# State of Energy Management

A BuildingOS and Smart Energy Decisions exclusive report on 2020's biggest insights and trends identified by 242 energy and facility leaders.

*Published January 2021*

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# A Letter From Us

We did it! As energy and facility managers, we questioned, pushed, pivoted, managed, and even sometimes guessed our way through 2020. Before we talk about how we made it work and why it matters, congratulations on finding the personal resources to manage your environmental resources during a global pandemic. I'm impressed and genuinely honored to support you.

As Acuity Brands' Vice President of Customer Success and Operations, it's my pleasure to welcome you to the second annual State of Energy Management report. The COVID-19 pandemic left a lasting mark on our work, which undoubtedly influenced the survey responses and trends you're about to read, including these two overarching messages:

● **COVID-19 significantly impacted multiple aspects of building management,** especially standard occupancy levels and increased industry standards on indoor air quality and filtration methods. Our research shows energy teams anticipate an increased need for higher-efficiency HVAC systems and the ability to remotely manage energy programs to address these and other challenges as they adapt system-wide performance to meet new and evolving building health standards.

● **Time and money are the most significant barriers to a successful EMIS implementation,** which is critical information considering these systems are valuable tools for continuous resource optimization. Limited staffing prevents those of you already using an EMIS from reading the dashboards and adjusting operations based on findings; time-consuming manual data collection holds back those of you trying to make a business case for EMIS funding. And both situations prevent staff from completing mission-critical tasks that directly impact the bottom line.

Whether you're new to the field or have decades of experience, thank you for trusting our research to help you make confident and knowledgeable decisions.

Please keep reading and onwards in 2021!

*Sarah Diegnan*

## Sarah Diegnan

**Vice President of Customer Success and Operations**

# Setting the Stage:
# Our Purpose & Process

The 15-question survey was available from September through October 2020 (published January 2021) to Smart Energy Decisions and BuildingOS energy, facility, and sustainability leaders representing various organizations. The 242 respondents represent six industries (Table 1) and building counts ranging from 1-500+ buildings (Table 2).

Our purpose was to identify behaviors and trends to share with a broader audience that, in turn, advances the energy management journey for all organizations. The results reflect the state of the industry in 2020 and will help you modify or pivot your energy management and sustainability programs as needed in 2021.

| | | |
|---|---|---|
| | **Higher Education** | **29%** |
| | **Commercial (majority of load from operating facilities)** | **26%** |
| | **Government (cities, municipalities, etc.)** | **17%** |
| | **K-12** | **15%** |
| | **Industrial/Manufacturing (majority of load from manufacturing)** | **11%** |
| | **Healthcare** | **2%** |

*Table 1 - Base: 242 total respondents, Source: SED Research, 2021*

■ **1 to 9 Buildings**   ■ **10 to 99 Buildings**   ■ **100 to 499 Buildings**   ■ **500+ Buildings**

| 0% | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100% |
|---|---|---|---|---|---|---|---|---|---|---|

| **13%** | **38%** | **31%** | **18%** |
|---|---|---|---|

*Table 2 - Base: 242 total respondents, Source: SED Research, 2021*

# We are making progress in advancing the energy journey

**We wanted to know** which stage of the energy journey respondents best identified with because this dynamic process heavily influences daily decisions and long-term resource allocation.

**You told us** that most of you identify your organizations as being in the middle stages of the energy journey: 27% "picking up speed," and 23% as "well on our way."

**This suggests** that even though energy managers identify their organizations at multiple stages of the energy journey, and some indicate they're further behind than they'd like, overall, we're moving forward. The "well on our way" and "ahead of the crowd" groupings showed the largest increases over 2019, and we're encouraged 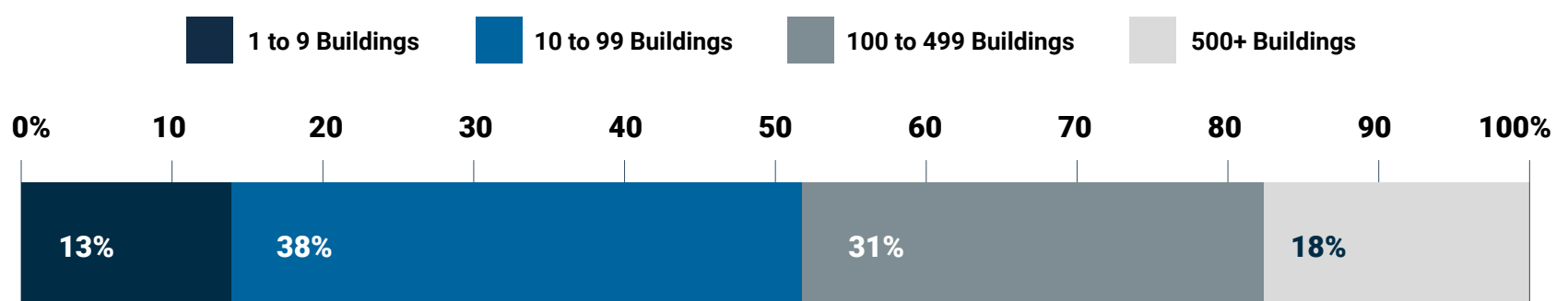by the 9-point increase in the number of organizations leveraging submetering to gain better portfolio visibility. The gains made in this category lead us to believe organizations are beginning to see the value in submetering to unlock deep insights into building optimization and resource reduction.

> Which of the following best describes where your organization is on the **journey in using energy data** to manage your business?

| | 0 | 5% | 10% | 15% | 20% | 30% | 35% |
|---|---|---|---|---|---|---|---|

At the beginning: Putting manual data in a spreadsheet (Beginning)
- 15%
- 14%

First steps: Automating utility bill data into a centralized system (Beginning)
- 22%
- 28%

Picking up speed: Accessing real-time data to identify anomalies and performance (Middle)
- 27%
- 34%

Well on our way: Submetering data for greater building performance visibility (Advanced)
- 23%
- 14%

Ahead of the crowd: Fault detection and diagnostics (Advanced)
- 13%
- 9%

2020 Data

2019 Data

*Table 3 - Base: 242 total respondents, Source: SED Research, 2021*

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# Reducing resource consumption is a driving force for organizations

**We wanted to know** participants' top priorities and which energy and sustainability goals they believed most impact their bottom line and strategic growth.

**You told us** resource reduction, including energy, water, and waste, is your top organizational goal (91%). More than half of you said your companies are committed to greenhouse gas reduction (58%) and upgrading building automation or IoT infrastructure (52%).

**This suggests** that stakeholders recognize the alignment between resource reduction and immediate, tangible cost savings. Similarly, they appear to understand the importance of automating critical processes and upgrading their IoT infrastructure to successful energy program management. And while the latter might not tie to cost savings as closely as resource reduction, there's arguably perceived value in the marketplace.

> ## To which of the following **energy and sustainability goals** is your organization committed?

| | |
|---|---|
| **Resource reduction (including energy, water, waste)** | **91%** |
| **Greenhouse gas (GHG) reduction** | **58%** |
| **Upgrading building automation or IoT infrastructure** | **52%** |
| **Renewable energy targets** | **49%** |
| **ESG reporting** | **41%** |
| **Carbon neutrality/Net zero** | **36%** |

*Table 4 - Base: 242 total respondents, Source: SED Research, 2021*

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# Investing in an EMIS is directly tied to energy savings and reduction goals

**We wanted to know** which of the many factors of an energy program you believe are the most important for long-term success in your organizations.

**You told us** the top three factors critical to the success of your energy programs are centralizing data into an accessible location (59%), securing utility incentives (58%), and establishing corporate goals to influence EMIS investments (56%). Of these three program components, 29% told us the single most important is setting corporate-level energy savings or carbon reduction goals to drive EMIS investment.

**This suggests** energy leaders are drawing a clear connection between organizational reduction goals and the need for an EMIS to verify, measure, and track goal achievement.

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### Which of the following factors are important to **the success of your energy management program?**

■ Important (Multiple Choice)    ■ Single Most Important

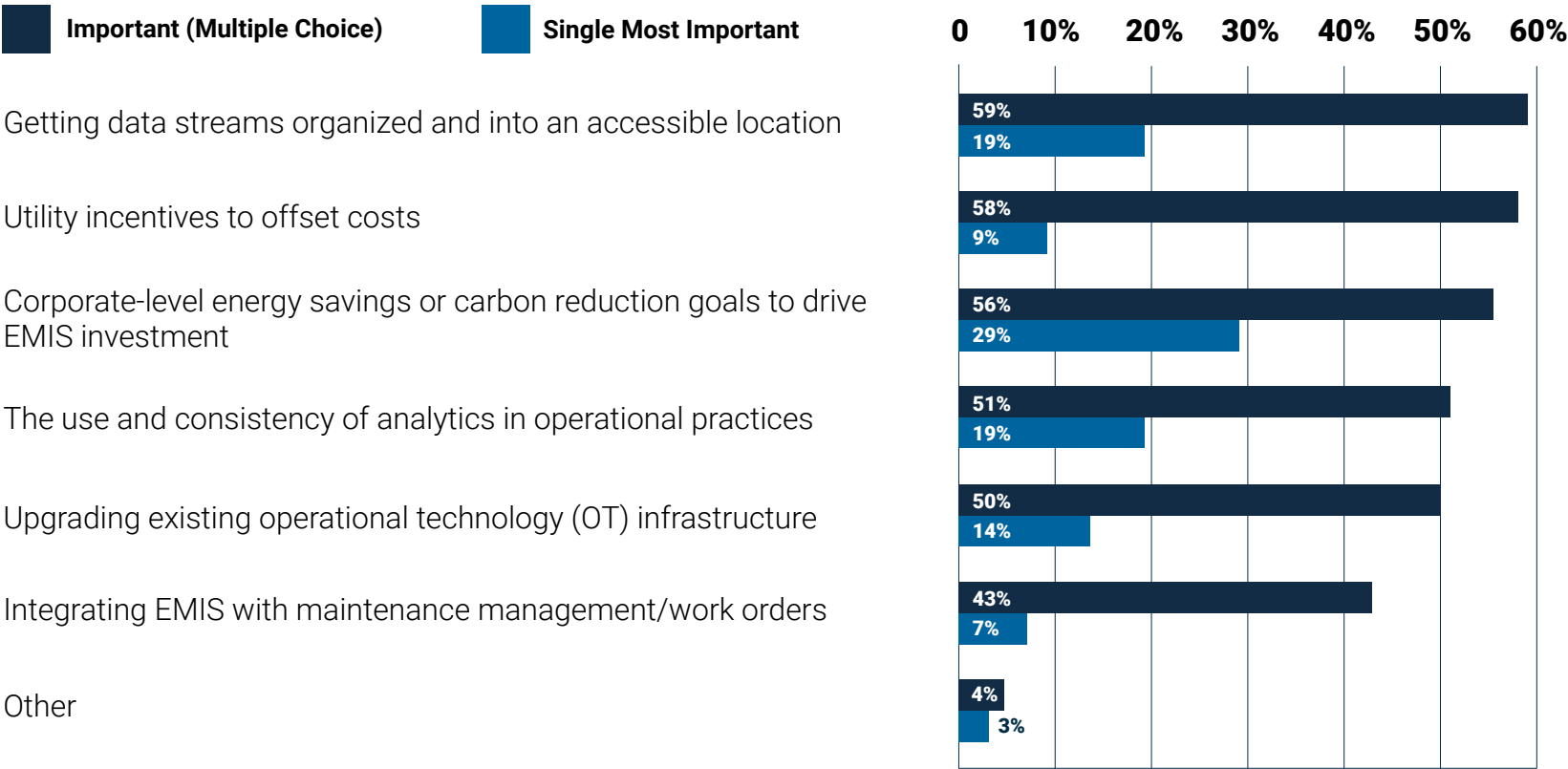| Factor | Important (Multiple Choice) | Single Most Important |
|---|---|---|
| Getting data streams organized and into an accessible location | 59% | 19% |
| Utility incentives to offset costs | 58% | 9% |
| Corporate-level energy savings or carbon reduction goals to drive EMIS investment | 56% | 29% |
| The use and consistency of analytics in operational practices | 51% | 19% |
| Upgrading existing operational technology (OT) infrastructure | 50% | 14% |
| Integrating EMIS with maintenance management/work orders | 43% | 7% |
| Other | 4% | 3% |

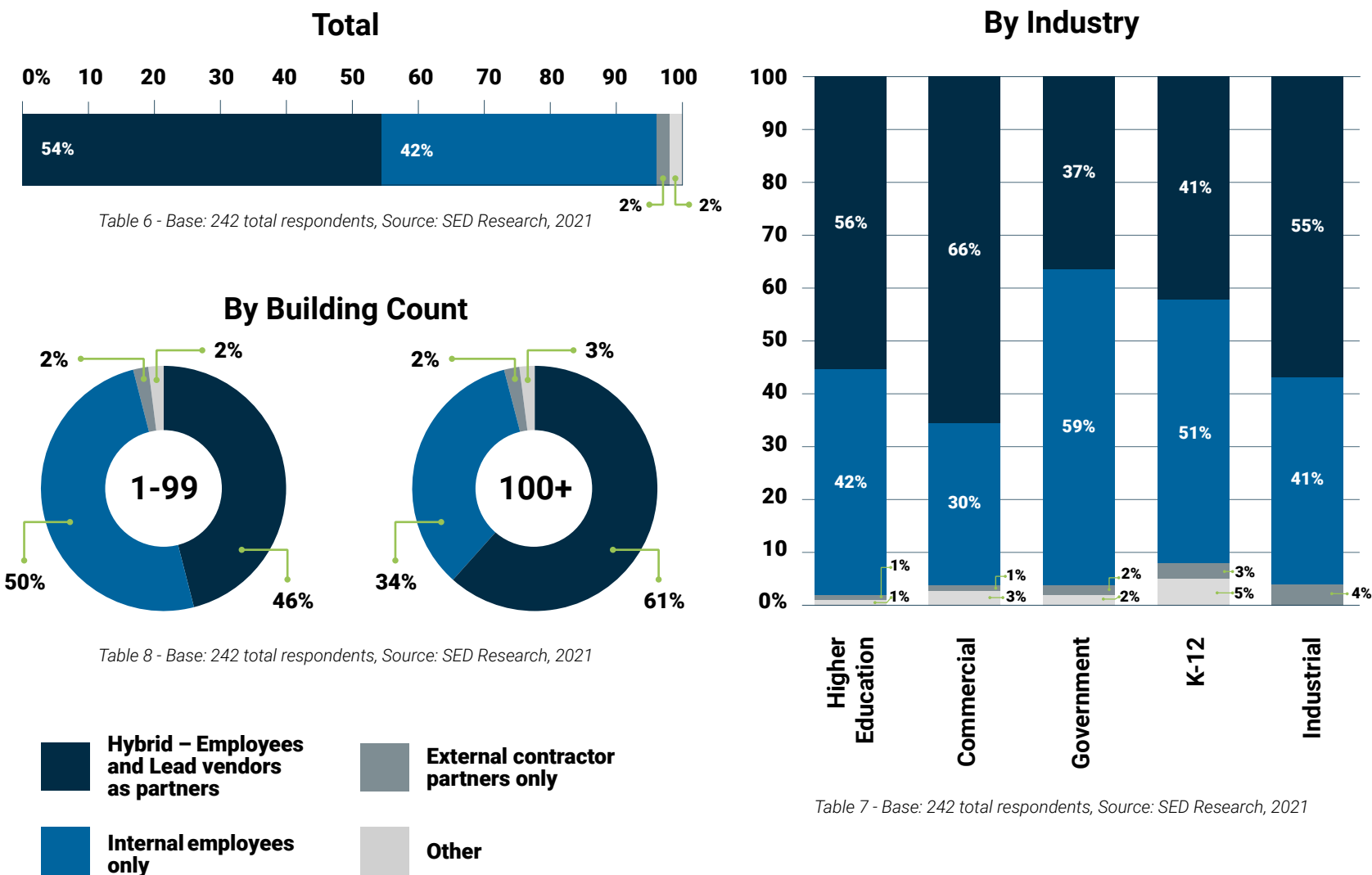*Table 5 - Base: 242 total respondents, Source: SED Research, 2021*

# Team makeup varies by industry and building count

**We wanted to know** the percentage of facility leaders relying on internal staff, external partners, or a hybrid model to run their corporate energy and sustainability programs.

**You told us** the internal employee model, used by a total of 42% of you, is most common among government agencies and those managing fewer than 100 buildings. The hybrid model, used by 54% of respondents, is most popular with commercial companies and those overseeing 100+ facilities. Interestingly, only 2% of total respondents are relying exclusively on external partnerships.

**This suggests** leaders are likely to assemble their teams based on expertise and cost-efficiency, whether that means relying on internal teams or outsourcing to vendors. For example, it is logical to contract with HVAC experts for annual compliance audits and as-needed repairs so internal employees can focus more effort on initiatives that support organizational reduction initiatives. Hybrid models might gain acceptance as managers direct more internal resources to ensure building systems are up to standards that ensure occupant health.

## Which best describes the **staffing** of your company's energy management program?

### Total



*Table 6 - Base: 242 total respondents, Source: SED Research, 2021*

### By Building Count



*Table 8 - Base: 242 total respondents, Source: SED Research, 2021*

- ■ Hybrid – Employees and Lead vendors as partners
- ■ Internal employees only
- ■ External contractor partners only
- ■ Other

### By Industry



*Table 7 - Base: 242 total respondents, Source: SED Research, 2021*

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# Energy managers are increasingly automating data collection processes

**We wanted to know** which of five specific methods teams are using to gather building data critical for benchmarking and measuring goal accomplishment.

**You told us** exporting trend data from a building management system is the most popular (47%), followed by automatically collecting monthly utility data in a centralized system (45%). On the other side, 41% of you manually collect bill data (a considerable decrease from 55% in 2019), and 30% still do manual meter readings. However, teams are essentially split between manual and automated data collection, proving there's room for significant change.

**This suggests** that of the many lessons learned in 2020, energy managers are bringing nimbleness and flexibility into 2021. As stakeholders and C-suite executives demand greater resource optimization, BuildingOS expects automation to increase as well. This transition releases teams from filling in spreadsheets or doing manual meter readings and refocuses their efforts directly on tasks that impact energy programs and sustainability goals.

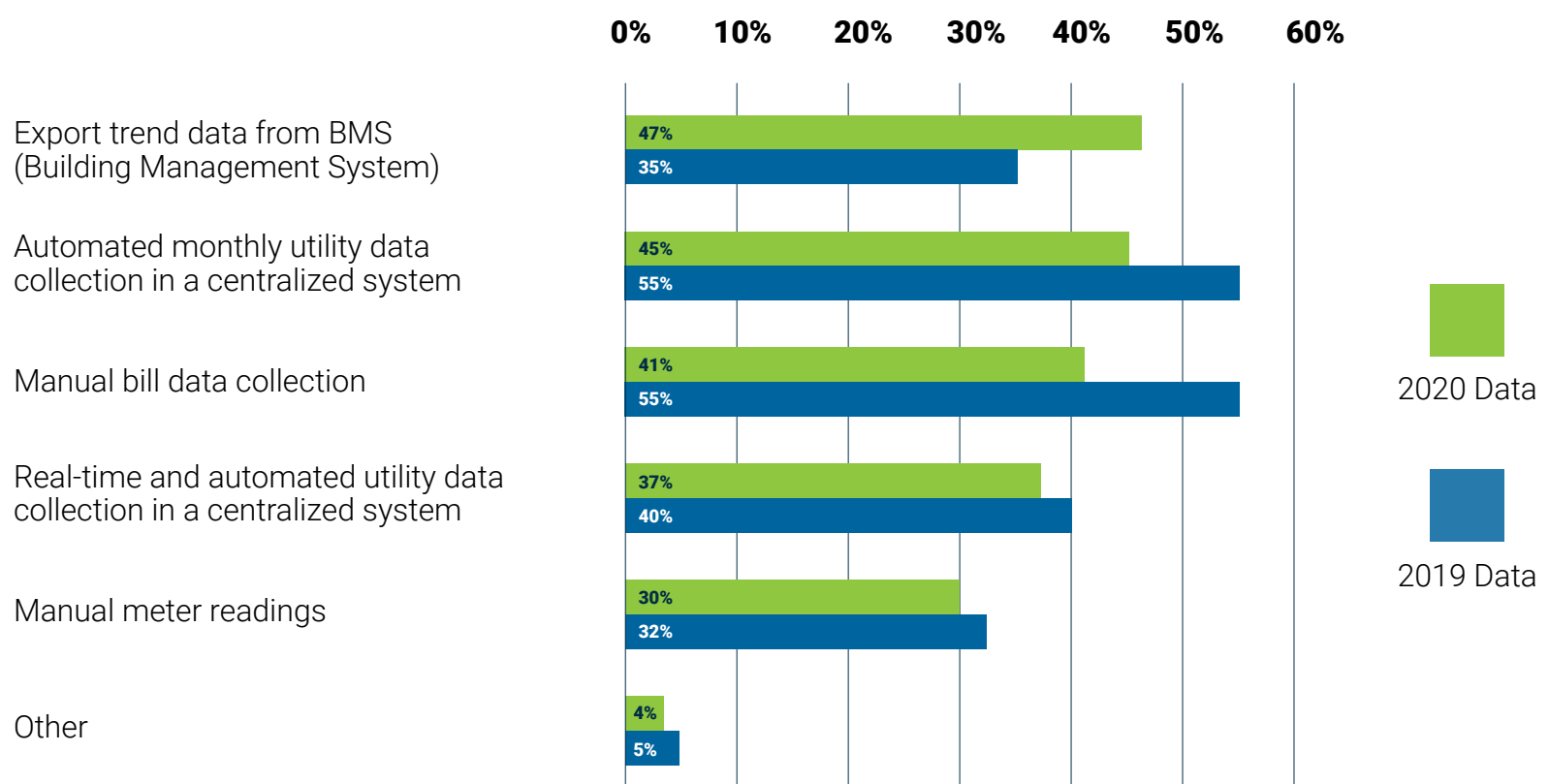## How does your organization currently collect **building data?**

| Method | 2020 Data | 2019 Data |
|---|---|---|
| Export trend data from BMS (Building Management System) | 47% | 35% |
| Automated monthly utility data collection in a centralized system | 45% | 55% |
| Manual bill data collection | 41% | 55% |
| Real-time and automated utility data collection in a centralized system | 37% | 40% |
| Manual meter readings | 30% | 32% |
| Other | 4% | 5% |

*Table 9 - Base: 242 total respondents, Source: SED Research, 2021*

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# Monthly bill analysis and an EMIS for data centralization are preferred energy program management tools

**We wanted to know** which methods and tools you prefer for tracking progress, evaluating outcomes, and understanding the impact of your energy programs.

**You told us** monthly bill analysis (78%) and centralizing data in an EMIS (57%) are your preferred methods to support your energy and sustainability initiatives. Interestingly, the status of your organizational energy journey seemingly affected this response, too.

**This suggests** those at the beginning stage of their journey were significantly less likely to use an EMIS to centralize data (33%) than those at the advanced stage (72%), as shown in Table 11 on the next page. This advanced group used Fault Detection and Diagnostics (FDD) and Automated System Optimization (ASO)/Predictive HVAC control (ASO) at higher rates than energy managers at the beginning or middle stages of their organizational energy journey. BuildingOS expects EMIS and benchmarking usage to increase through 2021 as energy managers work to proactively optimize and measure performance faster.

**Which methods does your organization currently use** as part of your energy management and/or sustainability programs?

| | |
|---|---|
| Monthly bill analysis | 78% |
| Energy Management Information System (EMIS) for data centralization and analysis | 57% |
| Benchmarking | 56% |
| Measurement and verification of savings using interval meter data | 42% |
| Fault Detection and Diagnostics (FDD) | 24% |
| Automated System Optimization (ASO)/Predictive HVAC control | 22% |
| We have no specific methods | 5% |
| Other | 3% |

*Table 10 - Base: 242 total respondents, Source: SED Research, 2021*

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## Which methods does your organization currently use as part of your energy management and/or sustainability programs?



Beginning · Middle · Advanced

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% |

**Monthly bill analysis**
- 78%
- 77%
- 79%

**Energy Management Information System (EMIS) for data centralization and analysis**
- 33%
- 71%
- 72%

**Benchmarking**
- 42%
- 61%
- 68%

**Measurement and verification of savings using interval meter data**
- 20%
- 44%
- 63%

**Fault Detection and Diagnostics (FDD)**
- 12%
- 27%
- 34%

**Automated System Optimization (ASO)/Predictive HVAC control**
- 9%
- 20%
- 38%

**We have no specific methods**
- 9%
- 6%
- 1%

**Other**
- 2%
- 5%
- 2%
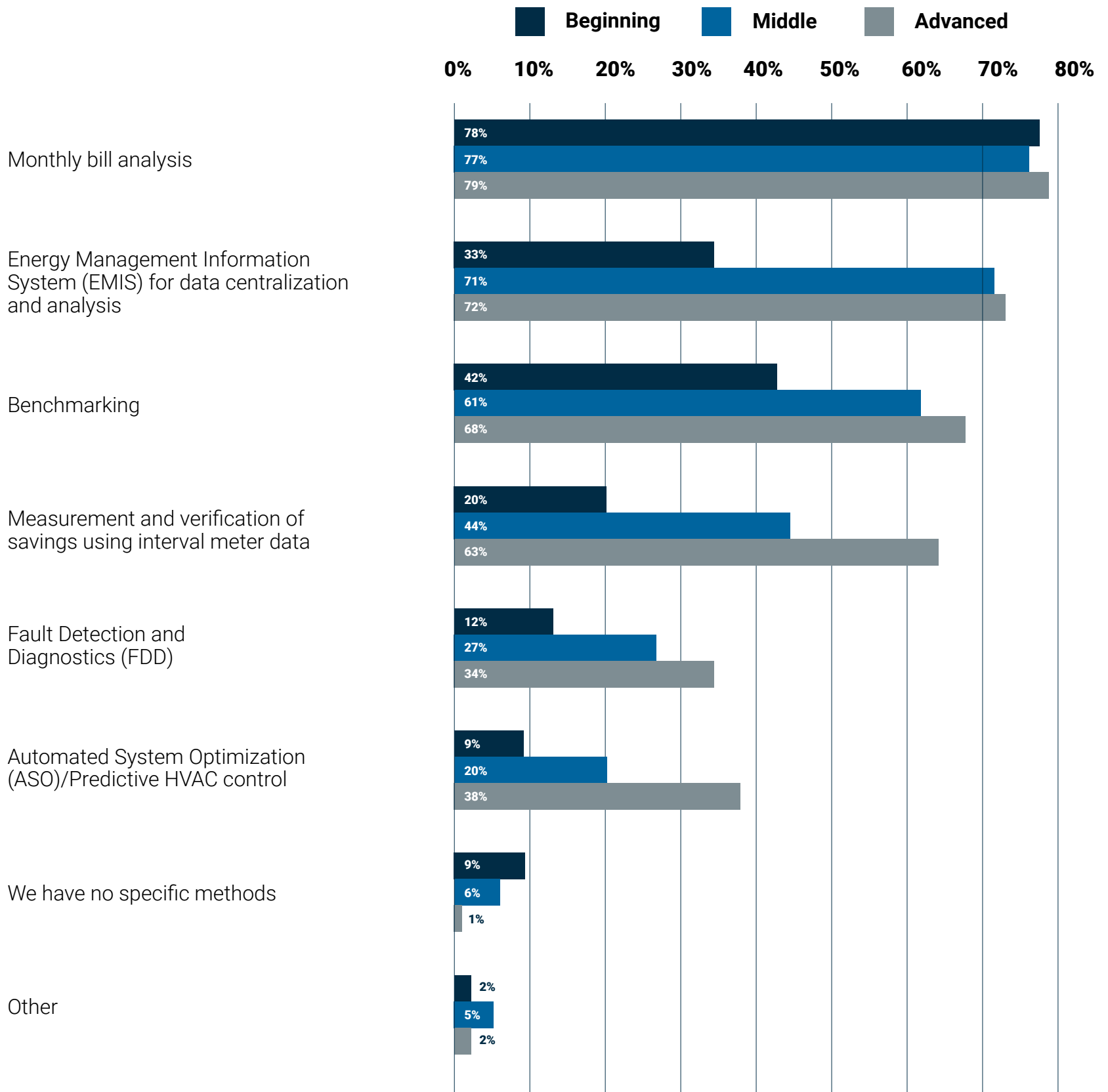
*Table 11 - Base: 242 total respondents, Source: SED Research, 2021*

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# Time and money are the most significant barriers to a successful EMIS implementation

**We wanted to know** what energy leaders perceived as their biggest challenge to implementing an energy management information system (EMIS), especially considering the recognized increased efficiency and ROI.

**You told us** the top two barriers to implementing an EMIS are the cost of adding meters (46%) and a lack of staff time to review EMIS output (46%). When asked to select the **single** biggest potential roadblock to integrating an EMIS, your biggest hurdles were limited staff resources to review and implement findings (19%), difficulty making the business case for an EMIS (18%), and a lack of existing meters (17%).

**This suggests** energy teams routinely need to prove the ROI of existing energy reduction measures--typically tangible utility or resource reduction—before new programs are approved. Success stories, current savings, and alternative funding models can help you clear the ROI hurdles to make the business case for an EMIS. Demonstrating sufficient personnel resources is critical to making your business case as well. Show the decision-makers how automating time- and labor-intensive tasks creates more time for teams to focus on high-impact projects.

> ## Which of the following factors have been **barriers** to the successful implementation of your EMIS?

**■ Total (Multiple Choice)**   **■ Single Biggest Barrier**

| Factor | Total | Single Biggest Barrier |
|---|---|---|
| Lack of staff time to review EMIS dashboards/reports, investigate and implement findings | 46% | 19% |
| Lack of existing metering in place/cost of adding meters | 46% | 17% |
| Difficulty making the business case to management to allocate funds to an EMIS | 38% | 18% |
| Data quality problems (data gaps, incorrect meter readings, etc.) | 34% | 12% |
| Challenges getting operations staff to buy-in and use the EMIS as a tool | 33% | 7% |
| Challenges integrating data from various sources into the EMIS | 32% | 8% |
| Difficulty maintaining the use of the EMIS as a part of the operations process over time | 24% | 2% |
| Experiencing data overload and/or too many faults detected | 19% | 2% |
| Difficulty selecting an EMIS product due to the large number of products on the market | 15% | 4% |
| Other | 12% | 11% |
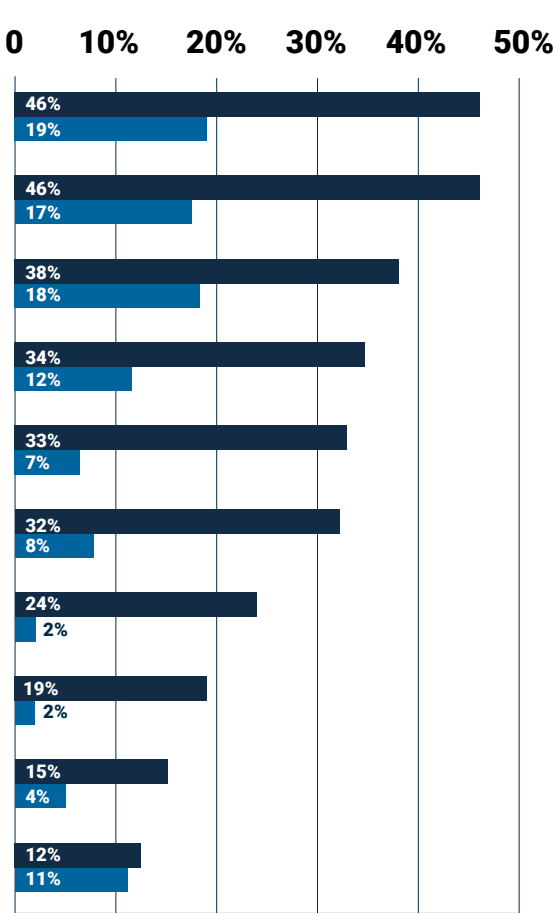
*Table 12 - Base: 242 total respondents, Source: SED Research, 2021*

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# Building optimization is closely tied to occupancy health

**We wanted to know** which tactics you consider most important for executing an overall energy strategy.

**You told us** that 87% of you consider higher efficiency HVAC equipment as the most important tactic to your overall energy and sustainability strategy. Lighting upgrades (79%) and analytics/actionable data (77%) were the second and third most important tactics.

**This suggests** energy leaders prioritize physical systems, especially higher efficiency HVAC systems and data collection, to execute their overall energy strategies. Peak equipment performance will be even more important to meet newer stringent IAQ guidelines and local public health regulations.

> What best describes the level of importance of each of the following tactics to your overall **energy and sustainability strategy?**

| | |
|---|---|
| **Higher-efficiency HVAC equipment** | **87%** |
| **Lighting upgrades** | **79%** |
| **Analytics/actionable data** | **77%** |
| **Upgraded building automation systems** | **77%** |
| **Access to building and asset-level data** | **75%** |
| **Visibility for the business and occupants** | **52%** |

*Table 13 - Percent of respondent rating tactic as extremely or somewhat important.*

*Base: 242 respondents, Source: SED Research, 2021*

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# Occupancy levels and associated resource usage are unpredictable

**We wanted to know** your average occupancy levels for January and July 2020 and your projections for these same two months in 2021. It's worth noting we asked this question before news of the COVID-19 vaccine, which presumably could have influenced responses.

**You told us** you projected a 44-point decrease in January 2021 over January 2020 and a 25-point increase in July 2021 over July 2020 for occupancy rates at 75% or above.

**This suggests** the status of the pandemic, local regulations, and general public health are bound to impact how many people return to worksites and when. Equally worth asking: Who will go back to a company location, and who will continue working from home? What will the 2021 workforce look like across industries and around the country? Leaders are grappling with these answers to determine which buildings they'll use as intended, if they can repurpose any properties, or when it's time to sell. The answers to these questions affect you. Energy and facility managers will have to rapidly adjust usage, system-wide settings, and tracking mechanisms. You might have to set new energy and sustainability goals. Yes, we expect more people will be working on-site by summer 2021, but we're watching with you to learn who, where, and for what purpose.

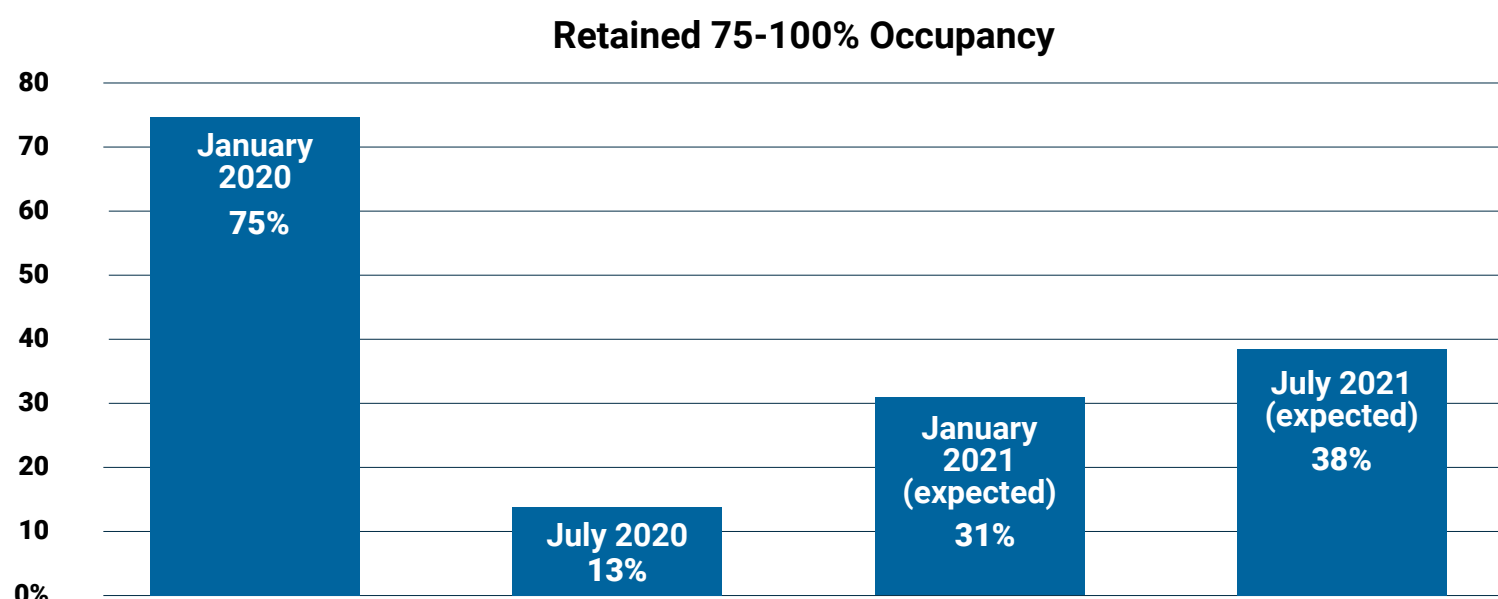> What is the **average level of occupancy** for your building(s) during each of the following times?

**Retained 75-100% Occupancy**

| Time | Occupancy |
|------|-----------|
| January 2020 | 75% |
| July 2020 | 13% |
| January 2021 (expected) | 31% |
| July 2021 (expected) | 38% |

*Table 14 - Base: 242 total respondents, Source: SED Research, 2021*

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# Rising occupancy levels will increase the need for remote HVAC controls and energy management

**We wanted to know** to what degree you think projected occupancy levels will affect your need for six different building management tools.

**You told us** that while most of you expect a decrease or no change in your needs for the items in Table 15, a significant number of respondents anticipate changing occupancy levels will increase requirements for these controls and energy management tools. If demand increases, you expect it will be for better control over HVAC equipment (43%) and the ability to monitor energy remotely (40%).

**This suggests** the need for better HVAC controls is indicative of the need for better indoor air quality and the ability to monitor in real-time indoor filtration based on occupancy levels. The ability to remotely manage programs implies that some teams will likely adapt hybrid roles or limit on-site employees to essential workers.

> Based on your anticipated level of occupancy in July 2021, how will **COVID-19 impact** your need for each of the following:
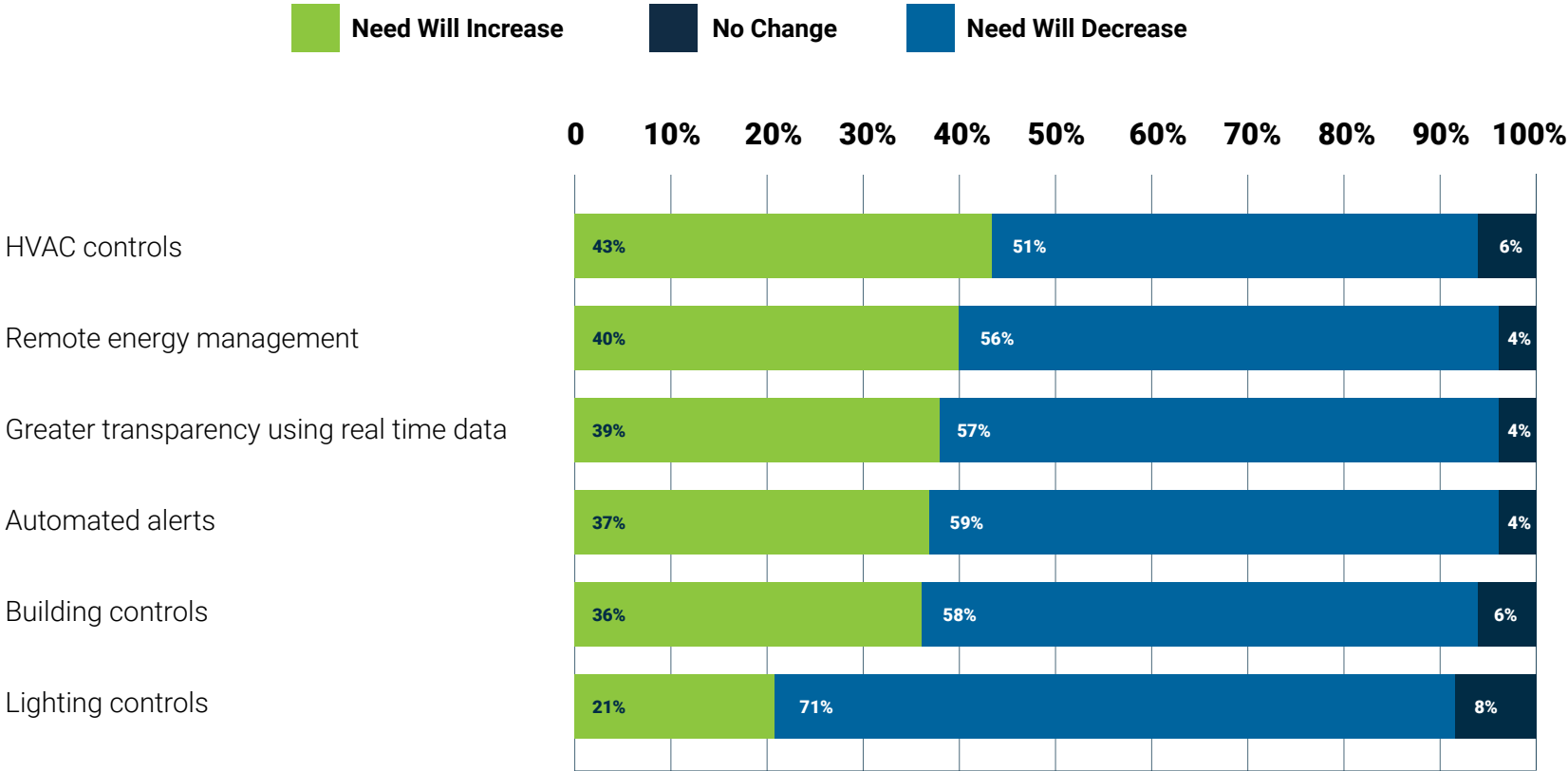
**Need Will Increase** ◼ **No Change** ◼ **Need Will Decrease**

| | 0 | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|---|---|---|---|---|---|---|---|---|---|---|---|

HVAC controls: 43% | 51% | 6%

Remote energy management: 40% | 56% | 4%

Greater transparency using real time data: 39% | 57% | 4%

Automated alerts: 37% | 59% | 4%

Building controls: 36% | 58% | 6%

Lighting controls: 21% | 71% | 8%

*Table 15 - Base: 242 total respondents, Source: SED Research, 2021*

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# There's no one preferred Measurement & Verification (M&V) method, but it is still critical to success

**We wanted to know** if energy managers have tools and staffing profiles for performing M&V.

**You told us** preferences are almost evenly divided between using an external partner or consultant (30%), conducting manual assessments internally (29%), and using an automated in-house resource such as an EMIS (25%). You also indicated that 16% of you do not perform M&V for existing projects.

**This suggests** most energy leaders recognize M&V is critical, particularly to secure funding for equipment upgrades or operating tools such as an EMIS. We anticipate organizational leadership will require deeper insights and more exact ROI moving through 2021. In other words, if you're not doing M&V now, you will be; if you already conduct regular M&V, make it richer and more useful.

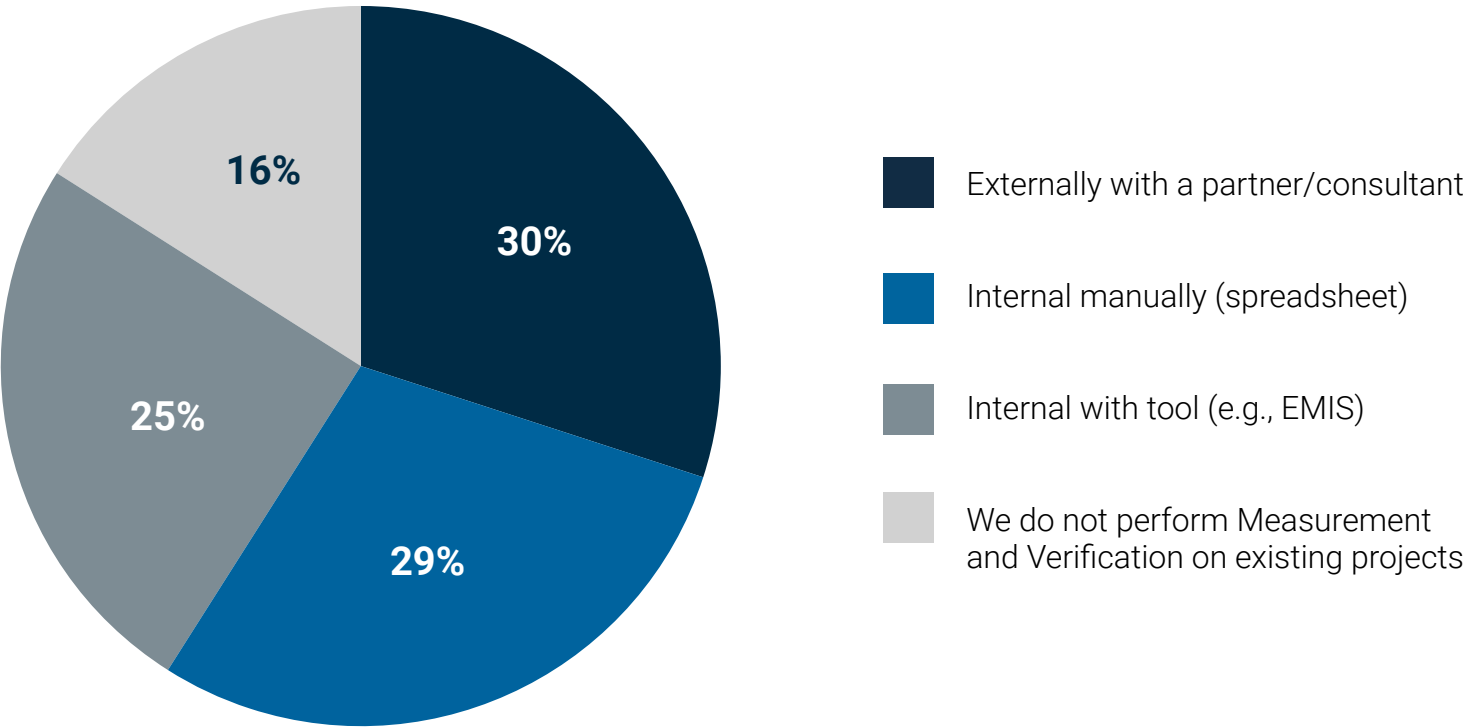How do you perform **Measurement and Verification** on existing projects?



- Externally with a partner/consultant — 30%
- Internal manually (spreadsheet) — 29%
- Internal with tool (e.g., EMIS) — 25%
- We do not perform Measurement and Verification on existing projects — 16%

*Table 16 - Base: 242 total respondents, Source: SED Research, 2021*

# 5 Emerging Trends

Energy and facility leaders have always valued optimization, a position they seem to be carrying forward into 2021. We recommend energy leaders, facility managers, and stakeholders understand these five bottom lines and the extent to which each might affect their organizational energy programs and sustainability goals.

**1** ## Resource reduction remains a driving force.

Among 242 participants, 91% said reducing energy, water, and waste consumption remains a top priority. Their desire to reach sustainability goals, create meaningful change, and demonstrate cost savings likely influenced this almost unanimous response.

**2** ## Getting the right tools to manage building performance and occupant health is crucial.

The top three requirements for managing building performance and protecting occupant health are higher efficiency HVAC (87%), better lighting (79%), and improved access to analytics derived from actionable data (77%). We also saw increasing needs for remote energy management tools and HVAC controls to monitor building performance at varying occupancy levels. Interestingly, over half of respondents want to upgrade existing building automation or IoT infrastructure. These numbers demonstrate that energy and facility managers know what's required to safeguard building health and workers' health.

**3** ## COVID-19 significantly disrupted occupancy and building usage.

Yes, this seems obvious since we all know the pandemic changed, well, everything. But it's the net effects of this disruption that matter. Occupancy levels will fluctuate, despite the COVID-19 vaccine, as administrators address work-from-home policies and the nature of their on-site workforces.

**4** ## Manual tasks are still slowing down energy management journeys.

The 13-point increase in the number of organizations identifying as advanced in their energy management journey is encouraging but still suggests room for improvement. Automating manual tasks, wherever possible, would help teams meet organizational resource reduction goals faster with a stronger impact on the bottom line.

**5** ## Implementing an EMIS requires time and money many teams lack.

Your industry colleagues told us their two most significant barriers to successfully implementing an EMIS solution are lack of time to review findings (19%) and the costs of upgrading or adding new meters (17%). They also noted how limited internal support for an EMIS complicates funding (18%). And this brings us full circle to the importance of cost savings generated by resource reduction.

Thank you for the time you gave us reading this report. We hope the data and discussions make your job easier. And as you apply these insights to advancing your organization's energy journey, we remain committed to supporting your energy goals at each stage of the journey.

# Contributors

**buildingOS**

BuildingOS is a leading enterprise building energy management solution that provides the most accurate, complete picture of building performance. Our actionable data, analytics platform, and expert team help building, energy, and sustainability professionals achieve more ambitious energy goals, reduce costs, and maximize building performance. The SaaS-based BuildingOS platform is deployed in more than 350 organizations, 10,000 buildings and 1 billion square feet of commercial buildings.

For more information, contact us at communuations@buildingos.com or visit us at buildingos.com
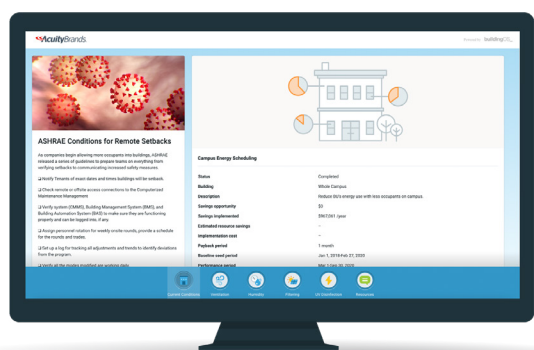


Access our BuildingOS storyboard on ASHRAE guidelines designed to optimize building performance and health.

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Harness the
power of data to
improve building
operations.