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AABC Commissioning Group  
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# Using Big Data Analysis as part of the Commissioning Process

Course Number: CXENERGY1502

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# Course Description

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As the marketplace continues to realize the value of commissioning a building to achieve performance enhancements, the role of technology within a commissioning strategy continues to evolve. The strategic benefit of analyzing large volumes of historical data to identify poor performance and implement improvement measures based on this data is clear, but the implementation of the strategy can take on many forms. This presentation will discuss research revealing three common myths associated with analytics for enterprise level energy management. Prior to adopting a big data solution to integrate into a commissioning strategy the myths have to be debunked: the solution has to fit with long-term goals, have the people and processes behind it, and output actionable information. Learn the details and scope of the research conducted as well as best practices when implementing a solution.

# Learning Objectives

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At the end of the this course, participants will be able to:

1. Understand the facts and myths around Big Data in buildings.
2. Learn how the analysis of large volumes of historical data can be used to improve building performance.
3. Learn common misunderstandings associated with data analytics for energy management and how to avoid them in order to implement solutions.

# The evolution of energy and operational management



## Pneumatic Controls

- No ability to gather system information
- Limited decision making intelligence



## Direct Digital Controls (DDC)

- Intelligent control with programming, scheduling and trending
- Graphical user interface, reporting
- Energy management applications



## Integration

- Single information and control platform
- Connection of multiple systems and equipment
- Reduces energy costs via equipment control
- Protects against costly equipment failures
- Enhances event / alarm detection and responses



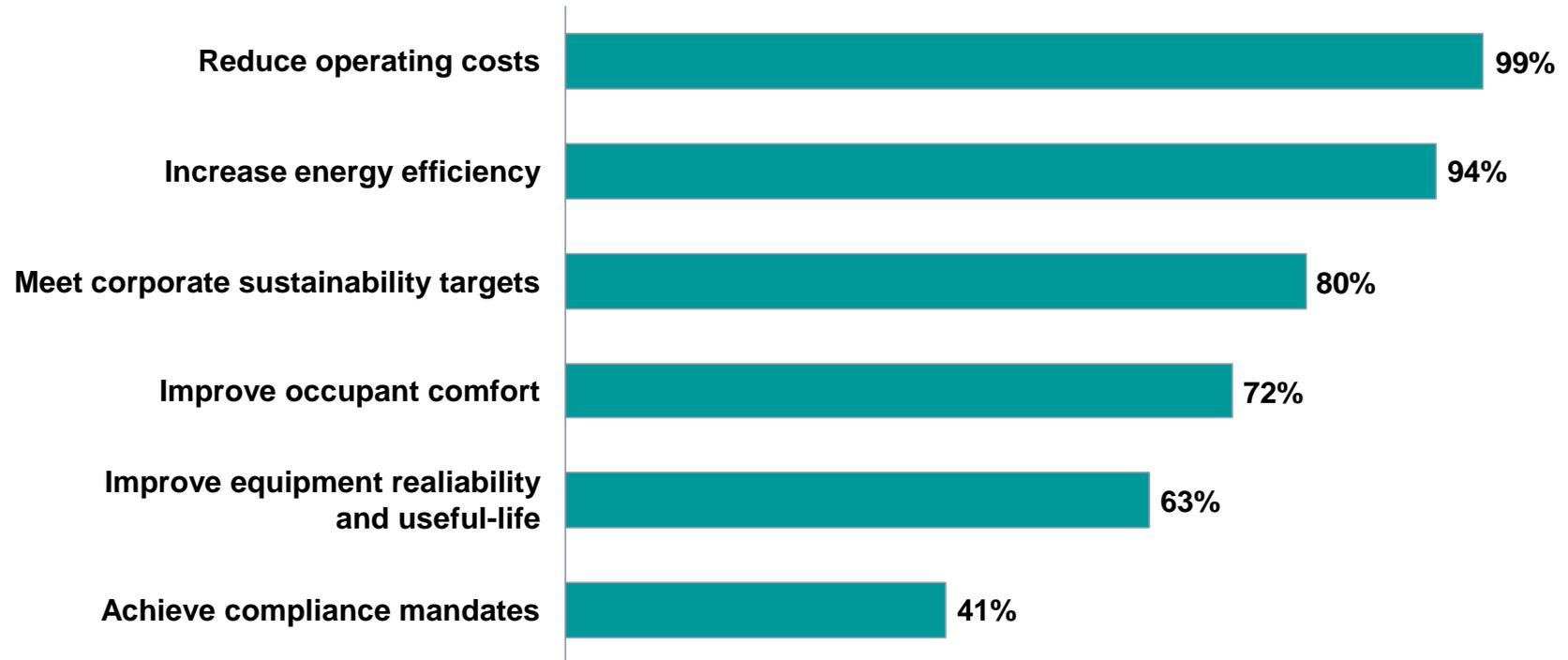
## Data Analytics

- Data, people & processes
- Partnership and trust with the customer
- Technology enables the productivity of customers
- Data analytics and optimization strategies
- Remote monitoring and maintenance of systems
- Proactive service
- Energy Management
- Sustainability



# Data can enhance the ability to achieve top goals

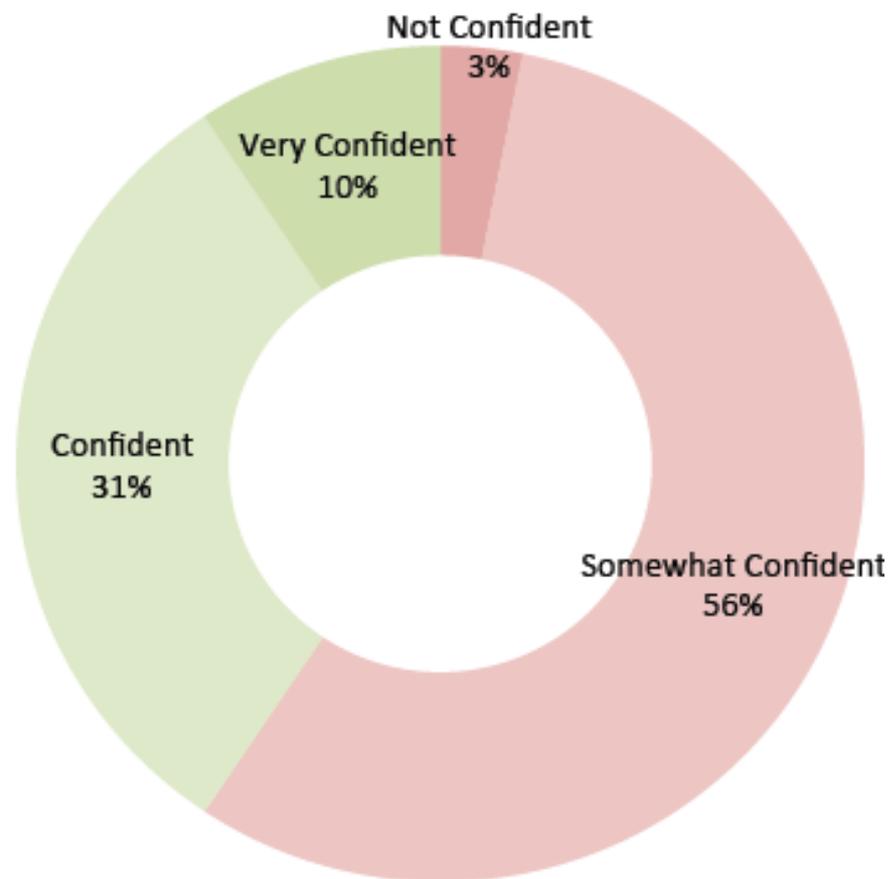
What goals does your organization hope to meet through the management of your enterprise real estate portfolio?



- Close to 100% of respondents seek to reduce operating costs and increase energy efficiency
- But only 44% have a dashboard to visualize building / portfolio data across their enterprise

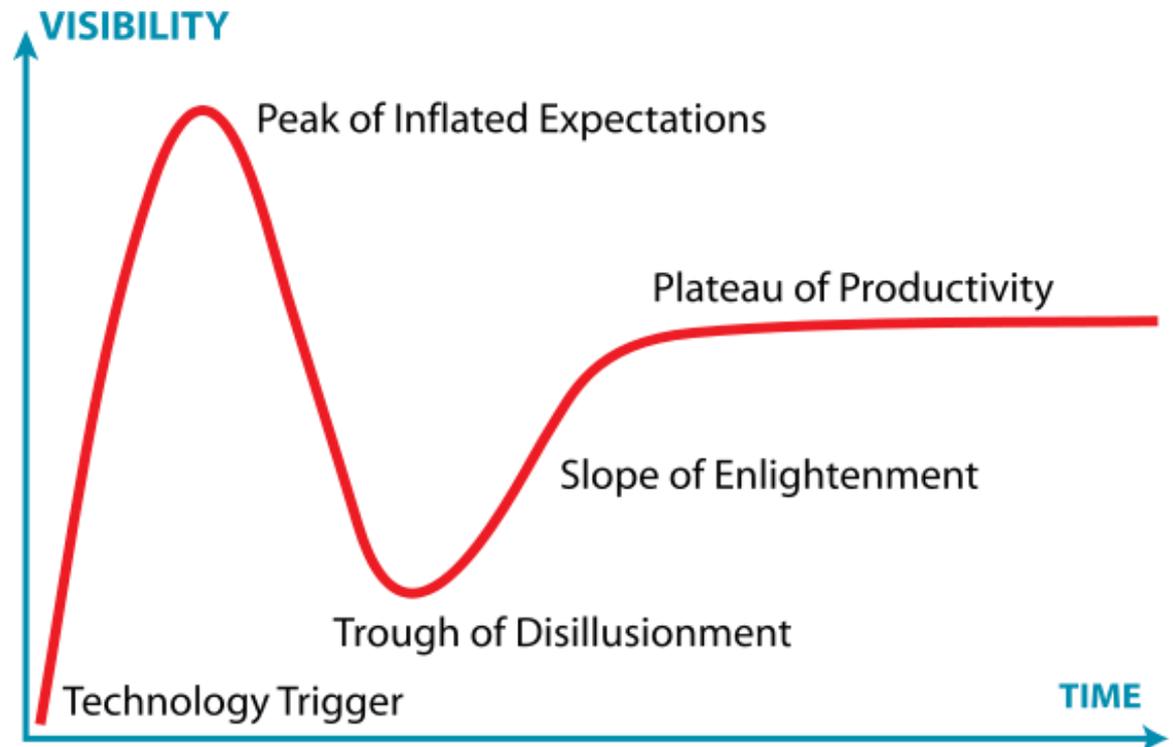
## Key to Success: Continuously Gathering Quality Data

60 % of those using software for data analysis and visualization are not confident or are only somewhat confident that their solutions will help them realize their portfolio goals.



## Key to Success: Continuously Gathering Quality Data

“We’re in the trough of disillusionment in the typical IT curve. There was a lot of promise and most of it was marketing. Some of our properties invested in companies that claimed they could solve our problems and many of those investments have not generated the returns we expected.”  
– Survey Respondent



# Three Myths about Big Data for Energy Management

## **Myth 1: One size fits all**

When it comes to choosing big-data analytics software to manage energy and sustainability for an enterprise real estate portfolio, not all solutions are created equal, or have equal application.

## **Myth 2: It's all about technology**

While many of the components and software packages that support big-data analytics and data visualization can be deployed today, the missing ingredient for many companies is the people necessary to do the work

## **Myth 3 Data equals information**

In our research, utility bill and meter data is the most collected data (96% and 85% respectively), followed by building automation system data (54%) and waste management data (52%). But there is a lack of confidence in much of the data collected.

## Myth 1: One size fits all

### Various strategies are available to meet energy efficiency goals



**Energy Demand Analysis**



**Energy Supply Optimization**



**Sustainability Analysis**



**Predictive Analytics**

### But building needs vary highly

- Commercial Office Buildings – Predictable occupancy
- Hospitality – Diverse infrastructure with variable needs
- Industrial – Complex Infrastructure with dynamic requirements
- Higher Ed – Campus with both aging and new infrastructure

## Myth 1: One size fits all

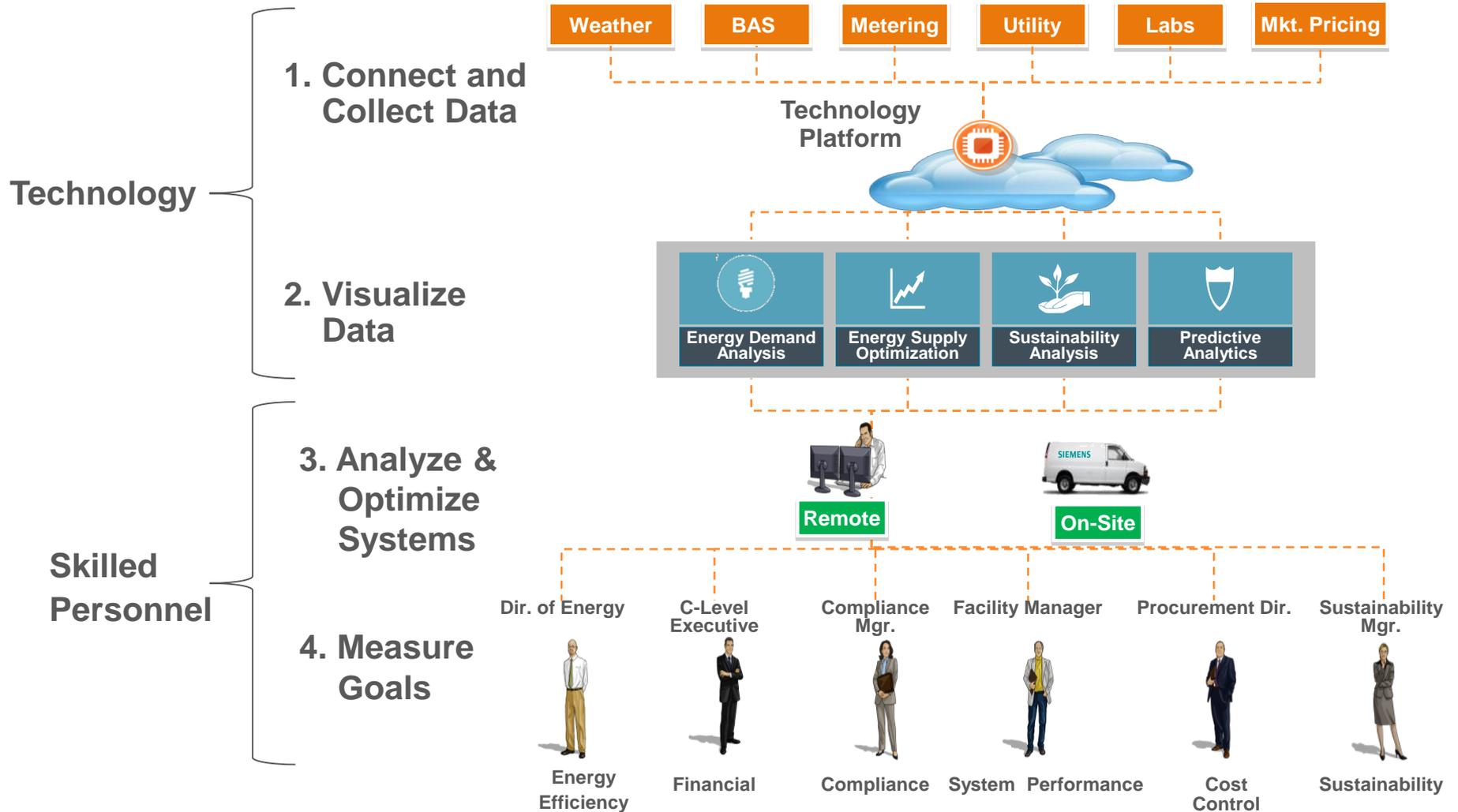
Executives estimate 50 – 150 companies have some type of product offering with varying capabilities



*“We have such a diverse infrastructure with theaters and changes in occupancy in our buildings and the towers and the ballrooms. So we have to take a very sophisticated approach.”*

**- Chris Magee, Executive Director of Sustainable Facilities for MGM Resorts**

# Myth #2: It's all about Technology



## Myth #2: It's all about Technology

What is preventing you from purchasing an energy management dashboard or other data/analytics solution?



**“Ultimately the data is the data, but you need that human interaction, the people to maximize the value of that data, whether it’s somebody telling the system what to do under certain scenarios or somebody that’s directly acting because of the data they’re getting.”**

**What should be considered when assessing resources?**

- Literacy, willingness and skill set to transition to digital technologies
- Operational structure in place to continue leverage data
- Current staff’s capacity to prioritize data analysis
- Training required to adopt and integrate technology into existing workflow

## Myth #3: Data equals information

$$\begin{array}{ccc} 5 & \times & 500 & \times & 15 \\ \text{Buildings} & & \text{Points / Building} & & \text{Min Interval data} \end{array}$$

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$$= 87 \text{ Million}$$

Data points / year

To effectively manage large volumes of data consider:

### People

- Current staff capability to analyze data
- In-house capacity to take optimization actions

### Process

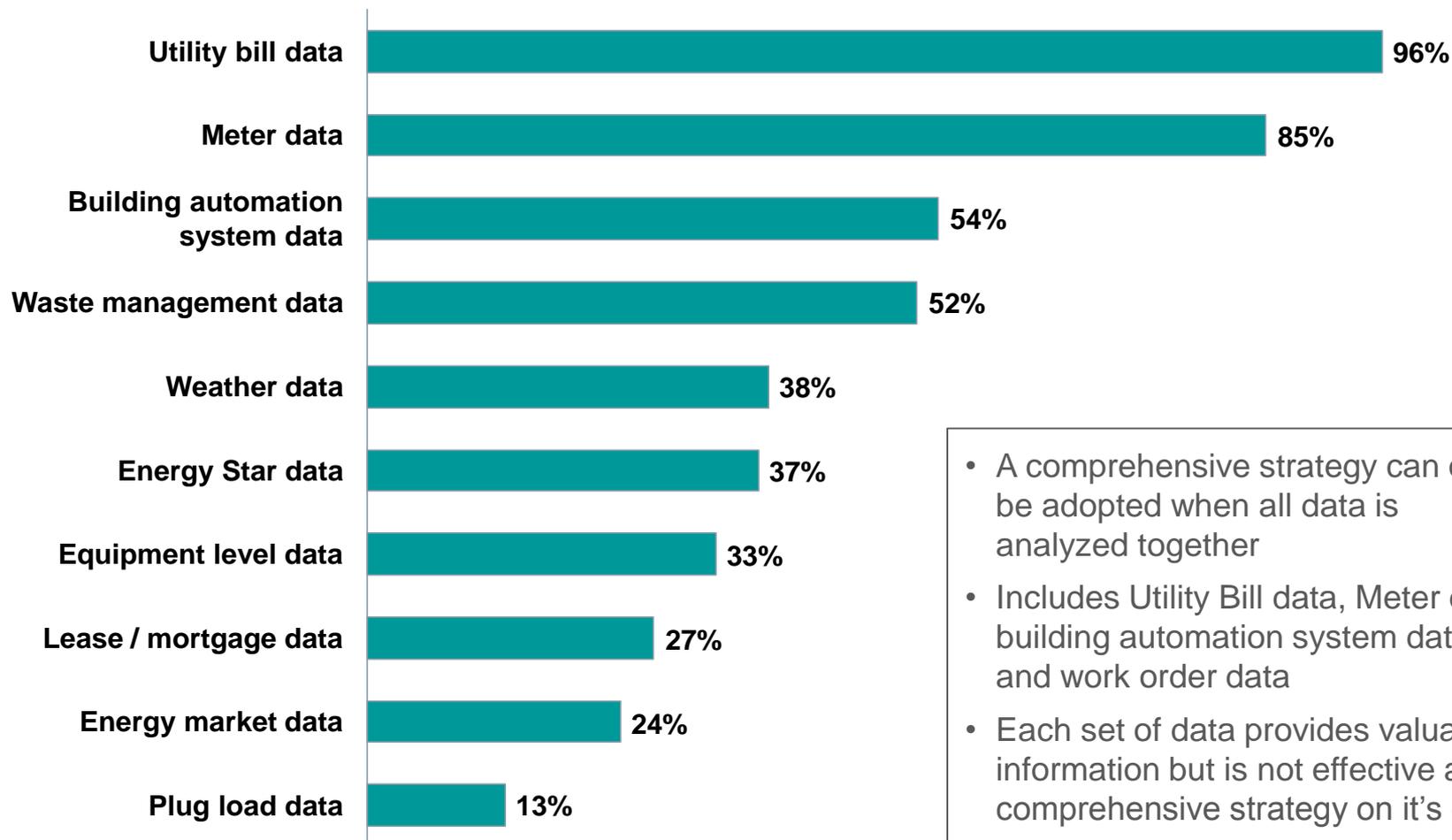
- Data Quality assurance and measures
- Measurement and tracking of projects

### Technology

- Ensure systems and infrastructure remain secure
- Visualization of data in a manner aligned with internal goals

## Myth #3: Data equals information

What type of building / portfolio data do you collect?



- A comprehensive strategy can only be adopted when all data is analyzed together
- Includes Utility Bill data, Meter data, building automation system data and work order data
- Each set of data provides valuable information but is not effective as a comprehensive strategy on it's own

## The Future of Analytics Holds Great Promise

- Correlate building performance to financial performance
- Remove the Energy / Facility Manager as the intermediary
- Use Analytics to pinpoint inefficiencies such as programming that turns on exhaust fans during off hours
- Use data to make investment decisions



## Challenges lie ahead before the full benefit is realized

In a survey, current users of Energy Management Systems were asked to identify functionalities they desire & are not getting from current efforts



- Fault Detection & Diagnostics was among the top identified gap in functionality
- Respondents also identified lack of integration with current systems (work order mgmt and Asset management)

# What happens when you only focus on software?

## Medical Research Facility

### Background:

- Cutting edge of managing infrastructure
- Sought automated identification of faults
- Highly skilled staff supplemented by a service provider

### Challenges:

- Technology was in place, but infrastructure was not fully assessed
- Panel lacked necessary memory which shut down AHU in a data center
- Building stability was put at risk due to inability to identify hardware needs

## Large Higher Ed Campus

### Background:

- Highly skilled staff seeking technology to enhance processes
- Sought operational efficiencies through automated analysis
- Prioritized having energy and system level analysis in a single platform

### Challenges:

- Selected an unproven solution that held significant promise
- Setup of the system was more complex and time consuming than anticipated
- Output was not information technicians could take action on

# Recommended approach to implementing FDD

**1 Plan** around value priorities & KPIs  
Determine building & equipment focus



**2 Evaluate** supporting infrastructure & FDD analytics readiness



**3 Implement readiness** measures and enhancements



**4 Implement FDD**, connect & set up platform



**5 Service** by identifying, prioritizing, diagnosing and correcting issues



**6 Measure & communicate results**  
using dashboards & reports



## Five Actions to take Today

1. **Learn from Your Peers** – Determine what others have implemented and how they went about procuring systems
2. **Align Incentives with Actions** – Create consistent reporting using KPIs used to measure and incentivize performance
3. **Reserve money to address issues** – Procurement of a system will be an expense until optimization occurs
4. **Consider Enterprise-Wide budgeting** – Addressing this at the enterprise level can not only help prioritize but also can be more cost-effective
5. **Don't Boil the Ocean** – When assessing a provider focus on a current need and expand

This concludes The American Institute of Architects  
Continuing Education Systems Course

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