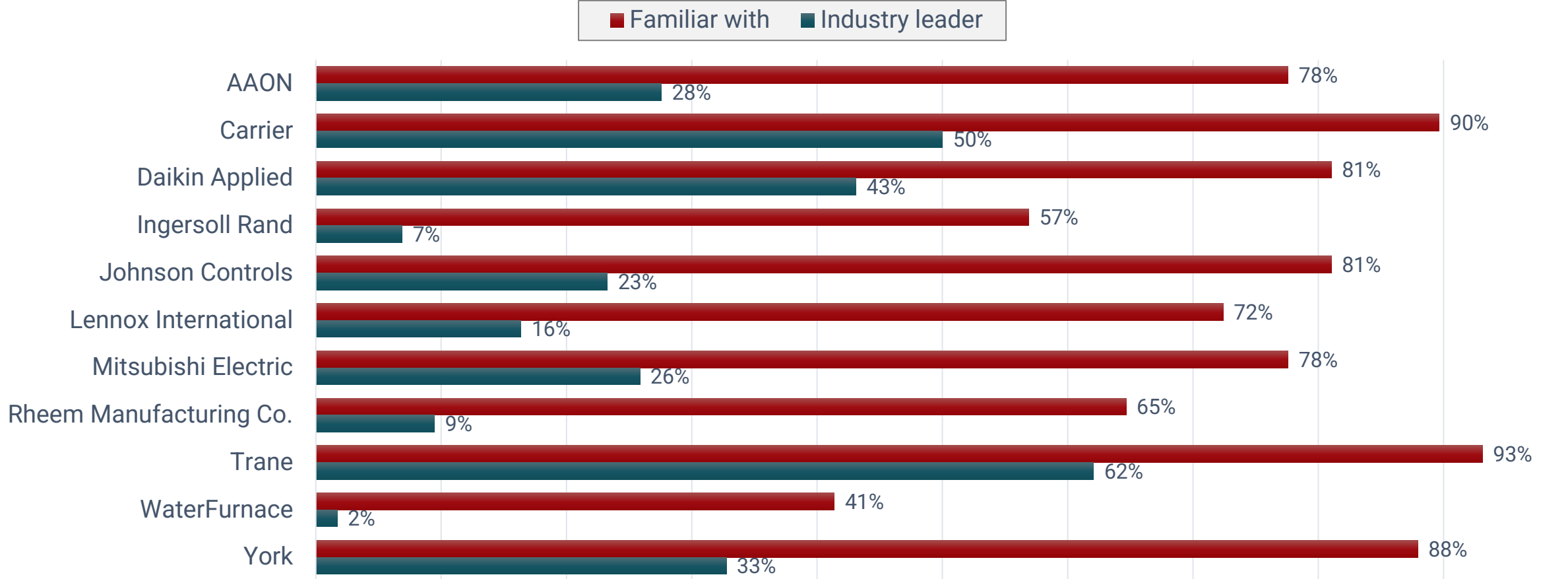
Which RTU brands do you consider to be industry leaders?



n=117

RTU Brand Awareness

Which RTU brands are you most familiar with, and which do you consider to be industry leaders?



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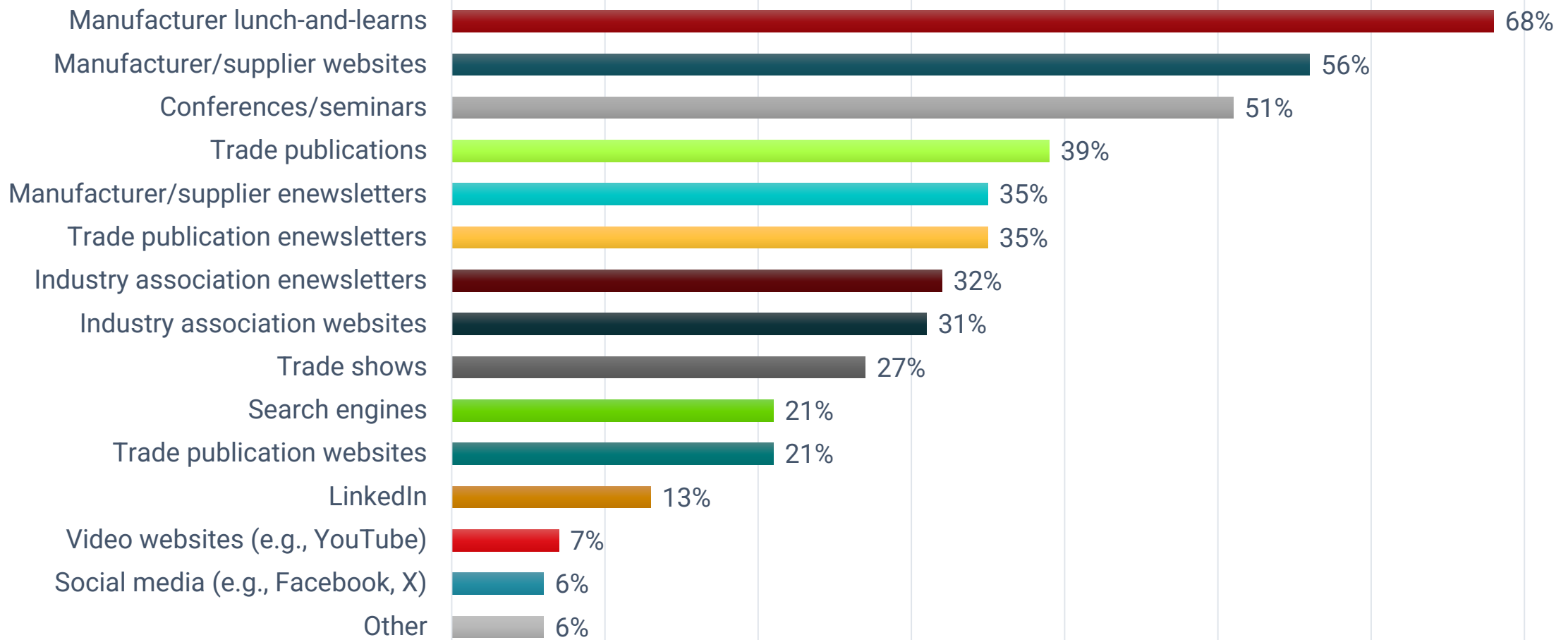


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Specifying Behavior

Sources for New Product Information

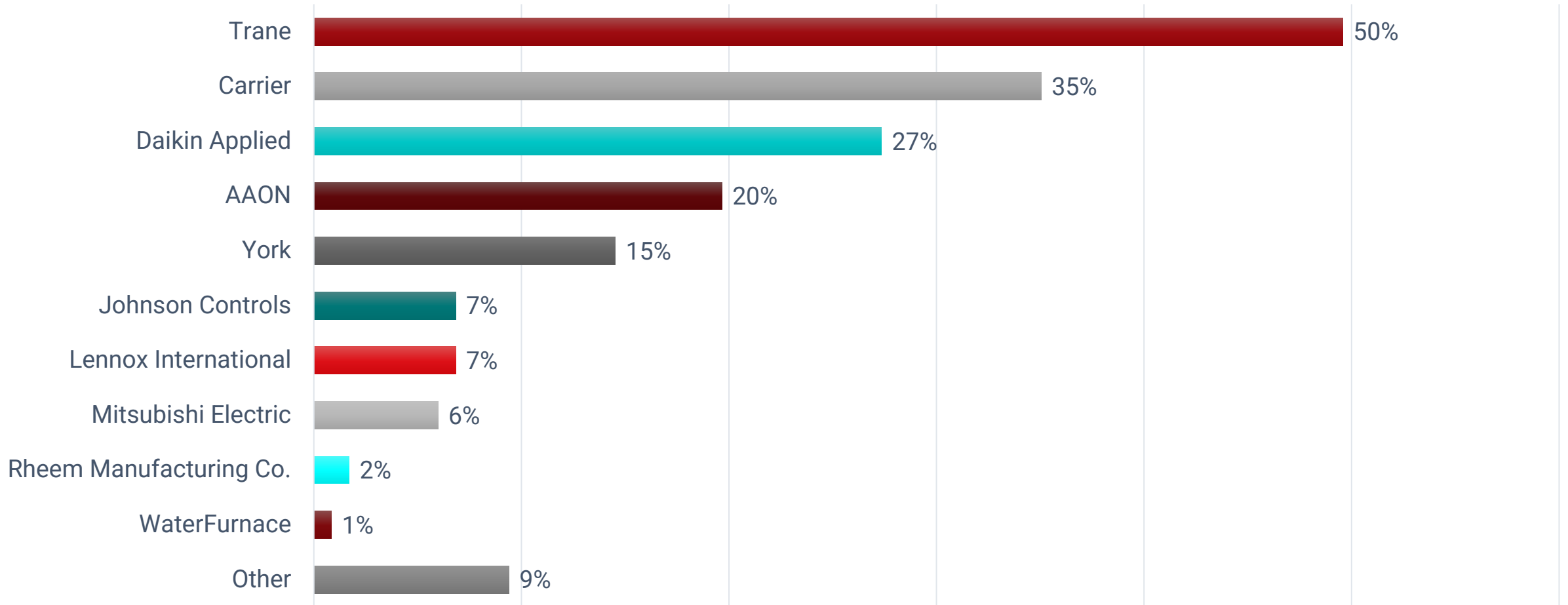
How do you stay informed about new products and developments in RTUs?



n=117

Frequently Specified RTU Brands

In recent projects, which RTU brands have you specified most frequently?



*Asked as an open-ended question

n=117

Impactful Marketing, Educational Efforts

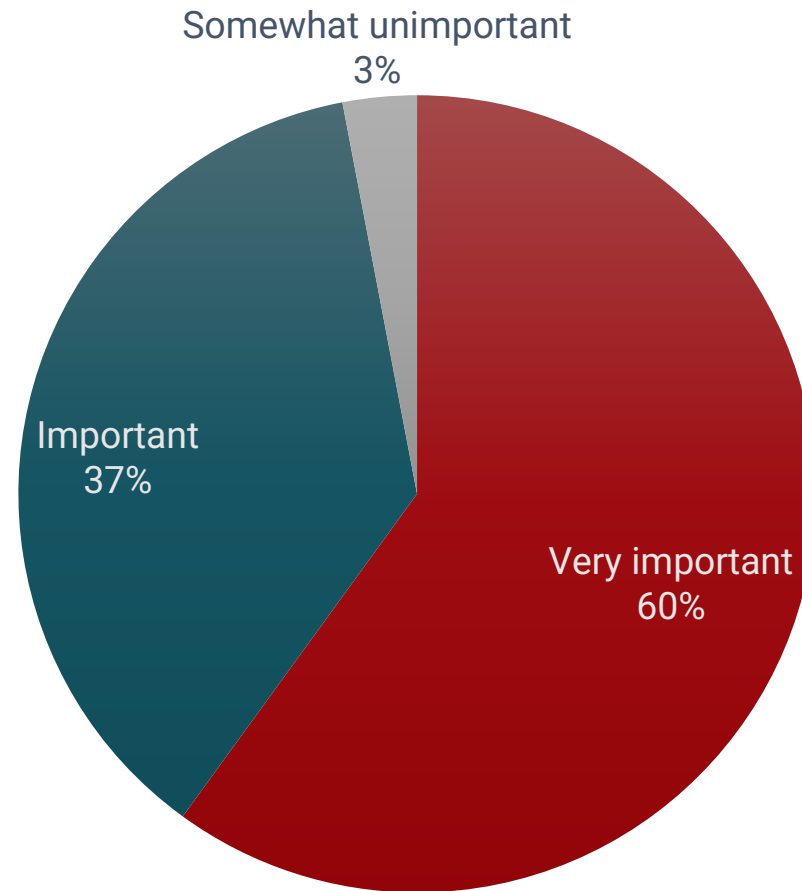
Which marketing or educational efforts from RTU brands have you found to be impactful?



n=117

Importance of Brand Reputation

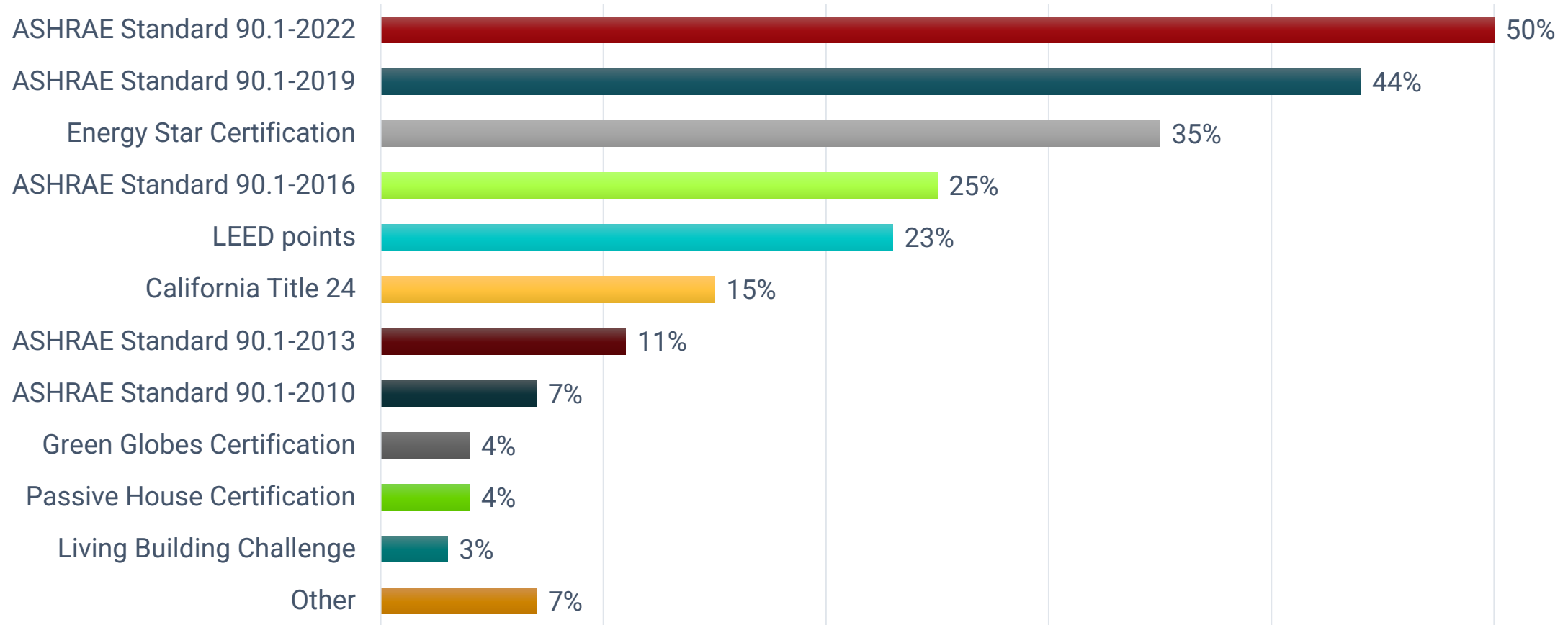
How important is brand reputation in your decision-making process for specifying an RTU?



n=117

Code, Standard & Certification Goals

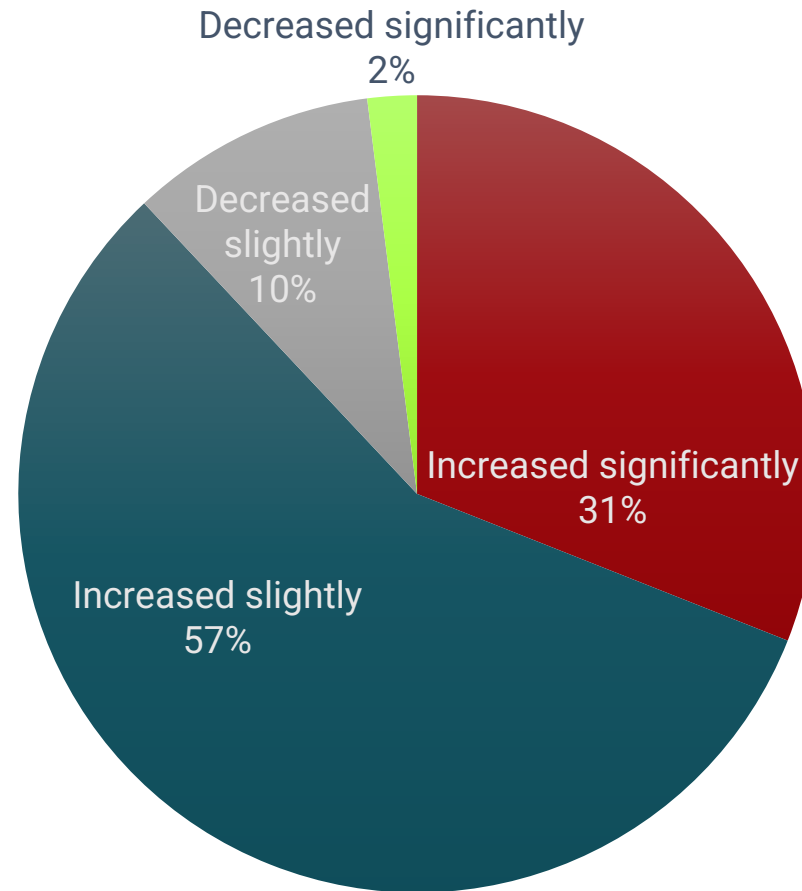
When designing an RTU to achieve energy efficiency, what code, standard, certification or other goal do you work toward for most projects? Check all that apply.



n=110

Recent Change in RTU Budgets

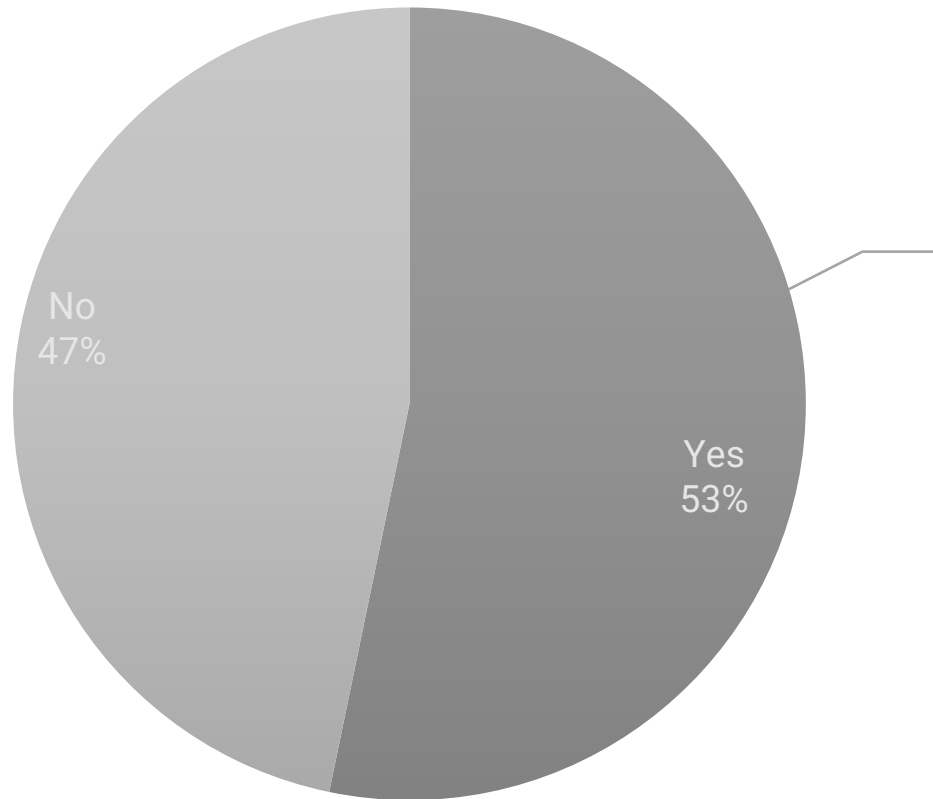
How has your clients' budget for RTUs changed over the past 2 years?



n=103

Budget Constraints & Energy Efficient RTUs

Do client budget constraints impact your ability to specify more sustainable or efficient RTU options?



Budget constraints as a factor

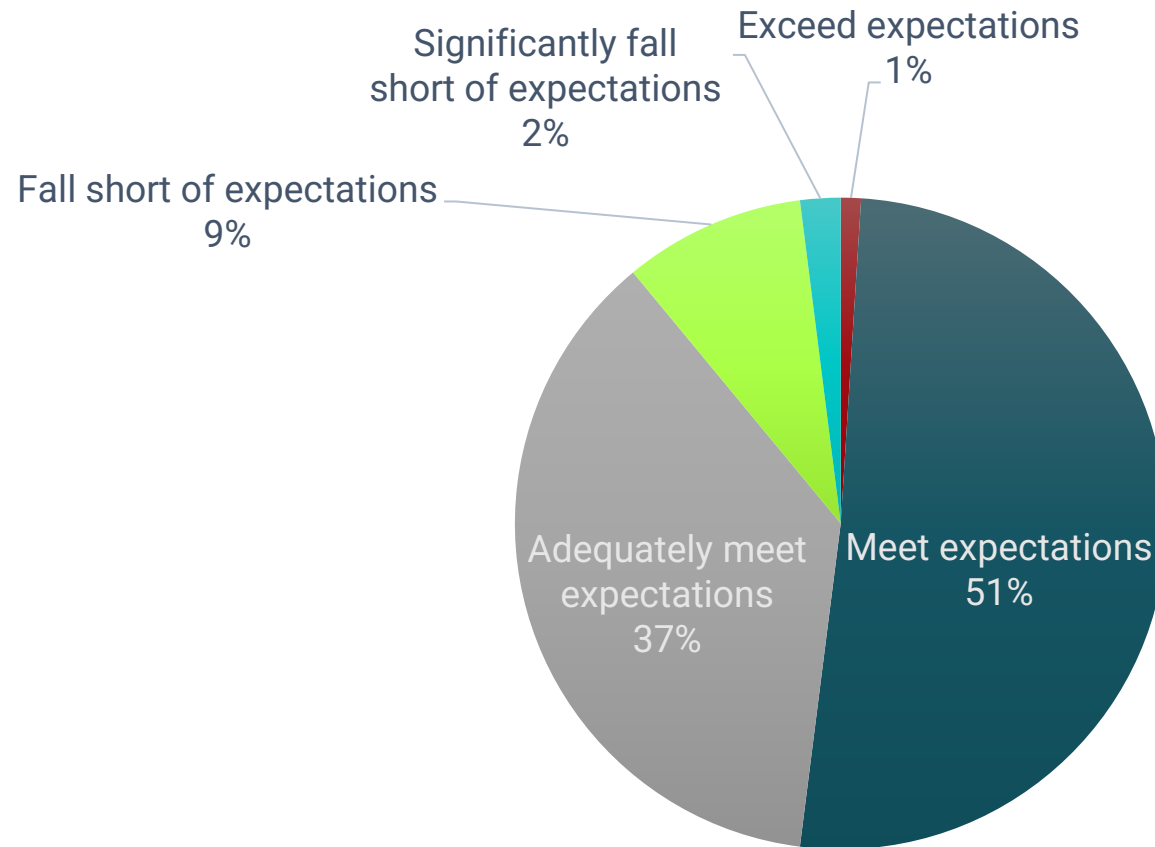
- Some respondents mentioned that cost considerations often lead clients to prioritize lower upfront expenses over long-term energy efficiency and sustainability.
- Clients often opt for basic RTUs due to budget limitations, even though more custom or efficient options may be available.

**Asked as an open-ended question*

n=102

Life Cycle Costing

In terms of life cycle costing, how do current RTUs measure up to your financial planning for projects?



n=103

Influence of Financial Incentives & Rebates

Are financial incentives, the Inflation Reduction Act, or rebates influential in your decision to specify certain RTUs?

Influential

- Absolutely, financial incentives, the Inflation Reduction Act, and rebates can significantly influence my decision to specify certain RTUs.
- Any incentives that help my clients afford more units is influential.
- Cost is a major factor in sourcing equipment.
- Financial incentives and rebate programs can play a significant role in the decision-making process for specifying RTUs.
- It has an influence on system design upfront as to whether they qualify; many manufacturers offer wide ranges of RTU types.
- Some utility rebates help sell efficient equipment.
- Sometimes, depending on the owner and their budget.
- Yes, if we can get a rebate from the utility for efficiency in a retrofit.
- Yes, the replacement of more efficient RTUs with federal funding.
- Yes, we would want to find the best solution for the client's needs.

Not influential

- Budgets are not estimated accurately these days. Architect and engineers need to update their cost analysts to account for increased HVAC system costs. Should allow an additional 15% increase to the 2023 estimated budgets.
- Financial incentives were a part of our decision a few years ago, but we are no longer installing natural gas-fired heating equipment (company mandate), so financial incentives are no longer available.
- Haven't seen one that works for everyday clients yet.
- No, our clients are struggling to afford base-level RTUs.
- Not really - all about life cycle costing.

**Asked as an open-ended question*

n=102

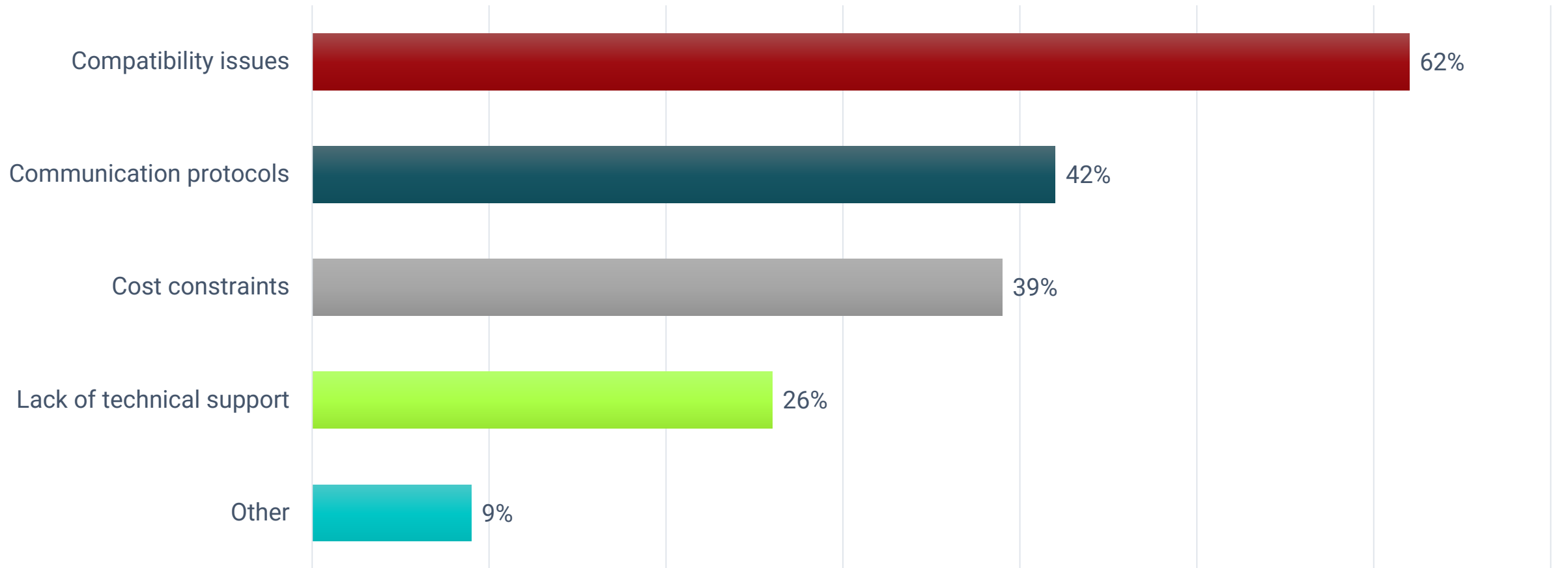


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Current Challenges & Future Innovations

Integrating an RTU With a Building Management System

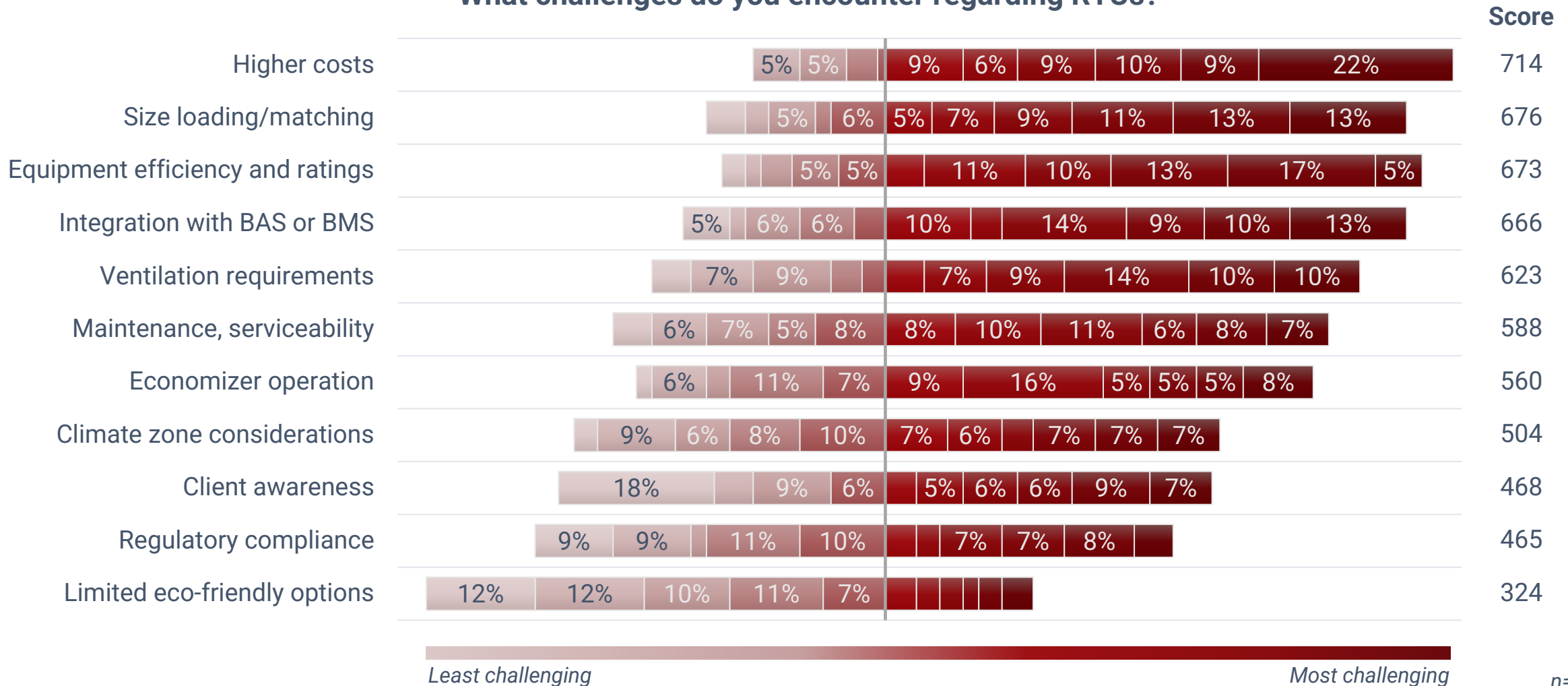
What are the most significant challenges you face in integrating an RTU with existing building management systems?



n=114

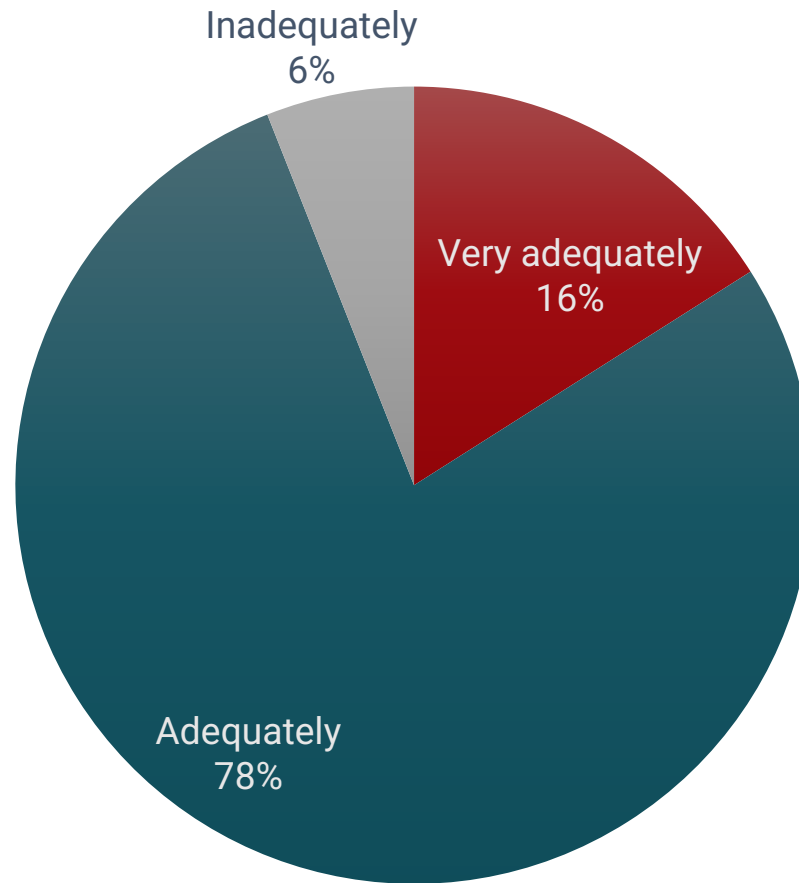
RTU Challenges

What challenges do you encounter regarding RTUs?



Adapting to Various Climatic Conditions

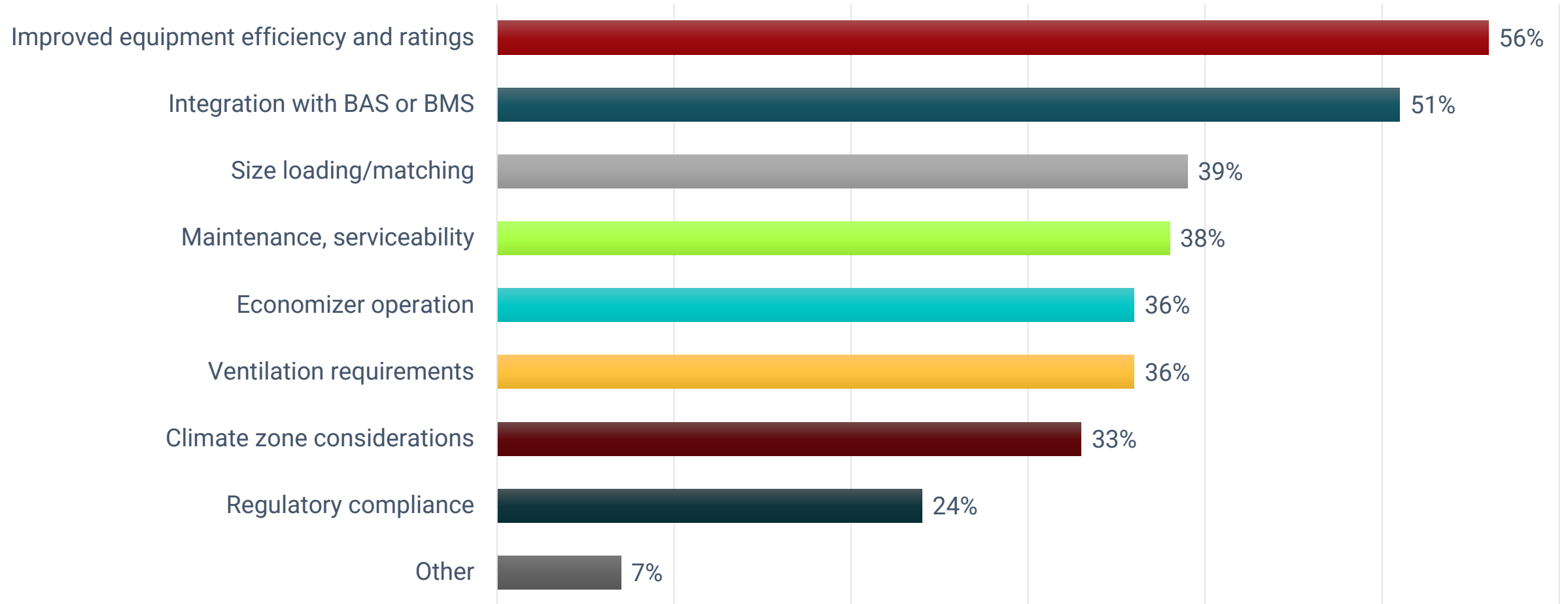
How adequately do current RTUs adapt to diverse climatic conditions in your projects?



n=114

Future Innovations

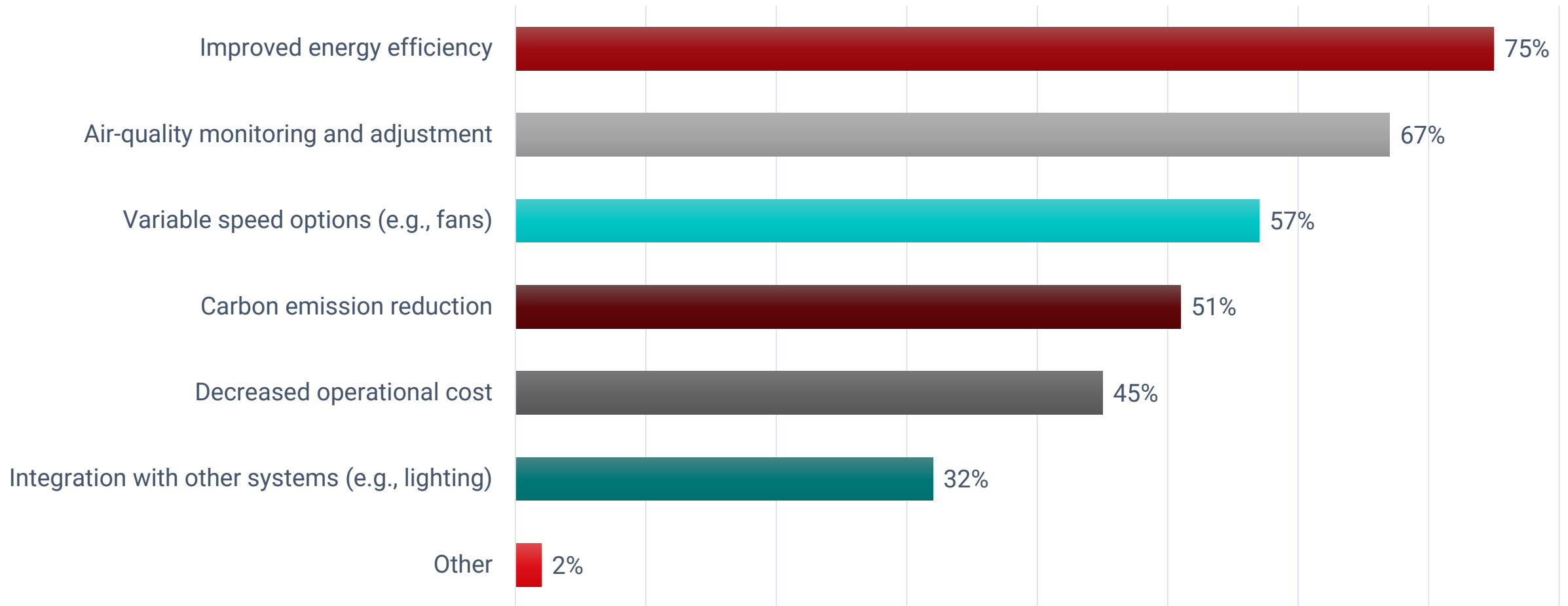
What future innovations in RTUs are you most looking forward to?



n=110

Impact of Smart Technologies on RTUs

How do you envision the integration of smart technologies impacting RTUs in the next 5 years?



n=110

Noise Reduction & Acoustic Control

What advancements in noise reduction and acoustic control do you anticipate or hope to see in future RTU designs?

Specific features for noise reduction

- Integration of "silence mode" for RTUs installed near quiet areas.
- Use of acoustic materials and consideration of variable speed for noise control.
- Adoption of advanced fan blade designs, quieter compressors, and improved cabinet designs.
- Implementation of better insulation and vibration isolation mechanisms internally.
- Utilization of ECM fans, variable speed compressors, and low-speed motors for noise reduction.

General expectations

- Focus on noise reduction in specific environments like educational buildings.
- Emphasis on improved operation at part-load conditions to minimize noise.

Specific suggestions

- Incorporation of integrated sound attenuators on condenser fans.
- Exploration of quieter operation at 60 Hz or less and softer start for compressors and fans.
- Consideration of specialist acoustic building materials and isolated ceilings.

Industry trends and requirements

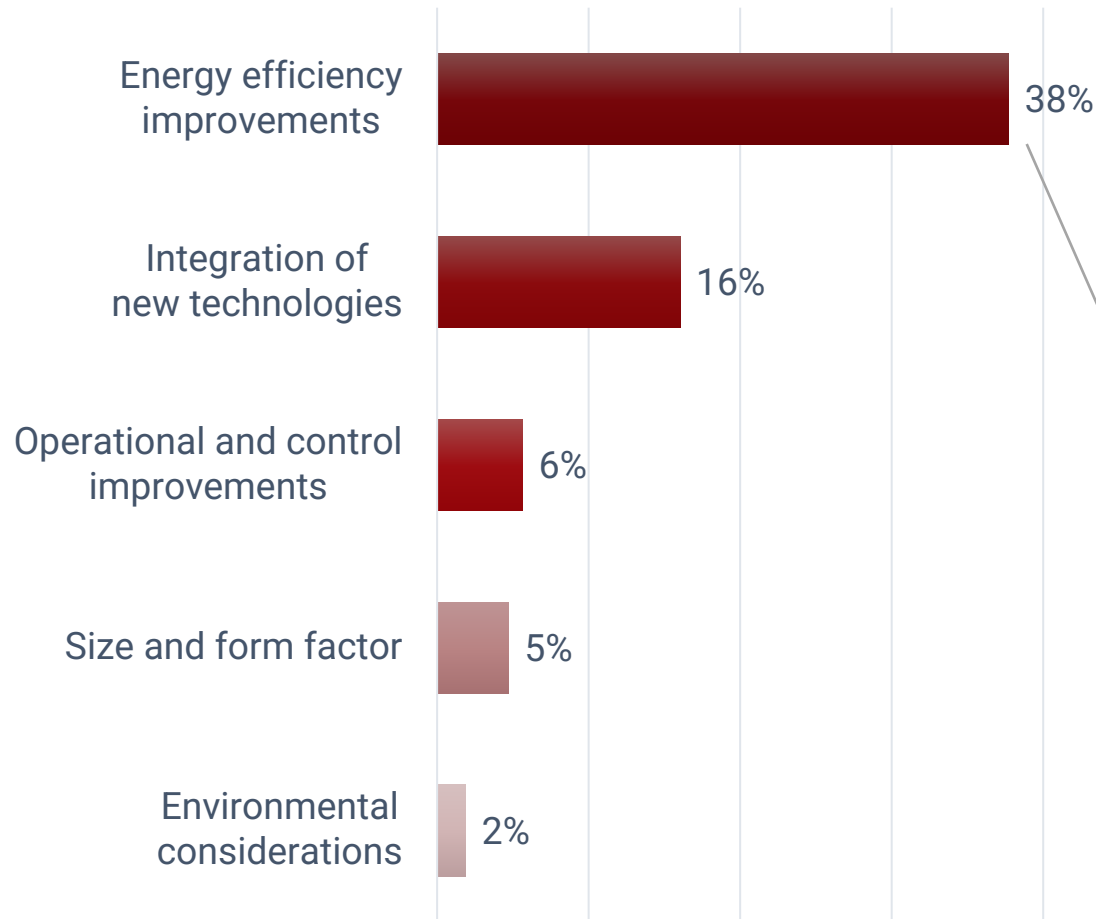
- Anticipation for reduction of noise transmission through ducts.
- Expectation for standardization of noise reduction features rather than being optional.
- Emphasis on noise reduction in critical facilities and mixed-use residential buildings.

**Asked as an open-ended question*

n=92

Improving Energy Efficiency

What improvements or innovations would you like to see in the next generation of RTUs?



Specific features for energy efficiency

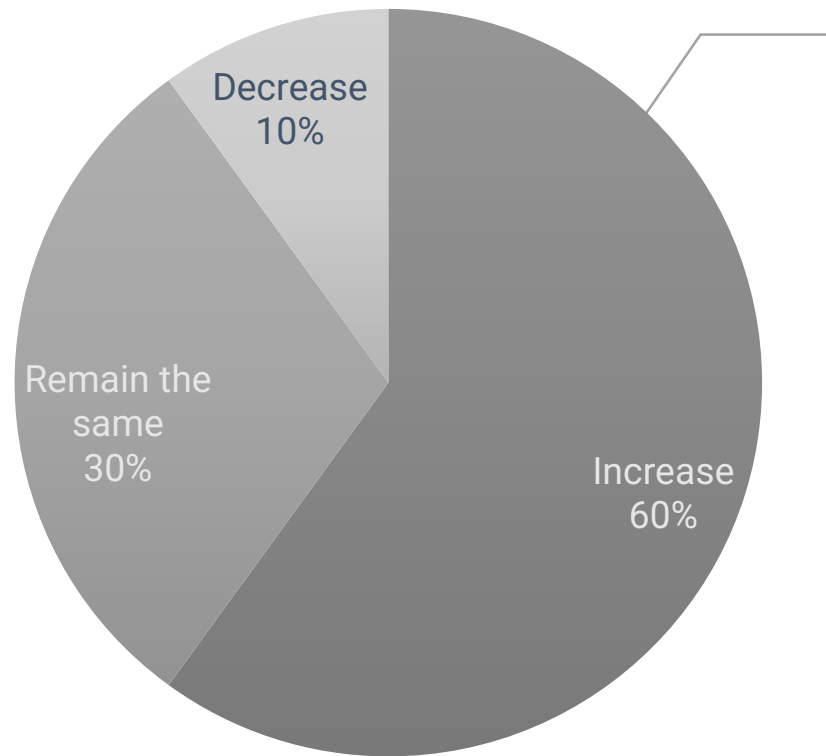
- Adoption of AC/DC motors and variable speed compressors.
- Implementation of air quality monitoring and improved efficiencies.
- Better compressor coefficient of performance (COP) for heat pump operation, especially in colder climates.
- Improved factory economizer options and performance.
- Introduction of cold climate heat pumps and dual-fuel systems for efficient operation in varying conditions.
- Utilization of modulating gas burners and variable speed controls for better part load performance.
- Integration of inverter-driven compressors and variable speed controls.
- Development of higher efficiency gas heating and heat exchangers.
- Incorporation of heat recovery systems and waste heat recovery for increased efficiency.

*Asked as an open-ended question

n=106

Anticipated Changes to Clients' RTU Budgets

Looking ahead, how do you anticipate your clients' budgetary allocation for RTUs changing in the context of technological advancements and sustainability considerations?



Some respondents anticipate an **increase** in their clients' budgetary allocations for RTUs. This increase is attributed to factors such as:

- Rising energy costs and environmental concerns leading to a greater focus on energy-efficient solutions.
- Technological advancements improving efficiency and sustainability, which may come with a higher initial cost but offer long-term savings.
- Expectations of higher efficiency and a reduction in capacity, driving the need for higher budget allocations.
- Increased investment in energy-efficient solutions due to inflation and rising material costs.
- Clients becoming more open to RTUs and willing to invest in sustainability.
- Growing focus on AHU equipment and ventilation, leading to requests for higher quality units and increased budgets.
- Anticipation of higher rebates and incentives influencing budgetary decisions.

**Asked as an open-ended question*

n=101

Additional Resources

Thank you for downloading the *Consulting-Specifying Engineer* HVAC & Mechanical Systems: Rooftop Units Report! Use the links below to access additional information.

Available at www.csemag.com:

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- [On-demand webcasts](#)
- [eBooks](#)
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Questions? We'd love to hear from you!

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