



Statement of Qualifications | Arkansas Department of Environmental Quality

## Statement of Qualifications

Arkansas Department of Environmental  
Quality Energy Performance  
Contracting Program

**Presented to:**

Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, AR 72118

**Presented by:**

ABM Building Solutions, LLC  
1005 Windward Ridge Parkway  
Alpharetta, GA 30005

October 3, 2022

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**ABM BUILDING SOLUTIONS, LLC**

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Alpharetta, GA 30005

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James.Byrd@abm.com

October 3, 2022

Chet Howland, Manager of Strategic Energy Initiatives  
Arkansas Department of Environmental Quality – Arkansas Energy Office  
5301 Northshore Drive  
North Little Rock, AR 72118-5317

RE: Statement of Qualifications - Energy Performance Contracting Program

Dear Chet,

The Arkansas Department of Environmental Quality (ADEQ) has exhibited great foresight in your decision to seek prequalified Energy Service Companies (ESCOs) to perform energy performance contracting services that will cut costs, reduce your carbon footprint, and remain good stewards to your local taxpayers.

Our financial solution provides the necessary funding to correct your facility deficiencies and help the State of Arkansas implement a more sustainable long-term strategy while also providing potential general fund relief for your facility needs. Our approach is unique and focuses on building value for you.

These elements set us apart from other energy services companies (ESCOs):

- **Self-Performance** – Utilizing our team members from multiple business divisions, we minimize overhead and mark-up 'stacking' that occurs with multiple subcontractors. As a result, ABM dedicates more funds to infrastructure improvements.
- **Product Neutrality** – We do not manufacture or represent products, so every solution is based on the individual need and the best technical solution available from the industry.
- **Procurement Leverage** – As one of the world's largest mechanical and facility services providers, we negotiate national purchasing agreements with all major manufacturers of energy related equipment. These agreements assure as many dollars as possible reach the improvement needs.
- **Ongoing Support** – We are a service contractor, so we are uniquely qualified in the existing buildings market to provide energy retrofits and comprehensive service agreements to maximize equipment life expectancy and energy efficiency.
- **NAESCO Accredited ESCO** – Accredited since 2012, we possess the technical and managerial competence to develop comprehensive energy efficiency projects, provide a full range of energy services, and apply a regular business practice of developing performance-based projects.
- **DOE and Prequalified ESCO** – We are proud to remain on the list of qualified ESCOs for the United States Department of Energy.

Thank you for your time and consideration. We look forward to presenting these solutions personally. Should you have any questions please do not hesitate to contact me.

Sincerely,

A handwritten signature in blue ink that reads 'Earl Byrd'.

**Earl Byrd**  
Sales Manager

ABM Building Solutions, LLC



# Table of Contents

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# Table of Contents

Cover Letter .....	2
Table of Contents .....	3
1. Executive Summary .....	4
2. Company Overview .....	8
2a. History and Focus of Company .....	8
2b. Industry Accreditations and Memberships .....	10
3. Management and Staffing .....	12
3a. Project Management and Staffing .....	12
3b. Arkansas State Construction Requirements .....	42
4. Company Financial Status .....	43
4a. Financial Soundness and Profitability .....	43
4b. Bonding .....	45
5. Marketing Approach .....	46
6. Reporting Approach .....	48
7. Technical Approach .....	49
7a. Investment Grade Audit .....	49
7b. Standards of Comfort and Construction Specifications .....	55
7c. Baseline Calculation Methodology .....	56
7d. Adjustments to Baseline .....	57
8. Company Scope of Services .....	58
8a. Energy Systems in Buildings: .....	58
8b. Project Development and Implementation .....	61
8c. Support Services: .....	94
9. Project History .....	118
10. Project References .....	123
11. Cost and Pricing .....	138
11a. Investment Grade Audit (IGA) Costs .....	138
11b. Fuel Escalation. ....	139
11c. Equipment/Labor Cost Competition .....	139
11d. Open Book Pricing .....	140
11e. Project Cost and Pricing Elements .....	140
Appendix A – Firm’s Annual Financial Report Summary .....	141



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# 1. Executive Summary

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# 1. Executive Summary

*Submit an Executive Summary providing a brief overview of your company's proposal to be accepted as a pre-qualified ESCO in the AEPC Program:*

*1. Summarize your firm's commitment to comply with the policies, procedures and rules as outlined in the AEPC Program Rules Manual. (If changes are made to the manual, AEO will articulate those changes to all pre-qualified providers and require a receipt that they have been received.)*

## ABM's Commitment to Environmental Quality

As one of the largest facilities services providers in the world, we're committed to taking care of the people, spaces and places that are important to our employees, our customers, and their customers. This is the foundation for why ABM exists and is a natural guiding function for our commitment to sustainability.

As we strive to do our part to leave the world a better place for future generations, our sustainability platform includes:

### GreenCare: Sustainable Solutions

Corporate social responsibility is at the heart of ABM every day, whether we're streamlining efficiencies for customers, keeping a keen eye on how our operations impact our shared environment and reducing our carbon footprint, creating new jobs, or giving back to the communities in which we serve.

### Doing Business in a Responsible Way

We've built a strong reputation by continually striving to improve our customer service offerings through our ABM GreenCare® program.

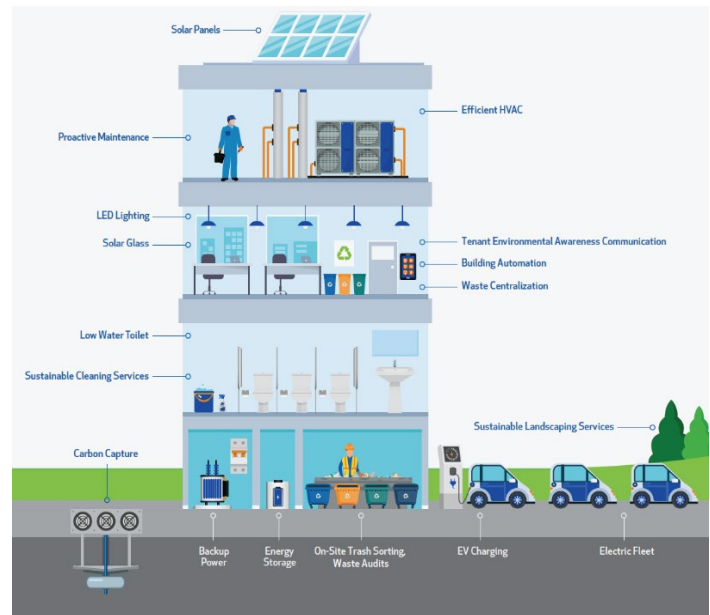
As part of the program, we actively work with our customers on a wide range of these efforts, from energy reduction to green cleaning and LEED certification.

### Ensuring our Team Members' Well Being

Our people continue to be the driving force behind everything we do. We take tremendous pride in our skilled and knowledgeable workforce. Spanning our wide array of service solutions in a diverse set of markets, we firmly believe that our rich diversity of expertise and experience is unmatched anywhere.

### Managing our Own Environmental Footprint

Our ABMCares program ensures that every management and staff employee can take a day to do community work, if they choose. We also have a charitable donation matching policy to help these employees continue to give back to the communities in which they work, play, and live.



## Sustainability Awards and Recognition

### Environmental, Social and Governance (ESG) Performance Ratings

ABM's outstanding sustainability commitment and performance has been reflected in the ratings we received from the very first year we responded to the ratings services. The company has engaged in cross-functional efforts to understand and use the ratings as one source for identifying areas of improvement that align with ABM's sustainability journey.



**BBB** | on a scale of AAA-CCC



**EcoVadis: BRONZE** | ABM moved from 45/100 to 52/100, positioning ourselves at the top 44% of the overall score distribution of all companies rated by EcoVadis in ABM's industry space.



**Carbon Disclosure Project: C** | ABM moved from D to C, outperforming the North American average.



**U.N. Global Impact** | Commitment to the United Nations Global Compact



**ISS ESG Corporate Rating: ISS ESG PRIME** | positioning the company in the top 10% of the industry.

## 2. Summarize how your firm meets the minimum qualifications, stated in Part 1, Section 5.

### Qualifications

**We understand the mission of the Arkansas Division of Environmental Quality is to protect, enhance and restore the natural environment for the well-being of all Arkansans.**

We have partnered with over 100 governmental customers across the nation, including in your neighboring states of Mississippi and Texas, greatly enhancing their infrastructure efficiency and redistributing funds to allow a more sustainable future. In providing energy saving and environmentally friendly services to these facilities, we have become familiar with local and state regulations and have proven our ability to provide services to the state of Arkansas.



## ABM is properly licensed in the State of Arkansas

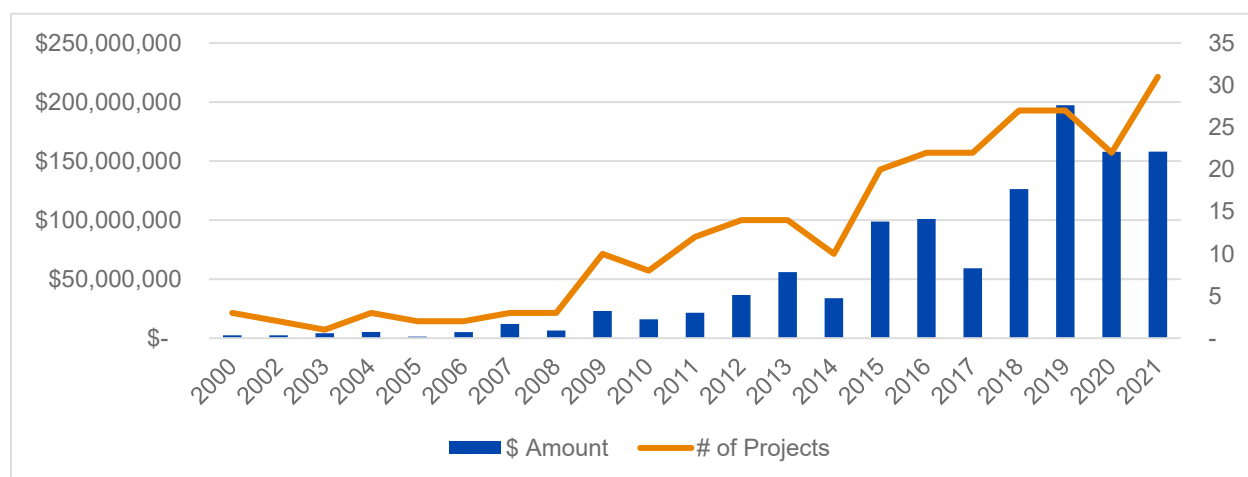
Name	Bid Limit	ID #	Type	License #	Expiration	Classification
ABM Building Solutions, LLC	Unlimited	51140	Commercial	0426310223	02.28.2023	Building – Commercial & Residential

## Certification

Upon your review, we hope to partner with and be certified by the Arkansas Energy Office as a qualified provider under this subchapter.

## Experience

We have completed **over \$1 billion** in energy savings performance contracts with significant experience in providing successful energy services to our customers, as indicated in our references. We have a tremendous track record in providing energy services for the last 40 years and are currently engaged in similar projects across the nation.



## Financial Acumen

ABM has comprehensive knowledge of federal and state laws that govern the issuance of tax-exempt debt. In addition, we have thorough knowledge of the federal and state law requirements for structuring bond debt and municipal leases, as well as federal and local grants and loans. We have created long-term relationships with banks, bond counsels, and other financial institutions that can deliver the best financial outcome for the ADEQ. We look at all financial options when building our solution.

## Our Guarantee

We provide a **100% guarantee** of energy savings as part of the energy savings performance contract, ensuring enough energy and operational savings will result over the term of the program to pay for all associated costs.

Our monitoring department works diligently to ensure that all customers understand the results of the measurement and verification activities. We accomplish this through periodic reporting, annual site visits, and council presentations. **If the energy savings fall short of the guaranteed amount, ABM will make up the shortfall.**

*3. Summarize how your firm's expertise and approach will enhance the effectiveness and reputation of the AEPC Program.*

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**We understand how important it is for the Arkansas Department of Environmental Quality (ADEQ) to select energy services companies (ESCOs) partners that will provide comprehensive, state-wide energy and environmental management programs for all types of facilities across the ADEQ's jurisdiction.**

ABM Technical Solutions (ATS), a division of ABM Industries Incorporated, provides custom energy maintenance and repair services for customers in public and private sectors. Our technical solutions groups are divided into HVAC and Mechanical; Electrical and Lighting; Electrical Power and Mission Critical; and Bundled Energy Solutions.

Our Comprehensive Facility Services Program is performance-based and custom-designed to fit the building owner's long-term (life cycle) cost of operation. This life cycle cost evaluation includes initial installation, functional requirements and needs, maintenance, and energy costs to operate your facility.

**We are Highly Experienced in Energy Efficiency**

Our guaranteed energy savings projects have been helping our customers improve their facility infrastructure while saving energy for over 40 years. We have performed over \$1 billion dollars' worth of energy retrofit projects, completing over 250 projects in the last ten years. Our projects vary from K-12 school districts, public and private colleges and universities; to local, state, and Federal government agencies. Mid-sized programs (\$1-\$10 Million) comprise our core market. All of the projects have resulted in 100% of the customers being 100% satisfied. That is why we are one of the few, if not the only, major Energy Service Company (ESCO) that has not been in litigation as a result of a guaranteed energy service contracts, nor have we been in default on any guaranteed or traditional retrofit project.

Our Bundled Energy Services offering is a high-efficiency conservation, facility modernization, and technical service program that addresses the facility upgrades and funding needs of cities, counties, K-12 schools, and government buildings. This program assists our customer by providing a cost-effective way to make necessary energy and infrastructure improvements.

**Size and Types of Projects Considered**

We are a competitive company with local and national locations and are capable of performing projects of any size, from small HVAC or lighting repairs to multi-million-dollar government energy savings performance contract (ESPC) projects. We understand that the Preliminary Assessment (PA) and Investment Grade Audit (IGA) processes will dictate much of the project work ultimately completed, and we are prepared to complete any and all work under our extensive list of national licenses while supplying solutions such as photovoltaic/solar as appropriate.

*4. State your permission for AEO to share your SOQ publicly (online, electronically, print) and acknowledge that your SOQ may be used by public entities to help select which ESCOs to interview for EPC projects.*

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ABM grants the Arkansas Department of Environmental Quality to share our SOQ publicly (online, electronically, and/or in print) and acknowledge that our SOQ may be used by public entities to help select which ESCOs to interview for energy savings performance projects.



## 2. Company Overview

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## 2. Company Overview

### 2A. HISTORY AND FOCUS OF COMPANY

*Describe the history and focus of the company, including: a) Structure and evolution of the firm;*

#### Structure and Evolution of ABM Industries Incorporated

ABM Industries (NYSE: ABM) provides comprehensive, custom facility solutions in urban, suburban, and rural areas to properties of all sizes through stand-alone or integrated solutions. With revenues of \$6.2 billion, we have become a leading provider of facility solutions since being founded in San Francisco, CA in 1909. Now headquartered in New York City, ABM operates through our subsidiaries, confident in the expertise of over 110,000 team members in 210+ offices across the United States and various international locations.

##### ABM at a Glance

- Founded in 1909
- 20,000 customers
- 210+ U.S. & international locations
- \$6.2 billion in revenue
- 110,000+ team members

##### Corporate Office

One Liberty Plaza, 7th Floor  
New York, NY 10001  
[www.abm.com](http://www.abm.com)

##### Purpose

To take care of the people, spaces, and places that are important to you.

##### Vision

To be the clear choice in the industries we serve through engaged people

##### Mission

To make a difference, every person, every day.



##### Electrical

We've installed **28,000+** EV charging ports across North America.



##### Energy

We've reduced our customer's average energy use by approximately **30%**.



##### Janitorial

Each day, we clean **4+ billion** sq. ft. of buildings.



##### Landscape & Turf

We maintain **55,000+** acres of landscaping and golf courses.



##### Mission Critical

We service and maintain **35+ million** sq. ft. of data center space.



##### HVAC & Mechanical

We service and maintain **70,000+** heating and cooling systems annually.



##### Facilities Engineering

**10,000+** certified engineers keep buildings running.



##### Parking & Transportation

We collect **\$1.5+ billion** in parking revenue for our customers.



ABM is a leading provider of integrated facility solutions. Thousands of commercial, industrial, government and retail customers outsource their non-core functions to ABM for consistent, quality service that meets their specialized facility needs. ABM's comprehensive capabilities include expansive facility services, energy solutions, commercial cleaning, maintenance and repair, HVAC, electrical, landscaping, and parking provided through stand-alone or integrated solutions. ABM delivers custom facility solutions to meet the unique customer requirements of multiple industries – ranging from healthcare, government, and education to high-tech, aviation, and manufacturing. ABM leverages its breadth of services, deep industry expertise, and technology-enabled workforce to preserve and build value for customers' physical assets. ABM Industries Incorporated, which operates through its subsidiaries, was founded in 1909.

ABM Technical Solutions (ATS), a division of ABM Industries Incorporated, provides custom energy maintenance and repair services for customers in public and private sectors. Our technical solutions groups are divided into HVAC and Mechanical; Electrical and Lighting; Electrical Power and Mission Critical; and Bundled Energy Solutions.

For 33 years we operated under the name of Linc Mechanical, LLC, which was previously owned by The Linc Group. ABM Industries acquired The Linc Group in December 2010, and now owns Linc Mechanical, LLC. As a result of the change in ownership that occurred in 2010, in February 2011 our name changed from Linc Mechanical to ABM Building Solutions, LLC.



**b) Number of years in energy-efficiency related business;**

ABM has been providing energy-efficiency related services since 1979 (43 years).

**c) Number of public energy-efficiency projects completed by your firm or key members of your firm over the past five years: number under \$1 million in project cost; number over \$1 million in project cost.**

In the last five years we have completed nearly \$780 million in guaranteed energy savings performance contracts (145 projects). 32 of these projects fell under the \$1 million mark. The rest of these projects (113 of them) were all over \$1 million. 20 of these projects were over \$10 million, the largest being just under \$44 million.

## 2B. INDUSTRY ACCREDITATIONS AND MEMBERSHIPS

*Provide information on any accreditations and/or memberships in any industry organizations (e.g. Arkansas Advanced Energy Association (AAEA), Energy Services Coalition (ESC), National Association of Energy Service Companies (NAESCO)).*

### Associations and Certifications

Your dedicated ABM team actively participates in the following associations and certifications:

- American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)
- ASHRAE Technical Committee 6.7 Solar Energy Utilization
- Member and Program Chair ASHRAE Technical Committee 2.8 Building Environmental Impacts and Sustainability
- United States Green Building Council (USGBC)
- Association of Energy Engineers (AEE)
- National Society of Professional Engineers (NSPE)
- National Association of Energy Service Companies (NAESCO)
- Department of Energy Super ESPC List (DOE)
- American Solar Energy Society (ASES)
- International Solar Energy Society (ISES)
- American Society of Mechanical Engineers (ASME)
- American Society of Civil Engineers (ASCE)
- Project Management Institute (PMI)
- Zero Net Energy Alliance (ZNE)
- ISNetworld Certification (ISN)
- National Fire Protection Association (NFPA) 70E and 70B Training and Certification
- Infrared Thermography Levels I&II Training and Certification (IRI and IRII)
- National Institute for Certification in Engineering Technologies (NICET)



ABM is an InterNational Electrical Testing Association (NETA) accredited company averaging \$80 million in annual revenues in the Electrical Power Division. ABM Electrical Power Solutions was a founding member of the International Electrical Testing Association (NETA). NETA was established in 1972 to ensure the integrity of third-party electrical testing and certification. NETA is the standards developing organization for the American National Standards Institute (ANSI) and publishes Acceptance and Maintenance Testing Specifications. NETA certifies member companies and their technicians, and it is the highest accreditation possible in the industry.



## ABM NAESCO Accreditation

Accredited since 2012, according to the National Association of Energy Service Companies (NAESCO), ABM possesses the technical and managerial competence to provide the following:

- Develop comprehensive energy efficiency projects, defined to include lighting measures; efficient motors and drives; and measures involving heating, ventilation, and air conditioning systems.
- Full range of energy services, defined to include conducting energy audits, providing or arranging for project financing, design engineering, providing operations and maintenance services, and verifying energy savings according to accepted industry practice.
- Regular business practice of developing performance-based projects, meaning projects for which the developer's compensation is contingent upon the projects realizing verified cost savings.



## NETA Certified High-Voltage Contractor

ABM has acted as the Engineering, Procurement and Construction (EPC) contractor on 7 ground-mount solar projects totaling more than \$14 million of construction over the last 3 years. Our scope of work includes design, construction, commissioning, operations, maintenance and repairs.

In addition to our work as a solar EPC, ABM also performs an extensive amount of power generation work with our NETA certified high-voltage technician staff. Our electrical team has completed commissioning on hundreds of power generation projects over the last 40 years. In total our electrical technicians have worked on a total of 250 MW of power generation projects. We currently manage and maintain over 11+ million square feet of critical electric distribution systems.

### 3. Management and Staffing

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### 3. Management and Staffing

#### 3A. PROJECT MANAGEMENT AND STAFFING

a) *Organizational Structure. Show a typical/generic organization chart for implementing and managing a project.*

Organizational Chart



*b) Project Responsibility. In a single table, list your personnel pool of individuals who will potentially be assigned responsibility for each task and phase of a project under the AEPC Program. Also include any added expertise and capability of staff available through other branch offices, subcontracts, etc., that can provide back-up strengths to your firm. Include the office location for each individual, branch office or subcontractor.*

### Project Responsibilities Matrix

Title	Name	Location	Role	%*	Industry Experience
<b>Sales Manager</b>	Earl Byrd	Jackson, MS	Partnering with customers to identify, qualify, develop, and implement bundled financial and energy solutions.	100%	20 years
<b>Account Executive</b>	Phil Parrish	Columbus, MS	Partnering with customers to identify, qualify, develop, and implement bundled financial and energy solutions.	100%	15 years
<b>Account Executive</b>	Don McPherson	Cullman, AL	Partnering with customers to identify, qualify, develop, and implement bundled financial and energy solutions.	100%	6 years
<b>Public Finance Project Developer</b>	Brad Gregory	Alpharetta, GA	Works to maximize all available financial resources for the customers with the goal of providing financial flexibility and sustainability of future needs.	100%	6 years
<b>Project Manager</b>	Brian Ciepierski	Alpharetta, GA	Responsible for planning, scheduling, and effective coordination of all parallel activities related to the management of multiple projects.	100%	30 years
<b>Project Supervisor</b>	Tim Lester	Alpharetta, GA	Overall project management, including safety training for field team members, contract development, review and sign-off.	100%	23 years
<b>Darryl "Tracy" Bice</b>	Sr. Project Developer	Pensacola, FL	Overall project development from inception through execution including technical solutions/project development.	100%	30 years
<b>Senior Energy Engineer</b>	Joey Groveman	Alpharetta, GA	Performs engineering design and energy savings calculations and leads project development, and energy analysis.	100%	12 years
<b>Senior Quality Assurance Manager</b>	Matt Whitenack	Alpharetta, GA	Responsible for Quality Assurance (QA) and energy savings verification.	100%	20 years

Title	Name	Area of Focus	%*	Industry Experience
<b>M&amp;V Engineer</b>	Brian Walker	Alpharetta, GA	100%	11 years
<b>Director, Technical Solutions</b>	Louis Verrone	Alpharetta, GA	100%	26 years
<b>Senior M&amp;V and Commissioning Manager</b>	Lucas Price	Indianapolis, IN	100%	21 years
<b>VP Sales Gulf South</b>	Paige Perilloux	Tampa, FL	100%	26 years
<b>VP, Customer Solutions</b>	Kevin Brown	Alpharetta, GA	100%	25 years
<b>VP, Technical Development</b>	Doug Mahnken	DeSoto, KS	100%	28 years
<b>VP, Operations</b>	Rick Goetz	Alpharetta, GA	100%	25 years
<b>Senior VP, Sales</b>	Joel Lowery	Alpharetta, GA	100%	30 years

\* Percentage dedicated to Energy Savings Performance Contracts.



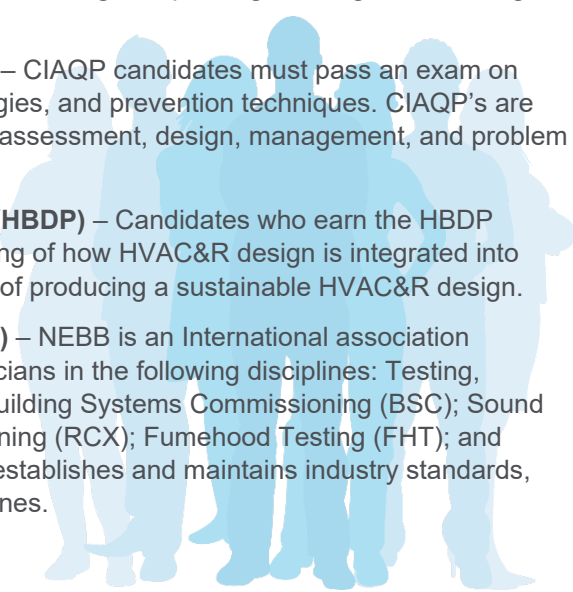
## Personnel

We provide a team of experienced and proven project leaders to each and every projects. Many team members have over 20 years of experience in their field. Key team members can have a combined total of over 180 years of experience in performance contracting. We have been delivering energy retrofits since 1979. Our service technicians and project professionals have implemented Bundled Energy Services (BES), HVAC mechanical, and electrical projects in similar situations over the past 40 years.

The organizational chart and resumes in this section highlight the careers of the personnel leading the efforts on the ADEQ' projects. They are a diverse group of individuals with specific areas of expertise. Our project managers; public finance professionals; project, energy, and design engineers; and field team members will work to implement the solutions we co-author with the ADEQ.

Our energy professionals hold a wide range of certifications and accreditations that ensure they are meeting or exceeding customer expectations on every project. Some of these include:

- **Professional Engineer (PE)** – Professional Engineers serve the public and keep them safe. They are required to demonstrate proficiency within a specific field of study and must pass an exam administered by the National Council of Examiners for Engineering and Surveying. PEs are licensed by state and must conform to continuing education requirements to keep their licenses.
- **LEED Accredited Professional (LEED-AP)** – LEED-Accredited Professionals demonstrate the ability to maximize energy efficiency while saving resources for future generations. They demonstrate experience and proficiency in green building analysis and design by passing an exam administered by the Green Building Certification Institute (GBCI).
- **Certified Energy Manager (CEM)** – Certified Energy Managers must pass an exam administered by the Association of Energy Engineers (AEE) that determines the knowledge of U.S. laws and guidelines surrounding the efficient use of resources and minimum operating requirements for buildings that serve the public.
- **Green Building Engineer (GBE)** – AEE's Certified Green Building Engineer (GBE) program awards special recognition to green building, design, and construction engineering professionals who demonstrate competence and ethical fitness for green building disciplines governing and affecting green building professionals.
- **Certified Indoor Air Quality Professional (CIAQP)** – CIAQP candidates must pass an exam on indoor environmental contaminants, mitigation strategies, and prevention techniques. CIAQP's are deemed competent and knowledgeable in air quality assessment, design, management, and problem mitigation.
- **High-Performance Building Design Professional (HBDP)** – Candidates who earn the HBDP certification demonstrate a well-rounded understanding of how HVAC&R design is integrated into high-performing buildings to achieve the overall goal of producing a sustainable HVAC&R design.
- **National Environmental Balancing Bureau (NEBB)** – NEBB is an International association certifying firms and qualifying supervisors and technicians in the following disciplines: Testing, Adjusting, and Balancing (TAB) of HVAC systems; Building Systems Commissioning (BSC); Sound and Vibration Measurement (S&V); Retro-commissioning (RCX); Fumehood Testing (FHT); and Cleanroom Performance Testing (CPT). NEBB also establishes and maintains industry standards, procedures, and work specifications for these disciplines.





### Number of graduated, non-registered Architects/Engineers by discipline:

The following are numbers projected nationwide for ABM company-owned and franchise contractor network.

- Structural Engineer > 10
- Mechanical Engineers > 50
- Electrical Engineers > 50
- Multi-Disciplinary Engineers > 20
- Systems Engineers > 20
- Professional Engineers > 25
- Mechanical Engineers > 50
- High-Performance Building Design Professional > 10
- LEED Accredited Professional > 75
- Certified Energy Manager > 50
- Green Building Engineer > 15
- Certified Green Indoor Air Quality Professional > 25
- Certified Energy Manager > 50
- Green Building Engineer > 15
- Certified Green Indoor Air Quality Professional > 25

## Key Team Member Resumes

### Customer Relations



#### EDUCATION & QUALIFICATIONS

Studied Petroleum Engineering, Mississippi State University

3 years with ABM

20+ years of energy and mechanical system related experience

Past President of local American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) chapter

#### Earl Byrd

*Sales Manager*

#### ROLE & RESPONSIBILITIES

Earl is responsible for partnering with customers to identify, qualify, develop, and implement bundled financial and energy solutions that improve the fiscal integrity of their budgets and deliver self-funded results.

#### EXPERIENCE

**ABM (2019 – Present)**

**McNeil Rhoads (2016 – 2019)**

*Business Development Manager*

Evaluated existing market penetration and sustainability. Identifying and evaluating new market potentials. Creating and implementing new market entry strategies.

**Siemens Building Technologies (1999 – 2016)**

*ESPC Account Executive/Sales Manager/Area Sales*

Responsible for meeting area sales goals in both security and ESPC including maintaining and building sales teams to meet the area goals, identifying, hiring, and training.

#### PROJECT HISTORY

- Holly Springs School District, Holly Springs, MS – 2021  
\$1.1 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Simpson County, Mendenhall, MS – 2021  
\$3.7 million performance contract
- DeSoto County, Hernando, MS – 2020  
\$2.8 million performance contract
- Mississippi Department of Corrections, Jackson, MS – 2018  
\$8 million performance contract





### EDUCATION & QUALIFICATIONS

PhD in Educational Leadership, University of Alabama

EdS in Educational Leadership, University of Alabama at Birmingham

Master of Education in Mathematics, Auburn University at Montgomery

Bachelor of Education in Mathematics, Auburn University

6 years with ABM

6 years of energy and mechanical system related

### CERTIFICATIONS & AFFILIATIONS

Member of The School Superintendents Association (AASA), National Association of Federal Education Program Administrators, School Superintendents of Alabama, Alabama Association of Federal Education Program Administrators, Superintendent Leadership Network

## Dr. Don McPherson

*Account Executive*

### ROLE & RESPONSIBILITIES

Don works with local government and school systems to reduce energy consumption and carbon footprint. By reducing energy consumption, Don helps to lower costs to each customer, which can be used toward the bottom line or the savings can be used to upgrade facilities.

### EXPERIENCE

**ABM (2016 – Present)**



#### Coffee County Board of Education (2011 – 2016) Superintendent

Don served as superintendent for 2,100 students in southeast Alabama county, overseeing a budget of \$20 million annually. Don helped pass a tax renewal with over 90% of the vote. He also raised graduation rates from the 85% to 95%.

### PROJECT HISTORY

- Holly Springs School District, Holly Springs MS – 2021  
\$1.1 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Boaz City Schools, Boaz, AL – 2018  
\$4.9 million performance contract
- Guntersville City Schools, Guntersville, AL – 2018  
\$6.2 million performance contract
- Coffee County Schools, Elba, AL – 2014  
\$2.7 million performance contract



### EDUCATION & QUALIFICATIONS

Master of Education/ Higher Education Administration, Mississippi State University

Bachelor of Business Administration, Management and Marketing, Mississippi State University

2 years with ABM

15 years of experience in customer solutions

## Phil Parrish

*Account Executive*

### ROLE & RESPONSIBILITIES

Phil works to help local governments, K-12, higher education, and hospitals in reducing their energy consumption and carbon footprint. Reducing energy consumption helps to lower costs to each entity, which can be used toward the bottom line or the savings can be used to upgrade facilities.

### EXPERIENCE

**ABM (2020 – Present)**



**CBORD (2006 – 2020)**

**Account Manager**

Assisted more than 300 Higher Education institutions in developing their vision and goals of implementing enterprise software and physical security solutions to reduce cost and improve management, safety, and efficiency.

### PROJECT HISTORY

- Mobile Credentials, Vanderbilt University – 2019-2020  
\$500,000 project
- Residence Hall Security, University of Missouri – 2019  
\$750,000 project
- Security Access Control, Baylor University – 2012-2018  
\$2.8 million project
- Worth Hills Renovation, Texas Christian University – 2016-2018 -  
\$275,000 project
- Dining System, The University of Mississippi – 2017  
\$220,000 project



### EDUCATION & QUALIFICATIONS

Masters of Business Administration – Mississippi College

Bachelor of Science in International Trade and Finance, Economics – Louisiana State University

1 year with ABM

26 years of energy and mechanical related experience

### CERTIFICATIONS & AFFILIATIONS

Women in Energy

Energy Management Professionals

The ESCO Network

## Paige Perilloux, MBA

*Vice President, Sales*

### ROLE & RESPONSIBILITIES

Paige is an experienced leader in sales, management, and operations with a demonstrated history of working within multi-industrial, global companies. Her focus is on strategic business development and relationship management while ensuring the best outcome of our Energy Savings Performance Contract (ESPC) customers in our Gulf South region.

### EXPERIENCE

#### ABM (2022 – Present)

##### Schneider Electric (2019 – 2022)

*Partner Sales Director – East Region*

Lead a transformative team in the U.S. to grow the Digital Buildings Channel business with over 120 EcoXperts.

##### AVI-SPL (2018 – 2019)

*Channel Business Development Manager*

Provided solutions and services for professional AV installation, telepresence and video conferencing, digital media systems, and managed conferencing and content production.

##### Johnson Controls (1996 – 2018)

*Strategic Account Sales Manager*

Lead the service business by executing sales strategies to achieve profitability, growth, and market penetration. Developed the service sales force in selling service offerings including planned service agreements, controls and mechanical retrofits, O&M, and labor and materials to the local Controls and Mechanical service market.

### PROJECT HISTORY

- Hinds Community College, Raymond, MS  
\$7 million performance contract
- City of Jackson, MS  
\$5 million performance contract (3 phases)





### EDUCATION & QUALIFICATIONS

Bachelor of Science in Mechanical Engineering, Georgia Institute of Technology

11 years with ABM

24 years of energy and mechanical system related experience

### CERTIFICATIONS & AFFILIATIONS

Member, Energy Services Coalition

Member, American Water Works Association

Member, Association of School Business Officials

## Joel Lowery

*Senior Vice President, Sales*

### ROLE & RESPONSIBILITIES

Joel assists ABM's energy solutions market leaders in the United States to fund customers' critical infrastructure needs.

### EXPERIENCE

#### ABM (2011 – Present)

##### NORESCO (2008 – 2011)

*Director for Technology Solutions*

Started a new division focused on technology and its ability to save operational dollars as well as create new revenue streams for public customers.

##### Servidyne (2007 – 2008)

*Executive Vice President, Sales, and Marketing*

Created a new solution sales department focused on bundling Servidyne's multiple business lines, product offerings.

##### Johnson Controls (1992 – 2007)

*Regional Solutions General Manager*

Managed solutions business for Southern part of the United States. Had responsibility for Sales and Engineering

### PROJECT HISTORY

- Orangeburg County School District, Orangeburg, SC – 2022  
\$39.9 million performance contract
- Pulaski County Government, Hawkinsville, GA – 2020  
\$2.8 million performance contract
- Holly Springs School District, Holly Springs, MS – 2021  
\$1.1 million performance contract
- Abbeville County School District, Abbeville, SC – 2021  
\$24.8 million performance contract
- Irwin County School District, Ph. 2, Ocilla, GA – 2021  
\$5.8 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Chattahoochee County Schools, Cusseta, GA – 2020  
\$5.4 million performance contract

## Project Development



### EDUCATION & QUALIFICATIONS

Bachelor of Science in  
Architectural Engineering,  
University Kansas

3 years with ABM

28 years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

Professional Engineering  
(PE) Licensed in the state of  
Kansas – License #15609

Association of Energy  
Engineers (AEE), Certified  
Energy Manager (CEM)  
#5213

Certified Building  
Commissioning  
Professional (CBCP) #628

Certified Carbon Auditing  
Professional (CAP) #236

## Doug Mahnken, PE, CEM, CBCP, CAP

*Vice President of Technical Development*

### ROLE & RESPONSIBILITIES

Doug leads the engineering team through scope development, pricing, and financial modeling. He has also assisted as the Engineering Manager, leading development team in determining scope, pricing, savings, and overall financial model for each project.

### EXPERIENCE

#### ABM (2019 – Present)

##### Johnson Controls (2012 – 2019)

##### *Regional Engineering Manager*

Oversaw project development in region

##### Innovative Power Solutions (2006 – 2015)

##### *Director of Technical Operations*

Oversaw sales, project development and installation.

##### Johnson Controls (1997 – 2006)

##### *Solutions Design Leader*

Oversaw energy conservation project development.

##### Energy Masters Corporation (1995 – 1997)

##### *Energy Engineer*

Engineering of energy projects.

### PROJECT HISTORY

- University of Arkansas, Fayetteville, AR – 2018  
\$2.7 million performance contract
- City of Bell Gardens, CA – 2021  
\$5.1 million performance contract
- City of Trinidad, CO – 2019  
\$5.1 million performance contract
- Gunnison County, Gunnison, CO – 2019  
\$1 million performance contract



### EDUCATION & QUALIFICATIONS

Bachelor of Science,  
Aerospace Engineering,  
Auburn University, AL

14 years with ABM

25 years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

PE – Virginia, Mechanical  
0402-033968

Association of Energy  
Engineers (AEE); CEM  
#8772 GBE #498, CMVP  
#4162

Certified Indoor Air Quality  
Professional (CIAQP)

American Society of  
Heating, Refrigerating and  
Air-Conditioning Engineers  
(ASHRAE)

U.S. Green Building  
Council (USGBC)

LEED-AP, CMVP, EMP,  
HBDP, AEE, NSPE; ASES;  
ISES; SAME; EMA;  
Southface Institute; GSEA;  
MENSA

## Kevin Brown, PE, LEED AP, CEM, CMVP, EMP, HBDP

*Vice President of Customer Solutions*

### ROLE & RESPONSIBILITIES

Kevin focuses on assessing and improving indoor air quality for our customers. As a member of ABMs Expert Advisory Council we focus on the Enhanced Clean and Enhanced Facility programs, Kevin vets new technologies, learning the nuances, maintenance of, and how to apply and maintain them, and how to prove their efficacy. Kevin helps the ABM team establish better ways to ensure that our customers, and their constituents, feel safe and secure about reoccupying their buildings.

### EXPERIENCE

#### ABM (2007 – Present)

##### Honeywell, Inc. (2006 – 2007)

*Performance Contracting Engineer – Federal Team*

Assess energy savings opportunities and identify risk factors associated with energy performance guarantees.

##### Honeywell Atrium (2001 – 2006)

*Senior Engineer*

Oversaw Energy Awareness Program with Regal Entertainment Group using interval meter data to identify low/no cost savings opportunities.

### PROJECT HISTORY

- Colquitt County Government, Ph. II, Moultrie, GA – 2018  
\$4.8 million performance contract
- City of Satellite Beach, FL – 2019  
\$1.4 million performance contract
- City of Cocoa Beach, FL – 2019  
\$1.2 million performance contract
- Guntersville City Schools, Guntersville, AL – 2018  
\$6.26 million performance contract
- Boaz City Schools, Boaz, AL – 2018  
\$4.9 million performance contract
- Oglethorpe County Schools, Lexington, GA – 2018  
\$10.1 million performance contract





### EDUCATION & QUALIFICATIONS

Business Administration,  
Seton Hall University, NJ

3 years with ABM

26 years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

Association of Energy  
Engineers (AEE), Certified  
Energy Manager (CEM)  
#8163

Certified Sustainable  
Development Professional  
(CSDP)

Certified Energy Auditor  
(CEA)

## Louis Verrone, CEM, CSDP, CEA

*Director, Technical Solutions*

### ROLE & RESPONSIBILITIES

Lou is responsible for development, engineering, budgets, and savings guarantees of projects in the Southeast.

### EXPERIENCE

**ABM (2019 – Present)**

**LEDVANCE (2014 – 2019)**

*Senior Business Development Manager*

**Orion Energy Systems, Inc. (2013 – 2014)**

*Senior Business Development Manager – National Accounts*

**XtraLight Manufacturing (2011 – 2012)**

*Business Development/Regional Director*

### PROJECT HISTORY

- Lowndes County Government, Valdosta, GA – 2021  
\$35 million performance contract
- GSA Region 4, MS/AL/NC – 2021  
\$35 million performance contract
- El Paso Independent School District, El Paso, TX  
(Phase 2) – 2020, \$9.5 million performance contract
- Goose Creek Consolidated Independent School District, Baytown, TX – 2019, \$43 million performance contract
- Nestle' Foods, Americas – 2014  
Five-year National Lighting Contract for North America
- Duke University Health System, Durham, NC – 2000  
\$15 million performance contract



### EDUCATION & QUALIFICATIONS

Doctor of Education, Ed.,  
Leadership, Walden  
University

Masters of Education,  
Leadership, Albany  
University

Bachelors of Business  
Administration, Thomas  
University

1 year with ABM

6 years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

Professional Association of  
Georgia Educators,  
GASBO, Georgia  
Accounting Information  
Network Support, High  
Potential Leaders of Colquitt  
County

Board of Directors for:  
Colquitt County United Way,  
Moultrie Boys and Girls  
Club Board of Directors,  
Colquitt County Family  
Connections Board of  
Directors, Moultrie-Colquitt  
County Recreation Authority  
Board of Directors

## Dr. Brad Gregory

*Public Finance Project Developer*

### ROLE & RESPONSIBILITIES

Brad advises the sales team and customer in all areas of public finance, including project funding, budget projections, grant opportunities, ESSER use and guidelines. He works to maximize all available financial resources for the customers with the goal of providing financial flexibility and sustainability of future needs.

### EXPERIENCE

#### ABM (2021 – Present)



#### Colquitt County Board of Education (2012 – 2021) CFO/Assistant Superintendent of Business and Finance

Served as Chief Financial Officer of a 9,200-student school district that consisted of 14 schools and over \$100 million operating budget.

#### Colquitt County Board of Education (2001 – 2012) Elementary Assistant Principal/ Elementary Teacher/Middle School Teacher

#### Tucker, Stone, and Plymel, LLC. (2000 – 2001) Accountant

#### McNair, McLemore, Middlebrooks (1999 – 2000) Auditor

### PROJECT HISTORY

- Abbeville County School District, Abbeville, SC – 2021  
\$24.8 million performance contract
- Irwin County School District, Ph. 2, Ocilla, GA – 2021  
\$5.8 million performance contract
- Holly Springs School District, Holly Springs, MS – 2021  
\$1.1 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Colquitt County Schools, Moultrie, GA – 2016  
\$12.9 million performance contract



### EDUCATION & QUALIFICATIONS

Bachelor of Science,  
Mechanical Engineering,  
Georgia Institute of  
Technology

4 years with ABM

12 years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

Association of Energy  
Engineers (AEE), Certified  
Energy Manager (CEM)  
#20921

Professional Engineering  
(PE) licenses in the  
following states:

AL (License # 37753)  
GA (License # 039976)  
FL (License # 85758)  
KY (License # 33267)  
MS (License # 32035)  
TN (License # 120965)  
SC (License # 39240)

## Joey Groveman, PE, CEM

*Senior Energy Engineer*

### ROLE & RESPONSIBILITIES

Joey performs engineering design and energy savings calculations. Joey also leads project development, energy analysis and customer technical presentations. He also recommends solutions that maximize energy savings while minimizing the impact to building operations.

### EXPERIENCE

#### ABM (2018 – Present)

##### Energy Systems Group (2014 – 2018)

*Project Developer*

Project development and energy engineering

##### Siemens (2010 – 2014)

*Project Developer*

Project development and energy engineering

### PROJECT HISTORY

- Unified Government of Cusseta-Chattahoochee County  
2021, \$5.1 million performance contract
- Colquitt County Government, Ph. II, GA – 2018  
\$4.8 million performance contract
- City of Satellite Beach, FL – 2019  
\$1.4 million performance contract
- City of Cocoa Beach, FL – 2019  
\$1.2 million performance contract
- Pulaski County Government, GA – 2020  
\$3 million performance contract
- Chattahoochee County School System, GA – 2020  
\$5.4 million performance contract
- Aiken County School System, SC – 2019  
\$42.2 million performance contract
- Grady County School System, GA – 2019  
\$14 million performance contract
- Bryan County Government, GA – 2019  
\$11.5 million performance contract





### EDUCATION & QUALIFICATIONS

Wallace State College  
Jefferson State College

1 year with ABM

30+ years of energy and mechanical related experience

### CERTIFICATIONS & AFFILIATIONS

Association of Energy Engineers (AEE),  
Certified Energy Manager (CEM) #17791

Certified Building Commissioning Professional (CBCP) #888

## Darryl "Tracy" Bice

*Senior Project Developer*

### ROLE & RESPONSIBILITIES

Tracy manages project development activities, including communication between team members, leading customer meetings, budgeting and scheduling project development efforts, project negotiation, attending industry conferences, quality assurance reviews, structuring project related contracts, development of safety plans specific to each project, and coordination of customer deliverables.

### EXPERIENCE

#### ABM (2021 – Present)

##### Siemens Government Technologies (2016 – 2021)

*Senior Project Developer*

Managed project design and development processes including leading customer meetings, attending industry conferences, internal and external presentations, communication between team members, budgeting and scheduling, management of subcontractors, negotiating, quality assurance and structuring project related contracts, development of safety plans with SHSO specific to each project, coordinating the production of customer deliverables.

##### Constellation Energy (2012 – 2016)

*Senior Project Development Engineer*

Identified and developed viable complex Federal sector energy services and energy asset projects. Provided technical/financial analysis of ECMs and energy supply for projects under review. Evaluated ECM opportunities at customer facilities and participated in the sales process. Lead liaison with the customer from the sales, bid process and installation phase through the acceptance of the project by the government.



### EDUCATION & QUALIFICATIONS

Bachelor of Science,  
Business Administration,  
United States Naval  
Academy, Annapolis, MD

10 years with ABM

19 years of energy and  
mechanical system related  
experience

## Clint Knudson

*Project Developer*

### ROLE & RESPONSIBILITIES

Clint provides technical project development and presentation, design, costing, and financial analysis and modeling. Clint also provides preliminary energy savings measurements and verification.

### EXPERIENCE

#### ABM (2012 – Present)

##### The Trane Company (2003 – 2011)

*Senior Account Executive*

Responsible for management maintenance contract base.

##### Lincoln Associates (2000 – 2003)

*Manufacturing sales Representative*

Provided sales of over 20+ specialty products in the Air Conditioning and Refrigeration market in the state of Georgia.

### PROJECT HISTORY

- Colquitt County Government, Ph. II, Moultrie, GA – 2018  
\$4.8 million performance contract
- Newton County Government, Covington, GA – 2016  
\$14 million Performance Contract
- Orangeburg County School District, Orangeburg, SC – 2022  
\$39.9 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Aiken County Public School District, Aiken, SC – 2019  
\$42.2 million performance contract
- Lowndes County Schools, Valdosta, GA – 2018  
\$9.2 million Performance Contract
- Brooks County Schools, Quitman, GA – 2018  
\$10 million Performance Contract
- Guntersville City Schools, Guntersville, AL – 2018  
\$6.1 million Performance Contract



### EDUCATION and QUALIFICATIONS

Graduated from Hinds Community College

34 years with ABM

35 years of energy and mechanical system related experience

Class II Conditioned Air Contractor (GA)  
# CN210147

Georgia Class II Boiler Certificate (GA) # 3207

## Kent Sauls

*Project Developer*

### ROLE and RESPONSIBILITIES

Kent is responsible for overall project development from inception through execution including technical solutions development, project development and pricing.

### EXPERIENCE

#### **ABM (1988 – Present)**

*Project Developer (2014 – present)*

*Operations Manager in (2004 – 2014)*

*Service Manager (1991 – 2004)*

*Service Supervisor (1988 – 1991)*

#### **Shelby-Skipwith (1987 – 1988)**

*Sales Representative*

Sold residential and light commercial York HVAC equipment to contractors in north Mississippi.

### PROJECT HISTORY

- Abbeville County School District, Abbeville, SC – 2021  
\$24 million performance contract
- Bryan County Government, Pembroke, GA – 2019  
\$11.5 million performance contract
- Colquitt County Government, Ph. II, Moultrie, GA – 2018  
\$4.8 million performance contract
- Center of Family Resources, Marietta, GA – 2017  
\$1.7 million performance contract
- Athens Christian Schools, Athens, GA – 2017  
\$1.2 million performance contract
- Commerce City Schools, Commerce, GA – 2016  
\$5.6 million performance contract
- Newton County Government, Covington, GA – 2016  
\$14 million performance contract
- Mitchell County Schools, Camilla, GA – 2016  
\$8 million performance contract

## Construction and Project Management



### EDUCATION & QUALIFICATIONS

Pennsylvania State University-Biochemistry

Hunter College (CUNY), New York, NY

University of Texas, Project Management Training

16 years with ABM

30+ years of energy and mechanical system related experience

Trained in EBB Balancing, Universal Refrigerant Certification, Power Actuated Tools, HILTI Fire Retardant Applications, Trane-Ice Bank Storage, LG VRS Design and Installation, Daiken VRS Design and Installation, High Efficiency Boiler Installation and Flue Piping

### Brian Ciepierski

*Senior Project Manager*

#### ROLE & RESPONSIBILITIES

Brian is responsible for management of all Bundled Energy Solutions (BES) and project work conducted at the work site. Brian ensures projects are delivered in a timely manner and within the timeline negotiated with the customer while maintaining high customer satisfaction.

#### EXPERIENCE

**ABM (2006 – Present)**

**Mechanical Service Corporation (1989 – 2006)**

*Project Manager*

#### PROJECT HISTORY

- Chattahoochee County School System, Cusseta, GA – 2020  
\$5.4 million performance contract
- Aiken County School System, Aiken, SC – 2019  
\$42.2 million performance contract
- Grady County School System, Cairo, GA – 2019  
\$14 million performance contract
- Lowndes County Schools, Valdosta, GA – 2018  
\$9.2 million performance contract
- Colquitt County Government, Ph. II, GA – 2018  
\$4.8 million performance contract
- Center of Family Resources, Marietta, GA – 2017  
\$1.7 million performance contract
- Athens Christian Schools, Athens, GA – 2017  
\$1.2 million performance contract
- Newton County Government, GA – 2016  
\$14 million performance contract
- Commerce City Schools, GA – 2016  
\$5.6 million performance contract
- Madison County Schools, Ph. IV, GA – 2016  
\$15.7 million performance contract





### EDUCATION & QUALIFICATIONS

Bachelor of Science,  
Electronic Engineering,  
New England Institute of  
Technology

2 years with ABM

23 years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

Member, Project  
Management Institute,  
Association of Energy  
Engineers

Certified Project  
Management Professional  
(PMP)

OSHA 30 Hour Health &  
Safety, Six Sigma Green  
Belt

## Tim Lester, PMP

*Project Manager*

### ROLE & RESPONSIBILITIES

Tim is responsible for leading the planning, scheduling, control, and effective coordination of all parallel activities related to the management of multiple projects of moderate to high complexity.

### EXPERIENCE

#### ABM (2020 – Present)

##### Energy Systems Group (2018 – 2020)

*Senior Project Manager*

Accountable for overall project delivery.

#### Honeywell (1997 – 2018)

*Senior Project Manager*

Responsible for overall project governance from development through implementation.

### PROJECT HISTORY

- Simpson County, MS – 2021  
\$3.7 million performance contract
- Holly Springs School District, MS – 2021  
\$1.1 million performance contract
- Itawamba County School District, MS – 2021  
\$2.4 million performance contract
- Chattahoochee County Schools, GA – 2020  
\$5.4 million performance contract
- Lowndes County Government, GA – 2021  
\$43 million performance contract
- Grady County Government, GA – 2020  
\$5.6 million performance contract
- Madison County Schools, Ph. 5, GA – 2020  
\$6.4 million performance contract
- Wilkes County Schools, Ph. 2, GA – 2021  
\$4.9 million performance contract
- City of Bloomington Solar, IN – 2018  
\$15 million performance contract

## Measurement & Verification (M&V) and Reporting



### EDUCATION & QUALIFICATIONS

Bachelor of Science in Mechanical Engineering, Georgia Institute of Technology

26 years with ABM

26 years of energy and mechanical system related experience

### CERTIFICATIONS & AFFILIATIONS

Association of Energy Engineers (AEE), Certified Energy Manager (CEM) #9314

Georgia Class II Condition Air Contractor

AL, MS, SC Heating and A/C Contractor Licenses

### Rick Goetz, CEM

*Vice President of Operations*

### ROLE & RESPONSIBILITIES

Rick is responsible for overall project management including estimate review, design, scheduling, managing, and overall project delivery. Rick also provides technical solutions development, energy savings management, and measurement and verification analysis.

### EXPERIENCE

#### ABM (2007 – Present)

#### Linc Mechanical (1996 – 2007)

##### *Project Manager*

Managed all project work conducted at location ranging in size from \$5,000 to \$7 million. Management and delivery of all Bundled Energy Solutions projects conducted at location. Ensure projects delivered in a timely manner and within the timeline negotiated with the customer while maintaining high customer satisfaction. Responsible for monthly project forecasting.

### PROJECT HISTORY

- Orangeburg County School District, Orangeburg, SC – 2022  
\$39.9 million performance contract
- Pulaski County Government, Hawkinsville, GA – 2020  
\$2.8 million performance contract
- Holly Springs School District, Holly Springs, MS – 2021  
\$1.1 million performance contract
- Abbeville County School District, Abbeville, SC – 2021  
\$24.8 million performance contract
- Irwin County School District, Ph. 2, Ocilla, GA – 2021  
\$5.8 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Chattahoochee County Schools, Cusseta, GA – 2020  
\$5.4 million performance contract



### EDUCATION & QUALIFICATIONS

Bachelor of Science,  
Mechanical Engineering  
(BSME), Purdue University

4 years with ABM

20+ years of energy and  
mechanical system related  
experience

### CERTIFICATIONS & AFFILIATIONS

American Society of  
Heating, Refrigerating and  
Air-Conditioning  
Engineers (ASHRAE)

American Society of  
Mechanical Engineers  
(ASME)

Association of Energy  
Engineers (AEE)

## Lucas Price

*Director of M&V and Commissioning*

### ROLE & RESPONSIBILITIES

Lucas provides M&V plan development and execution guidance to the ABM M&V team. He also oversees project development and project delivery team, as well as third-party vendors.

### EXPERIENCE

**ABM (2018 – Present)**

**Honeywell (2001 – 2018)**

*Project development and energy engineering*

### PROJECT HISTORY

- Orangeburg County School District, Orangeburg, SC – 2022  
\$39.9 million performance contract
- Unified Government of Cusseta-Chattahoochee County – 2021  
\$5.1 million performance contract
- Holly Springs School District, Holly Springs, MS – 2021  
\$1.1 million performance contract
- Abbeville County School District, Abbeville, SC – 2021  
\$24.8 million performance contract
- Irwin County School District, Ph. 2, Ocilla, GA – 2021  
\$5.8 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Chattahoochee County Schools, Cusseta, GA – 2020  
\$5.4 million performance contract
- Pulaski County Government, Hawkinsville, GA – 2020  
\$2.8 million performance contract
- Aiken County Public School District, Aiken, SC – 2019  
\$42.2 million performance contract
- Grady County School System, Cairo, GA – 2019  
\$14 million performance contract
- Georgia Institute of Technology, Atlanta, GA – 2019  
\$6.5 million performance contract
- City of Satellite Beach, FL – 2019  
\$1.4 million performance contract



### EDUCATION & QUALIFICATIONS

Bachelor of Science in Mechanical Engineering, Georgia Institute of Technology

12 years with ABM

12 years of energy and mechanical system related experience

### CERTIFICATIONS & AFFILIATIONS

Association of Energy Engineers (AEE), Certified Energy Manager (CEM) #15363

Professional Engineering Licensed in the state of Georgia, PE 037133

## Brian Walker, CEM, PE

*M&V Manager*

### ROLE & RESPONSIBILITIES

Brian provides Technical Solutions development, energy savings calculations, and Measurement and Verification.

### EXPERIENCE

#### ABM (2010 – Present)

##### Teng and Associates (2008 – 2010)

##### *HVAC/Energy Engineer*

Performed energy audits and renewable energy studies for VA hospitals; Analyzed energy savings on audited sites and given theoretical equipment retrofits; Performed retro-commissioning functionality testing at GSA sites.

##### Hines Interests LLP (2006 – 2008)

##### *Building Engineer*

Operated and maintained building MEP systems for 1.5 million sf property; Operated BMS systems at properties; Managed property life safety, building keying, IAQ programs.

### PROJECT HISTORY

- Orangeburg County School District, Orangeburg, SC – 2022  
\$39.9 million performance contract
- Unified Government of Cusseta-Chattahoochee County – 2021  
\$5.1 million performance contract
- Holly Springs School District, Holly Springs, MS – 2021  
\$1.1 million performance contract
- Abbeville County School District, Abbeville, SC – 2021  
\$24.8 million performance contract
- Irwin County School District, Ph. 2, Ocilla, GA – 2021  
\$5.8 million performance contract
- Itawamba County School District, Fulton, MS – 2020  
\$2.4 million performance contract
- Chattahoochee County Schools, Cusseta, GA – 2020  
\$5.4 million performance contract
- Pulaski County Government, Hawkinsville, GA – 2020  
\$2.8 million performance contract





### EDUCATION & QUALIFICATIONS

Art Institute of Atlanta

4 years with ABM

20+ years of energy and mechanical system related experience

## Matt Whitenack

*Senior Quality Assurance Manager*

### ROLE & RESPONSIBILITIES

Matt manages energy savings for the entire Alpharetta branch. He delivers branch checklists, annual audits, and performs quarterly site visits and periodic controls audits.

### EXPERIENCE

**ABM (2018 – Present)**

**CGL Companies (2014 – 2018)**

*Facilities Manager*

**ISS Facilitis Services (2013 – 2014)**

*Critical Environment Operator*

**Lee Technologies (2010 – 2013)**

*Senior Critical Facilities Technician*

**Ryder System, Inc. (2008 – 2010)**

*Facilities Supervisor*

### PROJECT HISTORY

- Orangeburg County School District, SC – 2022  
\$40 million performance contract
- Abbeville County School District, SC – 2021  
\$24.8 million performance contract
- Lowndes County Government, GA – 2021  
\$43 million performance contract
- Simpson County, MS – 2021  
\$3.7 million performance contract
- DeSoto County Government, MS – 2021  
\$2.8 million performance contract
- Holly Springs School District, MS – 2021  
\$1.1 million performance contract
- Itawamba County Schools, MS – 2021  
\$2.4 million performance contract
- Pulaski County Government, GA – 2020  
\$2.8 million performance contract

*c) Approach to Subcontracting. Describe the types of services (both professional and construction services) that your company offers in-house and the services typically offered through subcontractors.*

## Subcontractor Source Selection

ABM employs a rigorous subcontractor sourcing process to ensure we select partners who share our commitment to quality, safety, and performance. For any scope of work to be performed, all subcontractors undergo a rigorous evaluation and vetting process prior to working with ABM, in which we evaluate and require all subcontractors to complete a thorough application, detailing information on the following topics:

- Company profile
- Health and safety
- Financial and legal
- Services provided
- Construction quality and overall quality
- Sustainability
- Ethics
- Project history and references

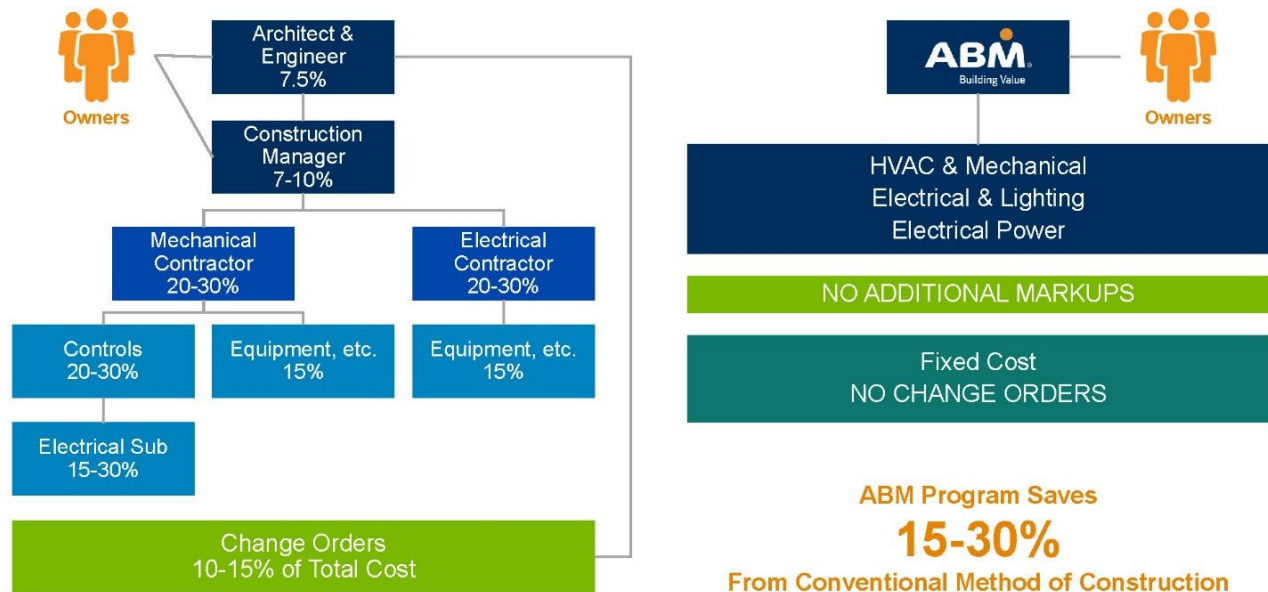
ABM's commitment to the small business community is evidenced by our small business contracting activities. This strategy is effective for ABM and the small business community. In Fiscal Year 2019, ABM awarded \$92 Million of subcontracts to small business firms for services and supplies, far exceeding the company goals for the year. In Fiscal Year 2021, ABM awarded a total of \$89 Million to Small Business and Small Disadvantaged Business concerns. Based on our commitment to the small business community and our outstanding small business subcontracting record, we are confident in our ability to meet and exceed the goals set forth by the ADEQ.

ABM has numerous sources available to identify and recruit qualified small businesses to meet established Small and Small Disadvantaged Business subcontracting goals while fulfilling project requirements. In addition to an internal ABM database of small business subcontractors, we employ the following sources and methods:

- U.S. Department of Defense Small Business Contractors and the Annual Small Business Forum
- Society of American Military Engineers National and Regional Small Business Conferences
- The National Association of Minority Contractors
- U.S. Small Business Administration (SBA)
- Central Contractor Registration: access to subcontractor lists from SBA's 8(a) Business Development program, HUB Zone Empowerment Contracting Program, and Small Disadvantaged Business program through the Dynamic Small Business Search portal.
- National Minority Supplier Development Council
- U.S. Department of Commerce, Minority Business Development Agency Research and Information Division
- Vendor Information Service of the National Minority Purchasing Council
- Local business development organizations and Chambers of Commerce
- Small Business Utilization trade shows
- Trade publications to encourage new sources
- National Association of Black Women Entrepreneurs

## Subcontracted Services

ABM attempts to use our internal resources to the greatest extent we can to reduce mark-up stacking that results from subcontracting all the work being performed.



For the services which we would subcontract our first path would be to work with those who already service the ADEQ. Some of the ECMs that we subcontract are:

- Mechanical Piping
- Water Conservation
- Controls
- Fenestration & Building Envelope
- Transformers

Additional scope may include roof coating, Green IT, kitchen exhaust controls, refrigeration upgrades on walk-ins, condenser fin service/ straightening and coil coating



The following table displays how ABM utilizes in-house staff versus subcontracted staff for each step in the overall performance contracting process. Please note that this is the entirety of the process from start to finish.

Description	A. Preliminary Assessment	B. Investment Grade Audit	C. Installation	D. Operation & Maintenance	E. Measurement & Verification
<b>Project Development &amp; Management</b>					
Project Management & Quality Control	ABM	ABM	ABM	ABM	ABM
Site Management	N/A	N/A	ABM	ABM	ABM
Project Development	ABM	ABM	N/A	N/A	N/A
Energy Engineering	ABM	ABM	ABM	ABM	ABM
Power Engineering (PV, CHP)	ABM	ABM	ABM	ABM	ABM
Electrical Engineering	ABM	ABM	ABM	ABM	ABM
Mechanical Engineering	ABM	ABM	ABM	ABM	ABM
Project Financing	N/A	ABM	N/A	N/A	N/A
Performance Test & Acceptance Test	N/A	N/A	ABM	N/A	N/A
Design Reviews & Approval (Site Level & National Level)	ABM	ABM	ABM	N/A	N/A
Measurement & Verification Engineering	ABM	ABM	ABM	ABM	ABM
<b>Group 1 ECMs</b>					
TC.3 Building Automation and EMCS	ABM/Sub	ABM	Sub	ABM/Sub	ABM
TC.17 Commissioning	N/A	N/A	N/A	ABM	ABM
TC.18 Advanced Metering	ABM/Sub	ABM	Sub	ABM/Sub	ABM
<b>Group 2 ECMs</b>					
TC.4 HVAC	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.1 Boiler Plant Improvements	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.2 Chiller Plant improvements	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.7 Chilled Water, Hot Water and Steam Distribution systems	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.8 Electric Motors and Drives	ABM/Sub	ABM/Sub	ABM	ABM	ABM
<b>Group 3 ECMs</b>					
TC.10 Distributed Generation	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.11 Renewable Energy Systems	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.12 Energy/Utility Distribution Systems	ABM/Sub	ABM/Sub	ABM	ABM	ABM
TC.14 Electrical Peak Shaving/Load Shifting	ABM/Sub	ABM/Sub	Sub	ABM	ABM
<b>Group 4 ECMs</b>					
TC.5 Lighting Improvements	ABM	ABM	ABM	ABM	ABM
<b>Group 5 ECMs</b>					
TC.6 Building Envelope	ABM	ABM/Sub	Sub	ABM	ABM
TC.9 Refrigeration	ABM	ABM/Sub	ABM	ABM	ABM
TC.13 Water and Sewer Conservation Systems	ABM	ABM/Sub	Sub	ABM	ABM
TC.16 Energy Related Process Improvements	ABM	ABM/Sub	ABM	ABM	ABM
TC.19 Appliance/Plug load reductions	ABM	ABM/Sub	Sub	ABM	ABM

**Table Key**

ABM

ABM &amp; Subcontractor

Subcontractor

Not Applicable



## Coordination with Subcontractors

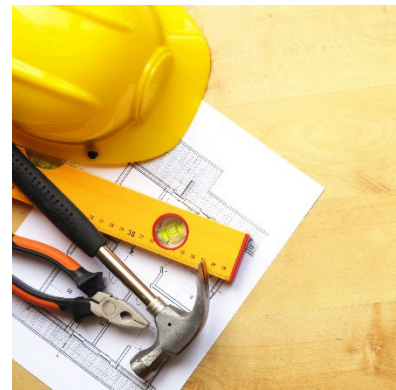
### Subcontractor Performance Management & Quality Control

To ensure subcontracted work is controlled, monitored, and evaluated, each subcontractor hired by ABM is issued a Subcontract Agreement and Subcontractor Management Plan.

Ultimately the relationship between ABM and our subcontractors is governed by the subcontract agreement itself.

Each subcontractor will have a legally binding written contract that defines the following items:

- The legal names of the parties involved in the contract will be specified.
- The scope of the contracted work (contained in an attached Statement of Work), described in terms of:
  - The responsibilities and authorities of each party to the contract,
  - A clear definition of the deliverables and minimum content to be provided by the subcontractor,
  - A clear definition of the services to be provided by the subcontractor,
  - Any and all constraints imposed on the subcontractor by the prime contractor, such as schedule constraints, budget constraints, specific tools to be used, etc.,
  - A clear statement of requirements for quality of deliverables and services, including the requirement to allow independent quality inspections of materials and processes, and
  - Clear language related to payment conditions and process.
- Appropriate terms and conditions imposed on the prime contractor and the subcontractor will be identified.
- Identification of any penalties associated with maintaining schedule, including but not limited to liquidated damages.
- The acceptance process will be clearly identified.



#### ABM projects that involve subcontractors all exhibit similar characteristics:

- **Clear and Unambiguous Subcontracts** – Subcontracts are established and include a Statement of Work
- **Cohesive Project Plan** – All subcontractor efforts are integrated into a project plan that shows where efforts fit into the overall picture
- **Documented Formal and Informal Interfaces** – All interfaces between subcontractors and the prime contractor are documented
- **Work Authorization** – Before starting specific work, subcontractors are granted written authorization to proceed
- **Team-Building Process** – A formal team-building process is established and implemented

The approach to managing the subcontractors is based on the following guiding principles:

- A project manager is responsible to effectively support the needs of the subcontractors.
- Effective channels of communications will be clearly defined and established.
- A “Statement of Work” is developed jointly by ABM with each subcontractor taking responsibility for the deliverables and services outlined in its areas of responsibility.
- The Statement of Work will provide each subcontractor with the following:
  - Clearly defined responsibilities and authorities.
  - Identification of deliverables and required content.
  - Services each is responsible for providing.
  - All constraints imposed on the subcontractor, including schedule and budget constraints.
  - Requirements for quality, including the requirement to allow independent quality inspections of materials and processes.
- All products and services provided by the subcontractor will be subject to the acceptance of ABM.
- Each subcontract will contain appropriate terms and conditions.
- ABM will support subcontractors in processing invoices and payments.

All payments to subcontractors require an authorization process:

- Subcontractors will submit progress or monthly invoices reflecting the hours worked, however defined in the subcontract agreement.
- If no defined and completed deliverables were included in the efforts for that invoice period, the payment will proceed.
- If a defined and completed deliverable is included in the invoice period, payment of that invoice is subject to the approval and acceptance process.

All products and services provided by the subcontractors will be subject to approval and acceptance by ABM. Our project team reviews all subcontractor deliverables for adherence to contract. The subcontractor is required to prepare a Deliverable Acceptance Form and submit it with the deliverable. When the deliverable is deemed to be acceptable by our project manager, the “Deliverable Acceptance Form” will be signed.

Invoices from subcontractors to ABM must be presented in a format suitable for review and processing. Subcontractor invoices must meet the format and content requirements for invoices as set out in the Terms and Conditions of the contract between ABM and the subcontractor.





Our “Subcontractor Management Plan” includes the following:

- Subcontractor organizational chart
- ABM and subcontractor roles and responsibilities
- Work effort integration
- Interfaces between ABM and subcontractors
- Interfaces among the subcontractors
- Work authorization
- Progress reporting
- Monthly Work Breakdown Structure (WBS) level progress reporting
- Review practices
- Progress reviews
- Contractor issues meetings
- Recovery plans when required
- Milestone reviews
- Weekly cost account level progress reporting:
  - Authorized work that was scheduled to be performed during the week.
  - Progress made against that authorized work presented as:
    - A description of progress.
    - A list of internal milestones attained.
    - An accounting of the hours billed against that cost account by all subcontractor personnel.
    - An assessment of the time (in hours) remaining to complete the activities in the cost account (estimate to complete).
    - A list of unplanned, but authorized work that was conducted, identifying the number of hours spent.
  - Authorized work that is scheduled to be performed during the next week, including any internal milestones expected to be reached.
  - A brief description of any problems encountered in performing the activities of the cost account or warnings of schedule slippage.

### 3B. ARKANSAS STATE CONSTRUCTION REQUIREMENTS

*Describe your firm's approach to complying with the Arkansas State licensing and labor requirements.*

#### Labor Requirements

As a licensed contractor with the State of Arkansas, we are aware of and comply with all related standards and regulations the state has set forth including, but not limited to:

##### Labor Standards

- Minimum Wage and Overtime
- Child Labor
- Wage Claims
- Private Employment Agency Laws and Regulations
- Mediation and Conciliation
- Nursing Mothers Breaks

##### Occupational Safety and Health

- OSHA Consultation
- AOSH (Arkansas Occupational Safety and Health)
- Training
- Safety Award Program
- OSHA Statistics (Injuries, Illnesses and Fatalities)

##### Code Enforcement

- Boiler Inspection, Licensing and Permits
- Electrical Inspection and Licensing
- HVAC-R



We understand the requirements of conducting energy-related project services with our contractor's license with the State of Arkansas and its requirements for labor. We will always review state and the ADEQ rules and regulations to be sure our team, as well as any subcontractors, are in full compliance.



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## 4. Company Financial Status

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## 4. Company Financial Status

### 4A. FINANCIAL SOUNDNESS AND PROFITABILITY

*a) Financial soundness. Provide a description of the financial soundness and expected stability of the company.*

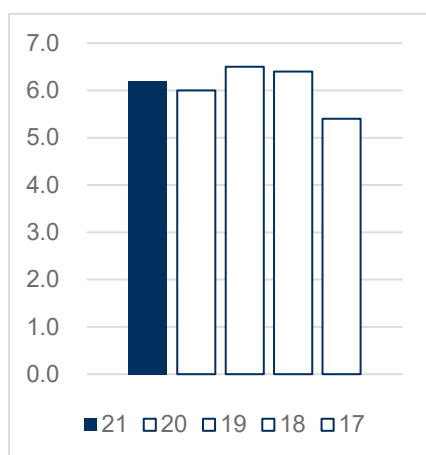
We have achieved revenues of \$6.2 billion by faithfully serving over 20,000 customers nationwide in over 200 metro areas. ABM has an exceptionally transparent balance sheet comprised of a strong cash position, minimal debt, and a solid performance record boasting consecutive quarterly dividends since 1965. ABM is also one of the largest facilities services contractors on the New York Stock Exchange. Our subsidiaries are leaders in their respective fields and are capable of independent growth as well as growth through acquisition. Our size, operational infrastructure and financial strength enable us to offer customers a level of sophistication that translates into savings and peace of mind.

Our Annual Report is posted online:

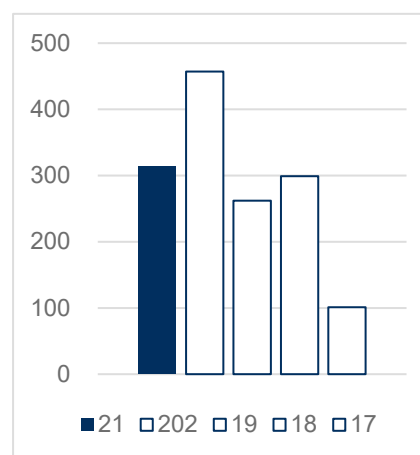
<https://abm.gcs-web.com/static-files/67a93aec-d8ec-4d9a-a15f-57ab65730c91>

### Financial Highlights

(\$ in millions)	Year Ended October 31,				
	2021	2020	2019	2018	2017
Revenues	<b>\$6,228.6</b>	\$5,987.6	\$6,498.6	\$6,442.2	\$5,453.6
Net cash provided by continuing operating activities	<b>\$314.3</b>	\$457.5	\$262.8	\$299.7	\$101.7



Revenues (in billions)



Net Cash Provided by Continuing Operating Activities (in millions)



*b) Profitability. Provide a description of the company's profitability with supporting documentation covering the past three calendar years.*

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ABM is a publicly traded company; therefore our financial information is available at <https://www.abm.com/investors/>.

Our most recent 10-K can be found at <https://www.abm.com/investors/?ipg=/sec-filings/sec-filing/10-k/0000771497-21-000038>



*c) Financial report. Attach a financial report summary as an appendix, showing the company's most recent 12-month audited financials including, at a minimum: Balance Sheet, Income Statement, Statement of Cash Flow, and Statement of Financial Conditions. Include the name, address, and telephone number of the preparer.*

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#### **Financial Auditor**

KPMG LLP  
345 Park Avenue  
New York, NY 10154

Theresa Zuschlag, Audit Manager  
516.477.5488  
[tzuschlag@KPMG.com](mailto:tzuschlag@KPMG.com)

*Please see Appendix A – Firm's Annual Financial Report Summary.*

## 4B. BONDING

*Include responses to the following:*

### *d) Current bonding rating (maximum project size firm can bond)*

---

Travelers Casualty and Surety Company of America ("Travelers"), Fidelity and Deposit Company of Maryland ("Zurich"), Liberty Mutual Insurance Company ("Liberty"), Westchester Fire Insurance Company ("CHUBB"), Federal Insurance Company ("CHUBB"), and Arch Insurance Company ("ARCH") to provide surety bonds on behalf of ABM Building Solutions, LLC ("ABM") for over Fourteen (14) years. Each of ABM's Sureties is recognized by A.M. Best with financial strength ratings of Travelers at A++ XV, Zurich at A+ XV, Liberty at A XV, Chubb at A++ XV, and Arch at A+ XV, respectively. Additionally, each surety is listed in the Department of Treasury's Federal Register of Certified Companies and is a licensed, admitted surety in all fifty US states. In our opinion, ABM remains properly financed, well equipped, and capably managed.

### *e) Current bonding capacity*

---

#### **Westchester Fire Insurance Company (CHUBB)**

436 Walnut Street, 10th Floor, Philadelphia, PA 19107

*Bonding Limits: \$70 Million single, \$500 Million aggregate*

#### **Fidelity and Deposit Company of Maryland (Zurich)**

1299 Zurich Way, Schaumburg, IL 60196

*Bonding limits: \$5 Million single, \$200 Million aggregate*

#### **Travelers Casualty and Surety Company of America (Travelers)**

One Tower Square, Bond/5PB, Hartford, CT 06183

*Bonding limits: \$70 Million single, \$500 Million aggregate*

### *f) Amount or percentage of bonding capacity currently obligated*

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57 bonds for a total amount of \$377,876,759

### *g) Current bonding rate*

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Our current annual performance and payment bond rate is \$3.05 per \$1,000.

### *h) Confirmation that the company is bondable for 100% of a payment bond on a project*

---

Yes, ABM is bondable for 100% of a payment bond on a project.

### *i) Confirmation that the company is bondable for 100% of a performance bond on a project*

---

Yes, ABM is bondable for 100% of a performance bond on a project.

### *j) Letter from a licensed surety as evidence of ability to bond for payment and performance*

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*Please see our bonding letters on the following pages.*



**March 10, 2022**

**Re: ABM Building Solutions, LLC**  
Surety Prequalification Letter

To Whom It May Concern:

*It has been the privilege of the current surety partners Travelers Casualty and Surety Company of America ("Travelers"), Fidelity and Deposit Company of Maryland ("Zurich"), Liberty Mutual Insurance Company ("Liberty"), Westchester Fire Insurance Company ("CHUBB"), Federal Insurance Company ("CHUBB"), and Arch Insurance Company ("ARCH") to provide surety bonds on behalf of **ABM Building Solutions, LLC ("ABM")** for over **Fourteen (14)** years. Each of ABM's Sureties is recognized by A.M. Best with financial strength ratings of Travelers at A++ XV, Zurich at A+ XV, Liberty at A XV, Chubb at A++ XV, and Arch at A+ XV, respectively. Additionally, each surety is listed in the Department of Treasury's Federal Register of Certified Companies and is a licensed, admitted surety in all fifty US states. In our opinion, **ABM** remains properly financed, well equipped, and capably managed.*

*ABM has single project bond capacity in excess of \$70 Million and a collective aggregate bond capacity in excess of \$500 Million. Total available capacity is in excess of \$300 Million.*

*Please note that this letter is not an assumption of liability, nor is it a bid bond or performance bond. Any request for surety support would be subject to normal Surety underwriting procedures and is exclusively a matter between ABM and its Sureties. Therefore, there is no liability to you or any third party if for any reason Sureties do not execute any bonds.*

Sincerely,

Travelers Casualty and Surety Company of America  
Fidelity and Deposit Company of Maryland  
Liberty Mutual Insurance Company  
Westchester Fire Insurance Company  
Federal Insurance Company  
Arch Insurance Company

Joshua Sanford, Attorney-in-Fact

Willis Towers Watson Southeast, Inc.

10 State House Square, Floor 11

Hartford, CT 06103



Telephone: +1 860-241-4492

Website: [wtwco.com](http://wtwco.com)

E-mail: [brendan.fletcher@willistowerswatson.com](mailto:brendan.fletcher@willistowerswatson.com)





**Travelers Casualty and Surety Company of America**  
**Travelers Casualty and Surety Company**  
**St. Paul Fire and Marine Insurance Company**

**POWER OF ATTORNEY**

**KNOW ALL MEN BY THESE PRESENTS:** That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Joshua Sanford** of **HARTFORD**, **Connecticut**, their true and lawful Attorney(s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

**IN WITNESS WHEREOF**, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April**, **2021**.



State of Connecticut

City of Hartford ss.

By: \_\_\_\_\_

Robert L. Raney, Senior Vice President

On this the **21st** day of **April**, **2021**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

**IN WITNESS WHEREOF**, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June**, **2026**



Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this **10th** day of **March**, **2022**



Kevin E. Hughes, Assistant Secretary

**To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.**  
**Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.**



**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by **Robert D. Murray, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Jacqueline R. SUSCO, Kathryn PRYOR, Nicholas TURECAMO, Gentry STEWART, Amanda P. D ANGELO, Donna M. PLANETA, Bethany STEVENSON, Joshua SANFORD, Aimee R. PERONDINE, Jennifer G. GODERE, Alexis R. APOSTOLIDIS, Michelle Anne MCMAHON, Rebecca M. JOSEPHSON, Brendan W. FLETCHER, Cassandra BAEZ, of Hartford, Connecticut, EACH**, its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 26th day of August, A.D. 2021.



**ATTEST:**  
**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

By: Robert D. Murray  
Vice President

By: Dawn E. Brown  
Secretary

**State of Maryland  
County of Baltimore**

On this 26th day of August, A.D. 2021, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Robert D. Murray, Vice President and Dawn E. Brown, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



Constance A. Dunn, Notary Public  
My Commission Expires: July 9, 2023

**Authenticity of this bond can be confirmed at [bondvalidator.zurichna.com](http://bondvalidator.zurichna.com) or 410-559-8790**



## EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

## CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 10th day of March, 2022.



By: Brian M. Hodges  
Vice President

**TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:**

Zurich Surety Claims  
1299 Zurich Way  
Schaumburg, IL 60196-1056  
[www.reportsfclaims@zurichna.com](mailto:www.reportsfclaims@zurichna.com)  
800-626-4577

**Authenticity of this bond can be confirmed at [bondvalidator.zurichna.com](http://bondvalidator.zurichna.com) or 410-559-8790**



This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company  
The Ohio Casualty Insurance Company  
West American Insurance Company

Certificate No: **8207373-985949**

## POWER OF ATTORNEY

**KNOWN ALL PERSONS BY THESE PRESENTS:** That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Aimee R. Perondine; Alexis Apostolidis; Amanda Pierina D'Angelo; Bethany Stevenson; Brendan Fletcher; Bryan M. Caneschi; Cassandra Baez; Donna M. Planeta; Eric Strba; Gentry Stewart; Jacqueline Susco; Jennifer Gail Godere; Joshua Sanford; Kathryn Pryor; Kyle Williams; Michelle Anne McMahon; Nicholas Turecamo; Rebecca M. Josephson

all of the city of Hartford state of CT each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

**IN WITNESS WHEREOF,** this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 22nd day of February, 2022.



Liberty Mutual Insurance Company  
The Ohio Casualty Insurance Company  
West American Insurance Company

By:

David M. Carey  
David M. Carey, Assistant Secretary

State of PENNSYLVANIA ss  
County of MONTGOMERY

On this 22nd day of February, 2022 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Insurance Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

**IN WITNESS WHEREOF,** I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.



Commonwealth of Pennsylvania - Notary Seal  
Teresa Pastella, Notary Public  
Montgomery County  
My commission expires March 28, 2025  
Commission number 1126044  
Member, Pennsylvania Association of Notaries

By:

Teresa Pastella  
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

### ARTICLE IV - OFFICERS: Section 12. Power of Attorney.

Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

### ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.

Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

**Certificate of Designation** - The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

**Authorization** - By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

**IN TESTIMONY WHEREOF,** I have hereunto set my hand and affixed the seals of said Companies this 10th day of March, 2022.



By:

Renee C. Llewellyn  
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

For bond and/or Power of Attorney (POA) verification inquiries, please call 610-832-8240 or email HOSUR@libertymutual.com.





## Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company  
Westchester Fire Insurance Company | ACE American Insurance Company

**Know All by These Presents**, that **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, **WESTCHESTER FIRE INSURANCE COMPANY** and **ACE AMERICAN INSURANCE COMPANY** corporations of the Commonwealth of Pennsylvania, do each hereby constitute and appoint Alexis R. Apostolidis, Cassandra Baez, Bryan M. Caneschi, Amanda Pierina D'Angelo, Brendan William Fletcher, Jennifer Gail Godere, Rebecca M. Josephson, Michelle Anne McMahon, Aimee R Perondine, Donna M Planeta, Kathryn Pryor, Joshua Sanford, Bethany Stevenson, Gentry Stewart, Eric Strba, Jacqueline Rose Susco and Nicholas Turecamo of Hartford, Connecticut -----

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

**In Witness Whereof**, said **FEDERAL INSURANCE COMPANY**, **VIGILANT INSURANCE COMPANY**, **PACIFIC INDEMNITY COMPANY**, **WESTCHESTER FIRE INSURANCE COMPANY** and **ACE AMERICAN INSURANCE COMPANY** have each executed and attested these presents and affixed their corporate seals on this 20<sup>th</sup> day of May, 2021.

*Dawn M. Chloros*

Dawn M. Chloros, Assistant Secretary

*Stephen M. Haney*

Stephen M. Haney, Vice President



STATE OF NEW JERSEY  
County of Hunterdon

SS.

On this 20<sup>th</sup> day of May, 2021 before me, a Notary Public of New Jersey, personally came Dawn M. Chloros and Stephen M. Haney, to me known to be Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros and Stephen M. Haney, being by me duly sworn, severally and each for herself and himself did depose and say that they are Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY and know the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that their signatures as such officers were duly affixed and subscribed by like authority.

Notarial Seal



KATHERINE J. ADELAAR  
NOTARY PUBLIC OF NEW JERSEY  
No. 2316685  
Commission Expires July 18, 2024

*Katherine J. Adelaar*

Notary Public

### CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016; WESTCHESTER FIRE INSURANCE COMPANY on December 11, 2006; and ACE AMERICAN INSURANCE COMPANY on March 20, 2009:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY (the "Companies") do hereby certify that

- (i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
- (ii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this March 10th, 2022.



*Dawn M. Chloros*

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:  
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com



*This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for Note, Loan, Letter of Credit, Currency Rate, Interest Rate or Residential Value Guarantees.*

# POWER OF ATTORNEY

## Know All Persons By These Presents:

That the Arch Insurance Company, a corporation organized and existing under the laws of the State of Missouri, having its principal administrative office in Jersey City, New Jersey (hereinafter referred to as the "Company") does hereby appoint:

Aimee R. Perondine, Alexis Apostolidis, Amanda Pierina D'Angelo, Bethany Stevenson, Brendan Fletcher, Bryan M. Caneschi, Cassandra Baez, Donna M. Planeta, Eric Strba, Gentry Stewart, Jacqueline Rose Susco, Jennifer Gail Godere, Joshua Sanford, Kathryn Pryor, Michelle Anne McMahon, Nicholas Turecamo and Rebecca M Josephson of Hartford, CT (EACH)

its true and lawful Attorney(s)in-Fact, to make, execute, seal, and deliver from the date of issuance of this power for and on its behalf as surety, and as its act and deed: Any and all bonds, undertakings, recognizances and other surety obligations, in the penal sum not exceeding Ninety Million Dollars (\$90,000,000.00). This authority does not permit the same obligation to be split into two or more bonds in order to bring each such bond within the dollar limit of authority as set forth herein.

The execution of such bonds, undertakings, recognizances and other surety obligations in pursuance of these presents shall be as binding upon the said Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal administrative office in Jersey City, New Jersey.

This Power of Attorney is executed by authority of resolutions adopted by unanimous consent of the Board of Directors of the Company on December 10, 2020, true and accurate copies of which are hereinafter set forth and are hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them subject to the limitations set forth in their respective powers of attorney, to execute on behalf of the Company, and attach the seal of the Company thereto, bonds, undertakings, recognizances and other surety obligations obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the unanimous consent of the Board of Directors of the Company on December 10, 2020:

VOTED, That the signature of the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company, and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to the resolution adopted by the Board of Directors on December 10, 2020, and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company. In Testimony Whereof, the Company has caused this instrument to be signed and its corporate seal to be affixed by their authorized officers, this 2<sup>nd</sup> day of December, 2021.

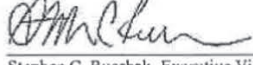
## Attested and Certified

  
Regan A. Shulman, Secretary

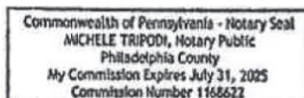
STATE OF PENNSYLVANIA SS  
COUNTY OF PHILADELPHIA SS

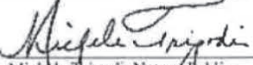


## Arch Insurance Company

  
Stephen C. Ruschak, Executive Vice President

I, Michele Tripodi, a Notary Public, do hereby certify that Regan A. Shulman and Stephen C. Ruschak personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.



  
Michele Tripodi, Notary Public  
My commission expires 07/31/2025

## CERTIFICATION

I, Regan A. Shulman, Secretary of the Arch Insurance Company, do hereby certify that the attached Power of Attorney dated December 2, 2021 on behalf of the person(s) as listed above is a true and correct copy and that the same has been in full force and effect since the date thereof and is in full force and effect on the date of this certificate; and I do further certify that the said Stephen C. Ruschak, who executed the Power of Attorney as Executive Vice President, was on the date of execution of the attached Power of Attorney the duly elected Executive Vice President of the Arch Insurance Company.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the Arch Insurance Company on this 10<sup>th</sup> day of March, 2022.

  
Regan A. Shulman, Secretary

This Power of Attorney limits the acts of those named therein to the bonds and undertakings specifically named therein and they have no authority to bind the Company except in the manner and to the extent herein stated.

PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:

Arch Insurance - Surety Division  
3 Parkway, Suite 1500  
Philadelphia, PA 19102



To verify the authenticity of this Power of Attorney, please contact Arch Insurance Company at [SuretyAuthentic@archinsurance.com](mailto:SuretyAuthentic@archinsurance.com)  
Please refer to the above named Attorney-in-Fact and the details of the bond to which the power is attached.

## 5. Marketing Approach

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## 5. Marketing Approach

*Briefly describe your firm's proposed approach to promoting and marketing the AEPC Program both in concert with AEO and in your individual marketing efforts for EPC.*

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### Public Relations and Social Media

ABM carries a strong presence in the media. Once awarded the ADEQ contract, ABM will develop and distribute either a press release and/or social media posts announcing the new partnership. In addition, as projects are awarded through the partnership, press releases and/or social media posts announcing the projects will be developed and distributed to relevant media platforms. These press releases and social media posts may be co-branded as appropriate.

In addition, we may also develop articles regarding awarded projects that mention the ADEQ partnership to pitch and/or submit to national, local, regional, and trade publication outlets.

### Email Marketing Campaigns

We have a proven track record using email marketing for brand awareness and lead generation for our projects within the energy savings performance contracting market. We will enhance ADEQ and ABM brand awareness among the performance contracting market through various targeted email marketing campaigns.

A sample campaign is outlined below:

- Introductory email blast to ADEQ members announcing ABM's new affiliation.
- Quarterly email campaigns consisting of 3-5 emails per campaign to ADEQ members.
  - Where relevant, the campaigns may contain a number of different co-branded materials, including but not limited to brochures, infographics, white papers, and articles.
  - They may also contain announcements and/or success stories highlighting awarded projects obtained through ABM's ADEQ affiliation.

### Other Sales and Marketing Collateral

To relay messaging and keep ABM and the ADEQ first in mind to the performance contracting market, our marketing team produces professional marketing and sales materials, including but not limited to brochures, infographics, and sales presentations. We will incorporate the ADEQ logo as well as a brief description of the partnership in all appropriate customer-facing sales materials and marketing collateral.

## Social Media Examples

**Facebook**

ABM is now a Preferred Vendor of ADEQ for ESPCs!

*We are excited to announce that ABM have been accepted as a preferred vendor for our energy savings performance contracting with ADEQ!*

**Google Plus**

ABM is now a Preferred Vendor of ADEQ for ESPCs!

*We are excited to be working with ADEQ to help with their energy needs. [LINK HERE]  
Thank you for your support!*

**LinkedIn**

ABM is now a Preferred Vendor of ADEQ for ESPCs!

*We are excited to be working with [customer] to help with their energy needs. Thank you ADEQ for your support!*

**Twitter**

ABM is now a Preferred Vendor of ADEQ for ESPCs!

*We are excited to assist ADEQ with their energy needs. [LINK HERE]*

**ABM also has thousands of subscribers on YouTube!**

You can find our page at <https://www.youtube.com/user/ABMBuildingValue/videos>.

## 6. Reporting Approach

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	Series 1	Series 2
1/1/2016	0.17	5.60
2/1/2016	0.95	8.52
3/1/2016	1.56	8.74
4/1/2016	2.09	1.08
5/1/2016	2.69	5.54
6/1/2016	2.73	3.03
7/1/2016	3.49	6.00
8/1/2016	3.65	5.78
9/1/2016	4.01	4.32
10/1/2016	4.57	7.56
11/1/2016	5.45	5.90
12/1/2016	5.45	2.43
1/1/2016	0.17	5.60
2/1/2016	0.95	8.52
3/1/2016	1.56	8.74
4/1/2016	2.09	1.08
5/1/2016	2.69	5.54
6/1/2016	2.73	3.03
7/1/2016	3.49	6.00
8/1/2016	3.65	5.78
9/1/2016	4.01	4.32
10/1/2016	4.57	7.56
11/1/2016	5.45	5.90
12/1/2016	6.16	2.43





## 6. Reporting Approach

*Describe your firm's approach to providing signed copies of contracts and measurement and verification reports to AEO in a timely manner. In addition, describe how you will meet the requirements for providing project performance metrics, described in detail in the Program Manual.*

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### Contracts

Prior to the execution of each energy savings performance contract our team will meet with the ADEQ team to negotiate terms, conditions, pricing and all other elements of our standard contract. Each key milestone of the project development process will involve both the ABM and the ADEQ teams. These milestones include:

- Project Kickoff
- Construction updates
- Commissioning and Training
- Project Close-Out
- Projects Performance Monitoring

### Typical M&V Services

#### Monitoring Reports

The ADEQ will receive a monitoring report with the following calculation for each building.

$$\text{HISTORICAL ENERGY BASELINE} - \text{ACTUAL ENERGY CONSUMPTION} \times \text{CONTRACTUAL ENERGY RATES}$$

Other savings calculation methodologies, as identified in the program, will also appear on these reports. They summarize the total savings for year-to-date and compare them against a prorated portion of the guarantee, so the progress of the program can be tracked.

At year-end, our M&V team compiles the savings, addresses any adjustments, and issues a final year-end report for acceptance by the ADEQ. We use the savings as reported to fulfill the requirements under the guarantee. We will note any changes to the baseline or savings adjustments in the monitoring reports, which we can modified to meet the ADEQ's needs, often without additional expense.

#### Monthly Activities

- Receiving and compiling energy bills or other data needed to M&V process
- Analyzing utility bills for errors or irregularities

#### Year-End Reports

- Final savings calculations and adjustments
- Overall analysis of facility energy performance
- Graphs comparing current usage to baseline usage

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## 7. Technical Approach

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## 7. Technical Approach

### 7A. INVESTMENT GRADE AUDIT

*Provide a description of the process your company uses to develop a typical audit in the types of facilities that will participate in the AEPC Program. Note any changes that will be made to comply with requirements of the AEPC Program.*

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#### General Approach to Investment Grade Audits

The Investment Grade Audit (IGA) process addresses the ADEQ's needs through proven methods of discovery. ABM will identify opportunities for improvement and savings, allowing us to work with you to craft a tailored, value-based solutions package. We seek input from team members at all levels of your organization so that we may gain the best understanding of the unique challenges, objectives, and expectations you face every day. Each person involved from your organization will have ownership in the outcome, ensuring the success of your project. Your people know your facility best.

Once the ADEQ has reviewed the Preliminary Assessment (PA) and approves the process, the IGA will be implemented. A detailed analysis will provide you with firm numbers for the energy savings and the cost of our recommended improvements. Our team will also look at how we can enable the replacement of existing infrastructure that is beyond its useful life.

During the IGA we will evaluate:

- Utility consumption
- Existing building control strategies
- Condition of existing infrastructure
- Existing lighting technology
- Building envelope issues
- Existing water consuming devices

Through discussions with your staff, we will obtain information regarding building and site drawings, operating systems, building envelopes, recent modifications or renovations, and any planned changes. We will also study building plans, observe energy consuming equipment, and review the following:

- Internal uses by people
- Uses by miscellaneous "plug load" equipment, such as copiers, computers, vending machines
- Operation & occupant schedules for each facility in conjunction with previously determined equipment load

We will evaluate the feasibility of installing energy conservation measures (ECMs) to reduce utility costs associated with operating the building. Application to each specific building will be observed, as well as the impact on the ability of the system to provide climate control. It is our engineering and design team's goal to demonstrate and evaluate how the project will improve the efficiency of the ADEQ's facilities through the reduction of utility consumption and operational expenditures. The net financial benefit of the measures will be entered into a pro forma to determine the financial impact of the program.

## Savings Calculations

To calculate energy savings, our engineers use modeling software programs based on American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) fundamentals to construct a computer model of the annual energy performance of a building. They input all construction, mechanical, and electrical characteristics, as well as operating patterns. The computer model becomes a representation of an existing building.



Once the building survey is complete and put into the modeling software, the facility is matched to the utility history. In this case, “matched” means that the computer model’s energy consumption is similar to the utility history of the facility. Ideally, a model is matched to its respective building’s energy usage by comparing an average of three years of utility data.



When the model for baseline conditions is complete, we input the proposed ECMs that are to be used in the different facilities and evaluate what the overall impact is on the utility spend. These findings are re-evaluated on an individual measure to ensure accuracy. Several calculations are used to verify the energy savings associated with each ECM, all of which are derived from ASHRAE and National Association of Energy Service Companies (NAESCO) standards.

There are several Department of Energy (DOE) software programs, metering tools, thermal scanning equipment, sub-metering tools, and other industry-approved technologies to help assist with the measurement of energy consumption. ABM uses the tools most appropriate for the energy source being measured.



## Multiple Baselines

ABM does not use multiple baselines. We work diligently to produce a very specific baseline that matches the characteristics of the facility we are modeling.

## Operational Savings

Operational Savings are true savings but unlike utility savings, cannot always be quantified through a meter or sensor. Typically, operational savings are verified through historical data such as past invoices for reactive repairs, work orders or through predictive measures such as long-range planning and capital outlay plans.

ABM will follow strict national and state guidelines to ensure that the ADEQ can verify and reconcile any operational savings used to justify the financial performance of the project.

The following operational costs will be reviewed and documented by ABM during the IGA:

- Deferred maintenance
- Administrative costs
- Financial restructuring
- Outside contracts
- Parts purchases
- Equipment repairs
- Scheduled/unscheduled equipment replacement
- Manpower

Savings will be calculated based on historical and future predictive data with savings being stipulated based on the collected data. Although the savings are not guaranteed to be met, past performance and expenses are good representations for continued spending habits and expenses. Again, any inclusion of operational savings in the contract will be the decision of the ADEQ.

## Energy Savings Risk Factor

The industry standard is to produce an annual Measurement and Verification (M&V) report to show achieved savings and measure them against guaranteed savings. If we were to hold a closer tolerance on this process, the ADEQ could see a shortfall monthly, but not reconcile the savings until the end of the guarantee period. Additionally, ABM knows that operating parameters change on a monthly basis. The ADEQ should not have to inform us of every little change that occurs in a facility.

## Assigning Dollar Values to Savings

All utility rates – be it water, sewer, electricity, gas, or fuel oil – have a cost per unit. The unit is dependent upon the commodity as in kWh, gallon, therms, etc.

Depending on the facility and their rate structure, the dollar value assigned to savings could be purely based on cost of kWh, demand charges, and blended rate, which combines both kWh and demand charges. An example savings to dollar value calculation is as follows:

**Units saved (kW, gallons, etc.) X cost per unit = \$ Dollars saved.**

Operating and capital savings are stipulated based on the ADEQ's audited financials and as agreed during the IGA process.

Following baseline development, the physical audit process is initiated. Our trained audit team visits the site and performs a IGA of the included lighting equipment, HVAC controls and equipment, boilers, motors, significant energy consuming equipment and facility grounds. The team we propose to use for this project will include our most senior auditors, who carry a variety of certifications and credentials.



## Field Audit

The field audit for the ADEQ will include, at a minimum, collection of the following information on existing conditions included with this project:

- Building name & number
- Building type/usage (parking, administrative, etc.)
- Building construction (steel, stucco, etc.)
- Lighting conditions, requirements, & levels
- HVAC conditions, requirements, & existing controls
- Solar potential & location assessments
- Boiler usage, condition & estimated life span
- Motor age, usage, wattage & estimated life span
- Details on additional energy equipment added to the contract scope
- Access issues – both physical access & security-related
- Building automation system/sequence of operations
- ECM suitability for intended purpose & consistent with requirements
- Construction cost consistent with similar ECMs in recent projects
- Proposed construction schedule reasonable & consistent with previous projects
- Commissioning plan approach
- Methodology used to calculate baseline energy use adequate & supported by the included measured data
- Operating hours & other assumptions are reasonable & well-documented
- Energy savings estimate consistent with similar ECMs in recent projects & is adequately documented
- Interactive effects with other ECMs considered in the calculations
- Assess the need for expert review of building models (DOE-2, EnergyPlus, etc.) & obtain secondary reviews as necessary
- Simulation models adequately calibrated
- Sampling of equipment to calculate baseline performed correctly
- Energy cost savings calculation consistent with energy savings estimate & baseline energy unit prices
- Energy-related O&M cost savings reasonable, well-documented & consistent with Federal Energy Management Program (FEMP) guidance & supported by customer evaluation
- Added O&M costs for additional equipment adequately documented & included in cash flow
- For ECMs with expected useful life less than project term, replacement plan is documented
- Post-installation M&V activities appropriate & adequate to determine potential to provide savings
- Annual M&V activities adequate & consistent with current FEMP guidance
- Planned measurements during post-acceptance M&V confirm performance as opposed to confirming operation
- Any sampling performed during M&V is adequate & consistent with FEMP guidelines
- Where M&V method depends on customer-maintained equipment, reviewer comments address the potential risks and/or recommend a backup plan
- Where ECMs or M&V depend on connection to military LAN, reviewer comments address potential risks

## Investment Grade Audit Tools

ABM utilizes a customized version of a proprietary auditing system developed specifically for Investment Grade Audit (IGA). The system utilizes web-enabled tablet devices for collection of field data, including line-by-line audit information, linked photographs, free-form field drawings, and dictation by the auditor. The system uses multiple databases to create a profile of the existing site equipment and controls conditions based on field-entered data. After the IGA, the design, pricing, and proposal is created for the project, with detail available in various summary formats, including by building, by building type, fixture type, etc. This is a real-time, web-enabled, and fully integrated system.

IGA tools include:



*Tablet device for field collection of data*



*Hand tools for opening fixtures and controls*



*Wattage meter for pre and post M&V, as needed*



*Data loggers for run time and occupancy studies*



*Digital Cameras*



*Air flow and water meters*

*\*All IGA tools will be calibrated per manufacturer's recommendation prior to use*

After using these tools, we put these findings in the IGA. This involves a thorough examination of the facility's operational budget and the relationship between expenses and services received. Our engineers and facility management reports can analyze every aspect of the operation, from utility rates to lighting upgrades. Our comprehensive study guarantees an efficient operation and addresses the concern on environmental and future local, state, and federal guidelines.

We will compile a IGA, involving an examination of the facility's operational budget and the relationship between expenses and services received. Our engineering and facility management reports can analyze every aspect of your operation, from utility rates to lighting upgrades. By taking these steps, we can guarantee an efficient operation and address any concerns on environmental, local, state, and federal guidelines.

Guaranteed construction costs are a necessity in guaranteeing paybacks and no change orders. We have been guaranteeing performance on designs for over 40 years – longer than most Energy Services Companies (ESCOs) you will find in business today. Our administrative personnel, project developers, and engineering team members support the design of mechanical systems for our customers rather than the sales or design of a product or vendor system.

## Schedule and Timeline for the Investment Grade Audit

Typically, the IGA takes approximately 12-16 weeks from signed timeline until completion. Upon acceptance and signature of the IGA, ABM can immediately mobilize our development team to begin the IGA process. Data is collected and the walk-through typically begins within a week.

### Sample IGA Timeline

Step	Estimated Time to Complete	Duration of IGA (Weeks)															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Energy Engineering	4-8 weeks																
Pricing	3-4 weeks																
Guarantee	1-2 weeks																
IGA Report	2 weeks																

### Energy Engineering

This process requires the engineering, energy savings, and calculations to be put together and finalized. Our team reviews each ECM and its interactions with each other to determine a precise energy and operational savings outline, which will become the basis of the guarantee.

### Pricing

During this process, ABM and its project team begin pricing the ECMs identified in the preliminary evaluation. If subcontractors are used, they are brought in, as well.

### Guarantee

This process requires the Measurement and Verification team to apply the International Performance Measurement and Verification Protocol (IPMVP). This is a federally acceptable process for measurement of savings. These calculations become the basis of the guarantee for the final project.

### IGA Report

Upon completion of the IGA, the report is compiled and delivered. The pricing, savings, and guarantees are reviewed and finalized, along with the potential financing and cash flows.

***Provide a recent sample investment grade audit as an electronic attachment. The audit should be representative of a recent energy efficiency project in a government facility. Provide verification that the sample audit was conducted by the members of the company's team who will be participating in the AEPC Program.***

*Please see a copy of our sample Investment Grade Audit (IGA) on the USB flash drive included with this submittal.*

## 7B. STANDARDS OF COMFORT AND CONSTRUCTION SPECIFICATIONS

*Provide a brief description of the standards of comfort the company generally uses for light levels, space temperatures, ventilation rates, etc. in the facilities intended for the AEPC Program and any flexibility for specific needs of the public entity.*

An ABM guaranteed energy project will not save energy at the expense of occupant comfort or otherwise jeopardize the indoor environment for our customers. We will make the ADEQ's spaces operate more efficiently within the guidelines and standards set for the project.

To illustrate this point, we have included sample language from our contract with Columbia College. As you can see, it shows the comfort standards and operating hours set for their campus. ABM assisted in making it more efficient and responsive to the needs of their students.

For over 20 years, research has proven that improved physical environments have positive effects on learning, worker productivity, health, performance, and absenteeism. The changes in the physical environment that can positively affect the working process are:



*Improved lighting levels & increased natural light*



*Improved humidity & temperature control*



*Removal of hazardous waste*



*Reduced noise levels*



*Improved ventilation & indoor air quality*

### Run Times & Conditions (Sample)

The design space temperatures for heating are 68 - 70°F or less; the design space temperatures for cooling are 72 - 76°F or more. The control system will be set to achieve the nominal design space temperature for heating or cooling. It is understood by both parties that there will be events and/or meetings that will go beyond the normal hours of operation as described below and have been accounted for in the Baseline Conditions.

### Hours of Operation (Sample)

The normal hours of operation are based on building types and usage and are as follows:

#### Administration Buildings and Offices

SUN	MON	TUES	WED	THURS	FRI	SAT
None	6am–7pm	6am–7pm	6am–7pm	6am–7pm	6am–7pm	None

#### Residence / Dormitory Halls

SUN	MON	TUES	WED	THURS	FRI	SAT
24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours	24 Hours

#### Classrooms and Conference Rooms

SUN	MON	TUES	WED	THURS	FRI	SAT
None	6am–7pm	6am–7pm	6am–7pm	6am– 7pm	6am–7pm	None



## 7C. BASELINE CALCULATION METHODOLOGY

*Provide a brief description of the methodology normally used by the company to compute the baseline of energy and water use for a facility. Include a discussion of how the public entity is engaged for development of an agreement on the baseline.*

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The first step of a IGA is developing the baseline. Baseline energy use is defined as the monthly and annual usage of each active energy source at the building. It is indicative of usage with current equipment, occupancy, and operational methodology.

When establishing a baseline, ABM analyzes energy usage records for the most recent two to three years. We consider any changes in facility equipment and operations that would alter the usage during that period. Actual data is used to develop an energy and water-usage computer simulation model for facility calibration. This model serves as a tool for evaluating energy savings and accounting for energy consumption interactions between energy conservation measures.

During site visits, ABM gains an understanding of the programmatic activities conducted in each of the ADEQ's buildings. We analyze the electrical and mechanical equipment operating patterns.



**To create each of your facilities' operating baselines, we use the following:**

- Local utility rates
- Renewable energy opportunities
- Research on "fuel switching"
- Building population
- Regional weather data
- Behavioral patterns
- Operating hours
- Maintenance history
- Utility procurement practices

The established baseline is always presented and explained to the ADEQ. Together, we will approve all baseline calculations.

An energy usage computer simulation model will be developed for each building and calibrated by using baseline data. This model is used as a tool for evaluating energy savings for specific energy reduction measures and accounts for utility consumption interactions between energy-saving measures.

## 7D. ADJUSTMENTS TO BASELINE

*Provide a brief discussion of typical factors that can impact the calculated baseline and the company's general approach to adjusting the calculated baseline if one or more of these factors are present. Include how the public entity is involved for agreement on any adjustments.*

A dynamic facility is one reason that energy savings can appear to decrease over time. Adjustments must be made to the baseline if the true savings derived from the ECMs are to be accounted for when a facility is modified for reasons outside the scope of the performance contract.



### Typical changes to facilities include, but are not limited to:

- Occupancy schedule changes
- HVAC schedule changes
- Additions to buildings
- New HVAC equipment
- Remodeled buildings
- Other additional equipment

As the ADEQ informs ABM of any changes to the facility that may affect energy use, ABM will quantify the effects of the changes on the overall energy use of the facility. The additional calculated monthly usage will be presented to the ADEQ for approval and added to the baselines for use in the savings calculations.

If excess time is required to calculate the effect of large-scale changes, the ADEQ may be asked to pay for the time involved or agree to another form of savings calculations for the areas affected by the change.

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## 8. Company Scope of Services

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## 8. Company Scope of Services

*Provide a brief description that highlights your firm's capabilities to provide services for the following items. Include as many as possible to validate firm's capabilities.*

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### 8A. ENERGY SYSTEMS IN BUILDINGS:

We provide a full suite of mechanical and electrical services and has licenses as both a mechanical contractor and electrical contractor. Common Energy Conservation Measures (ECMs) that we implement with respect to the mechanical and electrical infrastructure are as follows:

#### Central plants

##### **Chiller plants**

Chiller plant retrofits, including air-cooled, water-cooled, and hybrid ground-source designs (including variable refrigerant flow technology) to achieve maximum efficiency.

##### **Chilled/hot water piping**

Chilled and hot water piping infrastructure is addressed with proper insulation installation, water heater replacement to tank-less or heat pump design, steam trap repair/replacement/monitoring, and repair or replacement of existing condensate return systems and installation of new condensate return systems.

#### Control and building automation systems

Control system upgrades to web-enabled open protocol systems to improve scheduling, setbacks, optimum start/stop, ventilation control per ASHRAE 62.1, and elimination of pneumatics. We have provided this solution on every project to date. ABM is vendor-neutral, but has technicians trained in Tridium platform and KMC end devices.

#### Lighting systems

Lighting upgrades, including interior and exterior lighting retrofits and replacements, intelligent lighting controls, occupancy sensors, Light Emitting Diode (LED) technologies, daylighting, and spectrally enhanced lighting. ABM owns its own lighting group, which provides extra value to our customers. We have provided this solution on every project to date.

#### Distributed generation

Energy distribution systems are analyzed to determine if transformer upgrades, power quality upgrades, and/or power factor correction are necessary and self-funding.

#### Fuel switching

Boiler plant retrofits, including fuel switching and hybrid plant design with condensing boilers. Boiler decentralization is a common measure to reduce pumping energy and standby losses.

## Heating systems

### HVAC

HVAC upgrades on packaged and split system equipment, including HVAC damper and controller repair or replacement, cooling tower retrofits and/or replacements, economizer installation, fan and pump replacement or impeller trimming, thermal energy storage, and variable air volume retrofits. HVAC system refrigerant flushing/balancing and HVAC coil coatings are frequently included on equipment that does not need to be replaced due to limitations of the cash flow.

### Ground-source heat pumps

Ground-source heat pumps are approached as hybrid systems, often with an added cooling tower, to ensure an optimized/minimized well field. Continuous monitoring of loop temperatures and system performance is highly recommended to maintain optimum performance.

## Indoor air quality

Indoor air quality (IAQ) has the potential to reduce operational costs on retrofit projects and provide a higher level of energy savings. It can reduce OA by adding air purification and cleaning the air in the building, thus allowing the air to be recirculated and reducing the need for higher OA quantities. Unlike the VRP, the IAQP does not look at the amount of outside air per person or per square foot. Instead, it requires reviewing the contaminants of concern and running mass balance equations to determine the steady state of contaminants based on filtration effectiveness.

## Kitchens

Kitchen or fume hood suppression systems, standpipes, sprinklers, pipe and appurtenances, valves, inspectors test stations, control panels, and interlocks with other systems. System types may include but are not limited to wet pipe, dry pipe, pre-action, carbon dioxide, water mist, and other approved systems and shall be as specified in the project scope of work. All work shall be in accordance with all involved codes, regulations, and laws to include UFC 3-600-01, NFPA 13, NFPA 14, and other applicable NFPA standards.

## Laboratories

We apply deep, industry-specific knowledge to keep your facility safe, clean, and comfortable – all while keeping your risk low. With ABM as your partner, you can take your attention off the facilities management and focus on your next big breakthrough. Our team of fully trained experts provides high-quality services and knowledge of the industry, keeping you secure and poised to improve efficiency, operations, and the bottom line.

## Laundry

Many of our correctional facilities customers have experienced energy and cost savings from upgraded laundry facilities equipment including high-efficiency equipment like Energy Star and EnergyGuide washers and dryers.

Water conservation measures are installed on most of our performance contracts, including plumbing fixture replacements to low-flow technology and landscape management with web-enabled and surface moisture-sensing controls. This ensures proper hydration of ground cover without overwatering, including flexible anticipation of weather forecasts to use natural water fall over potable sources. We optimize evaporative condensers for refrigeration to maintain higher cycles of concentration, reducing potable water needs. Slowdown water is treated and re-used in the building, where permitted.

## Renewables (geothermal solar-electric/thermal, wind, biomass)

### Solar

We install, operate, and maintain solar photovoltaic solutions and solar thermal systems to help you stabilize and reduce utility costs and generate revenue from unused rooftops, parking lots, sports fields, and unused land.

### Energy Storage Systems

We install, operate, and maintain energy storage solutions to help you manage your facilities' peak demand, stabilize and reduce utility costs and generate revenue by providing grid or ancillary services during periods of high-power prices.

## Swimming pools and recreational facilities

Partnering with many education and local government facilities across the nation, we have developed customized solutions for many public and private swimming pools. Measures include upgraded water heating measures such as high-efficiency or solar heater, using a pool cover. High-efficiency pool pumps have also helped our customers with their water conservation efforts.

## Transportation (fleet fuel management, etc.)

### EV Charging Stations

Attract tenants, occupants, and staff by installing EV charging stations. ABM has met the growing demand for EV Charging Station solutions by proactively engaging the market for many years. Through this experience, we have developed best practices and standardized pricing and processes. Our turn-key solution approach includes full sales support, seasoned electrical expertise, and breadth of coverage.

## Additional options

### Building Envelope

Building envelope is inspected. ABM has experience with insulation installation, weatherization, roofing modifications to include reflective coatings, roof replacements, tuck-pointing and restoring brickwork, window replacement, and reflective solar window tinting.



## 8B. PROJECT DEVELOPMENT AND IMPLEMENTATION

ABM's engineering team generates design and construction documents to clearly define the complete requirements of the project to include applicable codes and criteria detailing the following:

- Site investigation
- Asbestos / lead-based paint abatement survey and plan
- Description of the work required
- Manufacturers installation procedures
- Catalog cuts and equipment specifications
- Work schedule and phasing plan
- Original scope of work
- Detailed materials take-off

Material and equipment used shall include standard products from a regularly engaged manufacturer and shall essentially duplicate items that have been satisfactorily in use. The work plan shall address the means of access and egress in the involved areas during the renovation periods for staff and visitors. The engineering and project development teams will investigate the requirements for permitting of air quality, boiler operation, potable water, wastewater, storm water discharge, dredge and fill, local construction for disruptions of vehicular traffic, and base utility systems permit requirements. Our design documents include a list of required permits for performing work, such as dig permits, welding permits, dark sky ordinances, irrigation well construction, and consumption use.

The following disciplines are typical to many of ABM's projects and serve as an example of the depth and detail of our engineering design processes. We will address all applicable disciplines as required within the work plan in accordance with design requirements.



### Site Work

Site clearing, demolition and removal, grading, soil treatment, horizontal and vertical control, flexible and rigid pavement, parking, access controls, storm drainage, bollards, sidewalks, concrete curb and gutters, utility services, valves and meters, miscellaneous site features and final site stabilization. All site work shall comply with current codes, regulations, laws, and standards requirements.



### Architectural

Interior and exterior finishes, wall systems, doors, roofs, floor systems, passive life safety systems, vapor barriers, glazing and frames, louvers, screen walls, interior and exterior signage, insulation, casework, fire and extinguisher cabinets, miscellaneous accessories, and furnishing/equipment as required by the scope of work. All architectural work shall comply with current codes, regulations, laws, and standards.



### Structural

Foundations, walls, floor framing, roofing framing, lateral load stability, framing and connection of any architectural features, support of mechanical and electrical equipment, and repairs to existing buildings. All work, both repair and construction, shall comply with applicable current code, regulations, laws, and standards.



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**Interior Design**

Floor, wall, ceiling systems; finishes involving repair and new installation work as identified in the scope of work and shall comply with current codes, regulations, laws, and standards.



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**Heating, Ventilating & Air Conditioning (HVAC)**

Repair or installation of variable volume air handling systems, constant air volume systems, multi-zone air handling systems, condensing units, chiller, boilers, air handlers, fans, dampers, pumps, unit heaters, fan coil units, compressed air systems, ductwork and appurtenances, controls systems, and any other cooling/heating plant accessories and/or appurtenances. Systems shall be designed to meet industry standards, codes, Government regulations, and the requirements of the project scope of work and contract. Repair and installation work shall be quality and technically accurate. All work shall be coordinated with other disciplines, ensuring compatibility of all building systems. Where applicable, the layout of rooms and equipment shall consider proper maintenance clearance, including coil pull space, dedicated electrical space required by the National Electrical Code (NEC), and separation of conditioned and unconditioned areas.

Load calculation shall be in accordance with the current edition of American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals. Energy use shall be designed to achieve energy consumption levels at or below ASHRAE 90.1 and applicable codes if lifecycle is cost-effective. Materials, R-values, equipment and motor efficiency, temperature control systems, lighting, and lighting controls shall be used to the extent possible to provide an energy-efficient facility that beats the target energy budget. Required incidental design shall include testing, balancing, and adjusting by a firm certified by National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC) to provide Air and Hydronic Testing, Adjusting, and Balancing (TAB) services. All TAB testing reports shall be submitted for approval.



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**Plumbing**

Repair or installation of domestic water heaters, plumbing fixtures, pumps, valves, piping and appurtenances, reverse osmosis systems, water filtration systems, water storage tanks and systems, automatic controls, low-flow faucet aerators, low-flow toilets, cooling tower modifications, boiler modifications. and all other items required for a complete and functional plumbing system. All design, materials, equipment, and work shall be in accordance with applicable codes, regulations, standards, and laws to include UFC 4-510-01 and the National Plumbing Code (NPC). Repair and installation work shall be as determined by the requirements of the individual scope of work.



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**Fire Suppression System**

Kitchen or fume hood suppression systems, standpipes, sprinklers, pipe and appurtenances, valves, inspectors test stations, control panels, and interlocks with other systems. System types may include but are not limited to wet pipe, dry pipe, pre-action, carbon dioxide, water mist, and other approved systems and shall be as specified in the project scope of work. All work shall be in accordance with all involved codes, regulations, and laws to include UFC 3-600-01, NFPA 13, NFPA 14, and other applicable National Fire Protection Association (NFPA) standards.



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**Electrical System**

Repair or construction of an Electrical Systems as required by the scope of work shall be in accordance with NFPA 70, NFPA99, and NFPA 110. Essential equipment transfer switches, distribution equipment, and batteries shall not be located in the same room as normal service equipment. Seismic protection shall be provided in seismic zones in accordance with applicable local codes.



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**Exterior Electrical System**

May include, but not limited to repair or new construction power distribution system to include transformers, main protection devices and feeders, conductors, duct banks, etc. The primary electrical distribution system shall meet the requirements of the National Electrical Code (NEC) unless more stringent specifications elsewhere in the contract documents. The main distribution systems shall not be located under any buildings and manholes shall be used where needed. Voltage drop requirements shall be in accordance with TM 5-811-1, Chapters 5-4 and figure 5-1. 3-530-01AN and Illuminating Engineering Society of North America (IESNA) guidelines.



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**Exterior Lighting System**

Repair and/or construction of parking lot, walkway, and entrance lighting, or special lighting for exterior signage or similar items as identified in the project scope of work. The design of exterior lighting and associated lighting levels shall be in accordance with Illuminating Engineering Society (IES) guidelines.



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**Interior Electrical System**

Repair or installation shall include, but not limited to work on panelboards, circuits, service entrance equipment, surge protection, disconnect switches, isolated power systems, ground, circuit breakers, motor control centers, relays, wiring, conduit, receptacles, ground fault interrupters, and other items as required. All repair and/or installation UFC 3-520-01, UFC 4-510-01, NFPA 70, NFPA 99, NFPA 110 and other national standards as applicable to the involved systems. The work on the lighting systems required by the individual project scope of work shall meet all requirements of ASHRAE 90.1 and IES guidelines. Short circuit analysis and arc flash hazard analysis may be required for electrical distribution systems to include a fault-impedance diagram, a load flow analysis or study, a short-circuit analysis or study and power system coordination study. Personal Protection Equipment (PPE) labels for all electrical shall be provided. Emergency Lighting shall be in accordance with NFPA 70 NFPA 99, NFPA 101, and Unified Facility Criteria (UFC) 4-510-01 with battery back-up lighting in accordance with UFC 4-510-01.



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**Electrical Design Calculations**

Calculations shall be provided as required to include interior lighting, exterior lighting, load analysis, fault analysis, and voltage drop.



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**Environmental Consideration**

ABM shall obtain all required permits in the performance of individual projects and copies of all environmental correspondence to include request for permits shall be provided to the customer.

### *Investment Grade Energy Auditing (ASHRAE Level 3 audit)*

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## Technical Approach

ABM will conduct an on-site survey of the ADEQ's lighting; heating, ventilating, and air conditioning (HVAC) equipment; water usage; building envelope; and facility operations. In the survey, we evaluate the energy and utility consumption and costs (fuel oil, natural gas, electric, water, and sewer), as well as the existing building control strategies. We also review the operation schedules for each facility and miscellaneous "plug load" equipment (copiers, computers, and vending machines). The ADEQ will receive a description of the savings potential from the measures evaluated in our Project Development Analysis (PDA) and will be shown additional project funding that can be generated by leveraging these savings.

## Baseline Calculation Methodology

### Establishing Baseline

Baseline energy use, developed during the PDA, is the monthly and annual energy output from current equipment, occupancy, and operational methodology.



#### In determining a baseline, we:

- Analyze energy usage records for the past three years, taking into account any changes in facility equipment and operations that would alter the usage during that three-year period.
- Obtain a thorough understanding of the programmatic activities conducted in each building, as well as an understanding of the electrical and mechanical equipment operating patterns.
- Develop an energy and water usage computer simulation model for the facility and calibrate using actual data. This calibrated model is used as a tool for evaluating energy savings for specific Energy Conservation Measures (ECMs) and accounting for energy consumption interactions between ECMs.

Once we have an annual baseline, we review prior years to determine if anything significant has changed. If the pattern is consistent, we have good reason to believe that the building is operating as its equipment and controls system will currently allow.

### Total Monthly Energy Use by Building

After completing mechanical drawings, data logging, and a survey, we perform an in-depth end-use analysis. This gives the ADEQ and ABM a better understanding of building energy use based on the load profile, occupancy patterns, and overall system efficiencies.

## Baseline Maintenance

A dynamic facility can show energy savings that appear to decrease over time. We must adjust the baseline if the true savings derived from the ECMs are to be accounted for when the customer modifies a facility for reasons outside the scope of the performance contract.



### Typical changes to facilities include:

- Occupancy schedule changes
- HVAC schedule changes
- Additional miscellaneous equipment
- New HVAC equipment (cooling)
- Additions to buildings
- Remodeled buildings

If excess time is required to calculate the effect of large-scale changes, we may ask the customer to pay for the time involved or agree to another form of savings calculations for the areas affected.

ABM will obtain data associated with changes at the facility and will furnish questionnaires to assist the ADEQ's designated personnel in providing required information. We model the questionnaire after ones we found effective in similar programs and customize it to accommodate your record-keeping methods.

As the ADEQ informs us of any changes that may impact energy use, we measure the effects on the overall energy use of the facility. The additional calculated monthly usage will be presented to the ADEQ for review and approval and added to the baseline(s) for use in the savings calculations.

## Restoration of Energy Using Equipment

Restoring non-operable equipment will cause an increase in the amount of energy used, particularly electricity. ABM's proprietary in-house comprehensive energy analysis software program can compute the anticipated annual utility consumption for these devices with an accuracy of +/-3%. It can also account for degradation of efficiency in rebuilt equipment.

We recommend adding the annual energy use from restored equipment to the initial baseline for the appropriate facility. We subtract the actual energy use after the implementation of the program from the adjusted baseline.



## Calculation Methodology

ABM determines energy savings on a monthly basis by using the baseline energy usage and the actual billed energy consumption of the facility. The steps in determining savings are shown arithmetically:

$$\text{BASELINE / ADJUSTED BASELINE} - \text{ACTUAL USAGE} = \text{ENERGY SAVINGS}$$

ABM's Monitoring Department performs measurement and verification of energy savings, ensuring compliance with International Performance Measurement and Verification Protocol (IPMVP) protocol and can use electric meters calibrated for accuracy and registered with the National Institute for Standards and Tests (NIST). We collect utility bill information on an ongoing basis to determine actual usage. During the process of entering data and comparing actual usage to expected usage, we sometimes find utility billing errors.

**ABM's monitoring personnel detect and facilitate the return of tens of thousands of dollars in excess utility charges to affected systems.**

### Methodology to Assign Dollar Value to Savings

Dollar savings are calculated by multiplying the energy incremental rate (i.e., \$/kWh, \$/MMBTU) by the energy units saved. ABM makes adjustments to the incremental rate each year to account for increasing utility rates. Two common methods to accomplish this are the Consumer Price Index and the actual increase/decrease in the utility rate structure. The use of a pre-arranged inflation index or flat utility rate structure establishes a floor and ceiling for utility energy costs. The ADEQ will approve the adjustment method used.

The procedures for assigning dollar values to energy, water, and O&M savings are described in the following paragraphs.

#### 1. Preliminary Evaluation

To accurately report savings from the installed energy conservation measures, complete baselines, and utility rates are developed and analyzed. We evaluate water and energy consumption data provided by the ADEQ. The savings potential at the specified facility is established based on energy and water conserving retrofit scenarios and their associated costs.

#### 2. Data Sources

Accurate information on fuel consumption, building occupancy, equipment down time, and/or renovation schedules is used to provide an assessment of savings. Information is obtained on a number of variables, including utility rates, local weather profile, facility square footage changes, environmental conditions, schedules, and an inventory of equipment in the facility. We obtain weather data from the National Weather Service, National Oceanic and Atmospheric Administration (NOAA), or Accuweather to establish the Comprehensive Energy Analysis baselines. Year-to-year utility usage trends and overall average use date-adjusted values are compared and adjusted to reflect the electric and natural gas usage within each calendar month. This eliminates variation and prepares the data for use in calibrating simulation programs.

#### 3. Utility Rates

Rate structures and actual utility bills are analyzed to determine the current rates being charged to the ADEQ's facilities. The resulting cost per unit is used for savings calculations. This analysis will be presented in the PDA.

#### 4. **Utility Bill Analysis**

Electric, gas and water data is collected and analyzed for the ADEQ's facilities. This data will establish an existing usage pattern and aid in the calculation of predicted savings from the various energy efficiency measures.

#### 5. **Master Meters**

For mastered metered buildings, we find the PDA baseline energy consumption by analyzing up to 36 months of data per meter. We enter the data onto a spreadsheet and normalize to calendar months. The data is used to calibrate the building models developed, estimate savings, and create weather-adjusted equations. For electric and gas data, a weather regression analysis is performed by charting the available usage versus the monthly degree-days. A linear equation is applied to winter and summer data and the correlation of the data is analyzed. Data outside of the norm may be removed until achieving a correlation of 0.8 or greater, or the best possible correlation allowed with the available data.

Utilization of non-utility savings is strictly up to the ADEQ. Some of ABM's customers choose to utilize non-utility savings to maximize project potential, while others choose to utilize utility savings only. ABM's customers that have chosen to utilize non-utility savings have typically utilized all of the savings categories listed above, with the exception of manpower and administrative costs, as these "productivity enhancing" categories often times do not result in actual cost reductions to the customer.

For buildings that contain electric meters, we calculate savings by subtracting the post-implementation billed usage from the baseline usage.

The specific equations for calculating the unit savings are as follows:

#### **Unit Savings = Baseline Usage – Billed Usage**

- Billed Usage = Total Units (kWh or Centum Cubic Feet (CCF)) from the current post implementation
- Utility bill, for all meters of that type for that facility.

#### **Baseline Usage = M x DD + B**

Where:

- M = slope of the equation
- DD = the degree days in the billing period (cooling or heating, depending on the equation used)
- B = they intercept of the equation

The regression equation to be used depends on the fuel type and the number of Heating Degree Days (HDD) and Cooling Degree Days (CDD) in the billing period. The equation will be decided by the follow rules:

For Electric Accounts:

- If CDD = > HDD then use Summer/CDD equation
- If HDD > CDD then use Winter/HDD equation

For Natural Gas Accounts:

- If HDD = 0 then use Summer/CDD equation
- If HDD <> 0 then use Winter/HDD equation

The dollars saved will be calculated by multiplying the units saved by the applicable unit rate.

**Dollars Saved = Unit Savings \* Contractual Utility Rate**

Some sites may not have any correlation to weather. For these sites, non-weather adjusted baseline usage will be determined and used for savings verification. The equations used for the calculation of savings are as follows:

<b>Unit Savings</b>	Baseline Usage – Billed Usage
<b>Billed Usage</b>	Total Units (kWh or ccf) from the current post implementation utility bill, for all meters of that type for that facility
<b>Baseline Usage</b>	Total Units derived from pre-implementation utility bills, representing the usage profile of the facility, usually an average over multi-year consumption

## Procedure for Calculating Energy and Cost Savings

To establish a baseline, ABM deploys extensive data logging and verifies equipment runtimes, CO<sub>2</sub> levels, indoor temperatures and humidity levels, and more. The following paragraphs summarize the typical procedures and formulas ABM uses to measure and calculate energy savings.

## Energy Savings Calculation Methodology

### Lighting Savings

The existing lighting kW baseline is calculated by counting and recording each individual fixture on a room-by-room basis and noting individual wattage. The existing fixture wattages are multiplied by the number of fixtures and tabulated to determine the kW connected load. Annual run hours (diversity factor) are applied to each individual fixture to calculate annual kWh consumption. This will serve as the existing baseline for lighting connected load and lighting consumption. After determining a list of proposed ECMs, the same calculations are conducted for the proposed lighting. Each proposed upgrade is counted and recorded, and each individual retrofit type will be allocated the new wattage to determine the new KW. The annual run hours are applied to determine the new annual kWh consumption. HOBO Lighting, occupancy loggers, and personnel interviews are used to get the lighting runtime.

The total lighting system kW demand savings are calculated by subtracting the proposed system kW demand from the existing system kW demand. Similarly, the total kWh savings are calculated by subtracting the proposed kWh from the existing kWh. The calculation is represented by the following equations:

- Total kW Demand Savings =  $\sum [\text{Existing kW Demand} - \text{Proposed kW Demand}]$
- Total kWh Savings =  $\sum [\text{Existing kWh} - \text{Proposed kWh}]$
- The sum total of the lighting savings is the total kWh and kW demand dollar savings
- Total kW Demand Dollars Savings =  $\sum [\text{kW Demand Savings} * \text{kW Utility Rate} * 12 \text{ Months}]$
- Total kWh Dollars Savings =  $\sum [\text{kWh Savings} * \text{kWh Utility Rate}]$

Lighting Heating Penalty and Cooling Savings are calculated to account for the HVAC/Lighting interaction. The appropriate cooling Coefficient of Performance (COPs) and heating efficiencies are used to account for the reduction in cooling load and heating penalty as shown below:

Cooling Savings	$\frac{(\text{lighting savings}) \times 3,413 \times (\text{cooling period}) \times (\text{chiller factor})}{12,000 \times (\text{lighting period})}$
Heating Penalty	$\frac{(\text{lighting savings}) \times 3,413 \times (\text{heating period})}{1,000,000 \times (\text{boiler eff.}) \times (\text{lighting period})}$

## Equipment Scheduling (Controls Upgrade)

The existing heating and cooling equipment usage is calculated on a bin-hour/temperature basis through a calculation of the net heating and cooling energy required to maintain comfortable environmental conditions. This technique varies for each type of HVAC system, such as single zone constant volume with reheat; single zone variable air volume with reheat; multi-deck constant volume; dual duct multi-zone constant volume; or single zone DX cooling with baseboard independent heating. Each of these systems requires different equations to evaluate energy use during occupied and unoccupied hours. ABM can develop customized spreadsheets to calculate energy requirements for each zone and system type in a building.

The formula developed considers the following:

- Zone loads based on occupied/unoccupied periods at various outdoor air temperatures and interior heat loads.
- HVAC system operating parameters that provide the necessary heating, cooling, and ventilation rates needed to meet zone loads through a combination of air quantity, discharge air temperature, and outdoor air Cubic Feet per Minute (CFM).
- Sum the annual heating, cooling, and fan energy for each temperature bin for each zone.
- Sum all zones and compare with annual HVAC energy consumption based on utility bills, after subtracting lighting, equipment, and other electrical and thermal loads unrelated to the HVAC systems.

## Calculation Methodology

1. HOBO Motor on/off, temp/RH loggers, along with Outdoor Air Temps (OAT) are used to determine the runtime and setpoints of the equipment.
2. The equipment load is assumed to vary linearly with OAT with Balance Point (BP) being the temp when the building is in equilibrium with no heating or cooling need.
3. Energy Efficiency Rating (EER)/COP for the equipment used in the calculation is obtained from the cutsheet (where name plate data is available) and derated for equipment in poor condition.
4. Building schedule is obtained from city system and is specific to each building. Difference between the existing equipment schedule and actual (or proposed) schedule results in these savings.
5. Cooling Setpoint of 80-85°F and Heating Setpoint of 55-60°F will be maintained during Unoccupied Hours. Extra equipment runtime to maintain these temps during night/weekend is taken into account while calculating savings.

<b>Shutdown Period</b>	$\left[ \text{old } \frac{\text{hrs}}{\text{wk}} \right] - \left[ \text{new } \frac{\text{hrs}}{\text{wk}} \right]$
<b>Cooling Savings</b>	$\left[ \text{shutdown period} \right] \times \left[ \text{cooling period} \right] \times \left[ \frac{\text{temp limit}}{\text{diversity factor}} \right] \times \left[ \frac{(\text{avg. tons}) \times 12}{\text{EER}} \right]$
<b>Heating Savings</b>	$\text{existing gas usage} \times 1 - \frac{\text{new temp. difference}}{\text{old temp. difference}} \times \frac{\text{setback period}}{168}$

## Equipment Upgrade

1. HOBO Motor on/off, Temp/RH loggers, along with OAT are used to determine the runtime and setpoints of the equipment.
2. The equipment load is assumed to vary linearly with OAT with BP being the temp when the building is in equilibrium with no heating or cooling need.
3. Pre and post EER is obtained from the nameplate data of the existing equipment and cutsheet for proposed new equipment.
4. Equipment upgrade savings are only taken for the occupied period.

<b>Cooling Savings</b>	$\left[ \text{demand savings} \right] \times \left[ \text{operating period} \right]$
<b>Demand Savings</b>	$\left[ \text{load factor} \right] \times \text{tons} \times 12 \times \left[ \frac{1}{\text{exist EER}} \right] - \left[ \frac{1}{\text{new EER}} \right]$
<b>Load Factor</b>	$\frac{\text{present cooling energy}}{\left[ \text{tons} \times \frac{12}{\text{exist EER}} \times \left[ \text{operating period} \right] \right]}$



## Boiler Replacement

1. Nameplate boiler efficiencies derated based on the boiler condition and age are used for the savings calculations.
2. New boiler efficiency from cutsheet is used in calculating the energy savings.
3. Boiler cycling losses were assumed based on the purge cycle timing.
4. Boiler load is assumed to vary linearly with OAT below the building BP.

<b>Gas Savings</b>	$(\text{existing gas usage}) \times \left[ 1 - \frac{(\text{old eff.})}{(\text{new eff.})} \right]$
<b>Cost Savings</b>	$(\text{gas savings}) \times (\text{gas rate})$

## Variable Frequency Drive (VFD) on Fans and Pumps

1. HOBO loggers are used to determine the runtime of the equipment.
2. Savings for Variable Frequency Drives (VFDs) are calculated only during the occupied runtime.
3. Yaskawa VFD Energy Savings Predictor' program is used to calculate the savings for VFD replacement.
4. % loading on the motor is assumed based on the typical building type and occupancy patterns to simulate the actual load on the pump or fan motor.

### Calculation Methodology

**Existing Pump kW = Pump Brake Horsepower (BHP) x 0.746/Motor Efficiency**

**Existing Pump kWh = Existing Pump kW x Full Load Heating Hours**

Where:

- Pump BHP = GPM x Head/(3960 x Pump Efficiency) OR Pump HP x % Pump Loading
- Full Load Heating Hours = Heating Bin Hours x % Heating Load
- Proposed Pump kW = (Existing Pump kW x % Flow ^ VFD Exponent) / VFD Efficiency
- Proposed Pump kWh = Proposed Pump kW x Heating Bin Hour
- kW Saved per Year = (Existing Pump kW – Proposed Pump kW) x 12 months per Year
- kWh Saved per Year = Existing Pump kWh – Proposed Pump kWh

### Fan Savings

**$(\text{fan HP}) \times 0.746 \times \left[ 1 - (\text{avg. \% load})^3 \right] \times (\text{operating period})$**

## Outdoor Air Adjustment

1. The amount of outdoor air 'required' was calculated based on the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 62 code.
2. Control trending data was used to monitor the return duct CO<sub>2</sub> levels, Outdoor Air (OA) CFM and position of OA damper to calculate the average actual OA brought into the building through Air Handling Units (AHUs).
3. The difference between the actual OA and the required OA was the savings. Cooling Savings were calculated using the 'Ventilation Preconditioning Bins' from BinMaker Pro software. Ton-hr./Standard Cubic Feet Per Minute (SCFM) of cooling or MBTU/SCFM of heating energy was calculated the energy required to bring in a SCFM of OA to indoor cooling and heating setpoints.

### Calculation Methodology

- Average Winter Outdoor Temperature (below balance point temperature) = AWO
- Annual Hours Below BP Temperature (from Bin or Hourly Data) = AHB
- Average Space Setpoint Temperature = ASST
- Pre-Retrofit CFM = Excess OA CFM to AHUs
- Post-Retrofit CFM = 0 Excess OA
- Savings (CFM) = (Pre-Retrofit CFM – Post-Retrofit CFM)
- Total Annual BTUs Saved = CFM Savings x 1.08 x (ASST – AWO) x AHB
- Total Annual Gas Saved = Annual BTUs Saved / (100,000 x Heating Efficiency)

Cooling Savings	$\frac{(\text{vent air decrease}) \times 4.5 \times (\text{enthalpy diff.}) \times (\text{cooling period}) \times (\text{chiller factor})}{12,000}$
Heating Savings	$\frac{(\text{vent air decrease}) \times 1.08 \times (\text{temp. difference}) \times (\text{heating period})}{1,000,000 \times (\text{boiler eff.})}$

## Chiller Optimization

1. Due to very low Delta T, Pre and Post COP were assumed based on chiller operation.
2. Chiller is assumed to run above OAT of 55°F as seen from the control system.

Demand Savings	$\left( \text{old } \frac{\text{KW}}{\text{ton}} - \text{new } \frac{\text{KW}}{\text{ton}} \right) \times (\text{cooling load diversity} \times \text{tons})$
Energy Savings	$(\text{demand savings}) \times \frac{\text{hrs}}{\text{yr}}$

## Economizer Mode Savings

1. Economizer Mode Savings were calculated only for the Occupied Period when the OA Enthalpy is lower than the return / mixed air enthalpy.
2. TMY3 Bin Data was used for OA enthalpy.
3. Nameplate Efficiencies (or new equipment efficiencies) were used to calculate the energy savings.

Cooling Savings	$\frac{CFM \times 1.08 \times (\text{temp. difference}) \times (\text{chiller factor}) \times (\text{economizer period})}{12,000}$
Heating Savings	$(\text{cooling savings}) \times (\text{electrical cost})$

## Building Envelope Upgrades

From the ASHRAE fundamentals handbook, the equation for heat transfer estimation is:

$$q = 1.08 \cdot Q \cdot \Delta T$$

Where:

- $q$  = heat loss/gain, measured in BTU/hr
- 1.08 is a conversion factor accounting for the density of air (~ 0.075 lb/ft<sup>3</sup> at sea level), the specific heat of air (0.24 BTU/lb/°F) and a conversion from minutes to hours (60)
- $\Delta T$  is the temperature difference between the outdoors and the building setpoint.
- $Q$  is the rate of airflow rate

Airflow rate is calculated as:

$$Q = A \cdot \sqrt{(C_s \Delta T + C_w \cdot V^2)}$$

Where:

- $Q$  is the airflow rate
- $A$  is the gap area (as recorded in the survey)
- $C_s$  is the stack coefficient
- $C_w$  is the wind coefficient
- $V$  is the average wind speed

The stack and wind coefficients are dependent on building height and are available as table lookups provided from ASHRAE. Average wind speed is obtained from NOAA comparative climactic data for locations throughout the U.S. Temperature bin data, obtained from a software package called BinMaker Pro which uses climactic design data obtained from ASHRAE. For each temperature bin, the heat loss/gain equation is applied and the summation of outputs from these equations provides an estimate of the heat transfer characteristics for a particular building.

## Insulation

The audit process for insulation is similar to that of air infiltration/exfiltration in that the auditor visually inspects areas of the building for existing insulation. Where insufficient or non-existent insulation is found, recommendations for upgrades are proposed. The calculation for heat gain/loss through insulation is:

$$q = A \cdot U \cdot \Delta T$$

Where:

- A is the area of insulation (in square feet)
- U is the heat transfer coefficient (inverse of R-value) of the insulation
- $\Delta T$  is the temperature difference between the outdoors and the building set point.

This equation is applied to the hourly bin temperature data for both the existing and proposed insulation amounts and the difference between the two indicates the estimated savings due to increased insulation.

## Water Savings

Existing Water Usage was calculated given the total people using the fixtures. This number was found by referencing field notes and interviews with on-site personnel. The water usage of each fixture can be calculated as follows:

$$\frac{\text{Average Usage}}{\text{Person} \cdot \text{Shift}} \cdot \frac{\text{Total}}{\text{People}} \cdot \frac{\text{Gallons}}{\text{Usage}} \cdot \frac{\text{Shifts}}{\text{Day}} \cdot \frac{\text{Days}}{\text{Week}} \cdot \frac{52 \text{ Weeks}}{\text{Year}} = \frac{\text{Gallons}}{\text{Year}}$$

The average usage per person per shift comes from the ASHRAE Pocket Guide 2005, page 77 water usage statistics table, this value is either the number of flushes or minutes of use per person per shift.

After the retrofit or replacement fixtures are chosen then the same calculation that was used for the existing water usage can be applied to find the proposed water usage. By applying the water and sewer rates to the saved amount of water yields the cost savings for water conservation only.

For faucets there are hot water savings that can be associated with the water conservation project due to the reduction in water usage. Based on the 'Amy Lucille Vickers, "Water Use and Conservation, First Edition" 2001', 54% of the water used by a faucet or shower can be assumed to be hot water. This hot water heating savings can be calculated below based on whether the heating method is electric, or gas or steam. Although showers were observed, no measure is recommended due to the limited amount of use, therefore any hot water savings that can be recognized will be from faucets only. Domestic hot water

$$\text{Water Saved} \cdot \frac{\% \text{ Hot Water}}{100} \cdot \frac{\text{Specific Heat of Water}}{1} \cdot \frac{\Delta T}{\text{Boiler Efficiency}} \cdot \frac{\text{Conversion to Therms}}{1} = \text{Therms Saved}$$

savings were calculated as follows:

### *Financing Knowledge: Municipal-tax-exempt lease purchase, Bonds, Self-Financed, other*

## Financing Energy Savings Programs

There are many ways of financing energy services programs. Cost, speed, simplicity, and prepayment requirements are the individual components that need to be considered in determining the best financial solution for a specific project. A good understanding of the ADEQ's needs and goals is necessary to properly weigh these criteria so that optimum financing is obtained.

ABM has a strong working relationship with several premier financial institutions, developed through our engineering focus over the years. We emphasize guaranteed saving results, risk management practices, financial strength, and meeting or exceeding all of our contractual obligations on each project. Our projects include Public and Private Education; State, Local (including authorities), and Federal Government; Commercial/Industrial; and Public Housing.

We provide a guarantee of energy savings as part of the program to ensure enough energy and operational savings will result over the term of the program to pay for all associated costs. Costs can include engineering analysis, capital equipment, installation, engineering design, construction management, commissioning, initial training, monitoring and verification, ongoing training, and debt service. If the energy savings fall short of the yearly guaranteed amount, we will provide reconciliation for the shortfall in savings.

#### **We offer a full spectrum of competitive corporate and public finance products:**

- Municipal tax-exempt leases with non-appropriation clauses
- Operating leases (taxable and tax-exempt)
- Issue bonds
- Certificates of participation
- Special purpose entities
- Standard capital leases
- State financing programs



## Financing Options

We can retain the services of financial specialists, including investment bankers, financial advisors/consultants, commercial banks, and equipment leasing companies. In some cases, ABM finances the projects internally. The selected financing partner must be familiar with energy projects and responsive to the complexities of each individual customer and transaction. We require our specialists to provide competitive and timely solutions that effectively meet the needs of all parties.

A specific financing mechanism cannot be determined prior to the final scope of work and cost breakdown. Once completed, the goal of any financing is to capitalize the program offering and repay the entire financial obligation out of realized savings.

We provide a financial solution that, at a minimum, meets the following requirements:

- Compliance with all applicable state statutes and procurement requirements
- No initial capital costs to be paid by the ADEQ
- Achievement of significant long-term guaranteed savings
- A budget-neutral or positive net cash flow realized by the project



***Financing is not a profit center for us. We do not mark up the financing to customers as part of our commitment to service excellence.***

Our approach is to search for grants, state and utility rebates, and special program monies to reduce the cost of the project and arrange financing on any remaining balance. Our Project Finance Manager can act as a facilitator or advisor if the ADEQ wants to control the placement of the financing.

We have built relationships with many leading energy project financiers so we can match the capabilities of the financier with the needs of the ADEQ. These relationships include banks, leasing companies, investment bankers, and securitization conduits. ABM is not tied to a single manufacturer or funding source. We are involved in a wide spectrum of project types, including K-12, Colleges, Universities, Municipalities, Public Housing Authorities, Non-Profit Organizations, Commercial Businesses, and the Federal Government. Each of these segments has unique financing requirements.

Our financing partners possess special strengths and serve specific markets. Most are members of the Association for Governmental Leasing and Finance (AGLF) and the Equipment Leasing Association of America (ELA).



### **Equipment Ownership**

In most of our financial arrangements, ownership of the equipment is transferred to the owner at final acceptance or when installation is complete. This is the case regardless of whether the ADEQ provides financing, or we provide the financing using a tax-exempt capital lease.

The only time ownership does not occur at final acceptance is when “off balance-sheet” financing is being used. With this financing, there is an option to purchase the equipment at its fair market value or renew the contract.

### **Primary financing vehicles that our customers use:**

**Issue Bonds** – Lowest rates, highest fees. Good for large, long-term projects.

**Tax-Exempt Lease** – Comparable rates, low/no fees.

- Capital Lease (subject to annual appropriations, on balance sheet)
- Operating Lease (off balance sheet, absolute obligation)
- Done through conduit for Non-Profits.

### **Energy Services Contract**

– ABM underwrites financing. Filed at taxable rates and discounts the payments to a bank or other financial institution at no markup. Can be a good solution for a Non-Profit if a conduit cannot be arranged.

### **Customer Arranges Own Financing**

– Master Lease or banking relationship is already in place.

### **State Financing Program**

(if available) – Many states offer state financing programs at below-market interest rates that can fund all or parts of projects at significant savings to the market.

## *Identification of and application for utility rebates*

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### Utilities, Rebates, and Incentives

#### Identifying Utility Incentives

In 2020, we were able to identify and receive for our customers over \$5 million in utility, state, and federal rebates. We have been working with utility companies for over 100 years to help them achieve their energy efficiency rebate goals. We are typically involved with the utilities throughout the year, evaluating what rebates are coming out and which rebate programs will apply to our customers. Our energy engineers and our grant writing team also leverage additional incentive programs, such as those identified on <http://www.dsireusa.org>.

For the ADEQ' projects, we will specifically address each rebate available based on the ECM list developed. The utility program managers are included in initial and final ECM evaluation to ensure that timing and thoroughness of the incentive application process is complete. We have the capability to file incentive applications on behalf of the ADEQ as their authorized agent, or we can assist you in filing the application by providing information as required. In either case, this process begins in the Preliminary Assessment phase. Any rebates and incentives are paid to the ADEQ – we do not benefit financially from the rebates.

On every project, we reach out to the ADEQ's utility representatives for electricity, natural gas, fuel oil, propane, water, sewer, trash removal, and other utility services. We engage the utility representatives early in project development and walk the sites with them to ensure that we are capturing all available rebates and incentives.

As these incentive programs are often changing, it is important to pre-reserve incentive allocations when necessary. Below is a summary of the steps we follow to secure utility incentives and rebates:

1. Include Utility Program Managers in initial and final ECM evaluation.
2. Assist or manage filing of the application on behalf of the ADEQ.
3. Evaluation any applicable utility rebate programs and review program guidelines with a utility program manager.
4. Review state-wide list of qualified energy efficiency products.
5. Perform all spreadsheet development, document assumptions, and produce an energy calculator according to utilities' requirements, which will vary.
6. Document the assumptions in the energy savings spreadsheet and summarize the approach taken to utilities.
7. Develop an additional validation report (if needed) to describe the energy savings and resulting rebate due to the installation of more efficient equipment.
8. Interface utilities to negotiate and obtain qualification for incentive rebates.
9. Assist the ADEQ in securing rebate check from their utility.

### *Commissioning of projects and retro-commissioning of existing buildings*

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## Commissioning and Re-Commissioning

The purpose of a commissioning and re-commissioning program is to ensure that ABM achieves project requirements and original design intent in the design, installation, and performance of all building systems. In addition, a successful commissioning and re-commissioning program optimizes the overall energy efficiency of the integrated systems.

Early in the design of the ADEQ's solution, we begin development of a master commissioning plan, including detailed commissioning guidelines for each piece of equipment and each system. These guidelines demonstrate that each system and piece of equipment is operating properly. They also establish ways to sustain performance throughout the system's life cycle.

## Development of Commissioning Plan

Although there are very detailed and formal procedures documented by all the commissioning certification agencies (i.e., ACG, BCA, ASHRAE, AEE, etc.), the following is an abbreviated procedure that we follow on our projects, unless directed otherwise by the ADEQ:

1. Project requirements and parameters are determined and documented by ABM and the ADEQ. The design team determines the design approach necessary to meet the requirements of the project - expectations, parameters, timing, scheduling etc.
2. ABM reviews the design documents several times during the design phase. Once the project has been awarded and submittals for the equipment/ systems to be commissioned are received and reviewed, ABM develops the final Commissioning Plan. Pre-functional Checklists (PC), also known as Field Installation Verification, are developed for each piece of equipment to be commissioned using industry practice standards and the respective equipment manufacturer's IOM documents.
3. Functional Performance Test (FPT) documents are developed using industry experience/knowledge, IOM Manuals, and Control Sequences of Operation to incorporate into the Commissioning Plan. Generally, the PC Checklists and all of the FPTs are executed by our commissioning team. In some cases, the owner(s) likes to have a representative present. This is a great training opportunity for the maintenance staff. ABM will inspect every single piece of equipment functioning and will not cut any corners during commissioning
4. Throughout the commissioning process, especially on the construction site, ABM documents the activities and progress observed during each visit and/or phase of the project. As discrepancies are noticed, an issues list or discrepancy list is made and/or updated for the entire Commissioning Team to discuss and track. The issues log will be maintained to track any issues and their resolution. Our goal is to do all that we can during the construction project to make certain there are no "punch list" items that go unnoticed and/ or unresolved.
5. Training classes are coordinated by ABM with your staff to make certain the Owner's staff all have adequate training on the commissioned systems. The deliverable of a Commissioning Report is formalized, along with the training records, completed and current issues log, and all appropriate warranty and O&M documents. This comprises the Systems Manual.

## Commissioning Process

This section sequentially details ABM's typical commissioning process by commissioning task or activity. During the actual commissioning process, ABM can work with a third-party commissioning agent or can act as the commissioning agent and as such, the tasks and activities mentioned below can be performed in-house.

### Commissioning Scoping Meeting

The scoping meeting brings together all members of the design, construction, and operations team that will be involved in the commissioning process. Each building system to be commissioned is addressed, including commissioning requirements and completion and start-up schedules. During the scoping meeting, all parties agree on the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan.

### Final Commissioning Plan

The commissioning agent finalizes the draft Commissioning Plan using the information gathered from the scoping meeting. The initial commissioning schedule is also developed along with a detailed timeline. The timeline is fine-tuned as construction progresses.

### Design Intent Documentation

The design requirements, relative to the building systems selected for commissioning, must be documented to establish a baseline of performance expectations to which the actual installed performance is compared. The commissioning provider, with the assistance of the building owner and design team, prepares a Design Intent Summary that documents the design intent for those building systems selected for commissioning. The Design Intent Summary reflects the underlying assumptions and requirements that are represented in construction documents.

### Submittals

ABM will provide the commissioning agent with a set of equipment and system submittals. This equipment data includes installation and start-up procedures, O&M data, performance data, and temperature control drawings. The subcontractors, ABM, or A/E notify the commissioning agent of any new design intent or operating parameter changes, added control strategies, and sequences of operation, or other change orders that may affect commissioned systems.

### Site Observation

The commissioning agent makes periodic site visits to witness equipment and system installations. Each site visit will have a specific agenda and will be coordinated with the ABM site supervisor. The commissioning agent attends selected planning and job-site meetings to remain informed on construction progress and to update parties involved in commissioning. ABM provides the commissioning agent with information regarding substitutions or change orders that may affect commissioned equipment or the commissioning schedule.

## Pre-Functional Checklists and Startup Procedures

A Pre-Functional Inspection Checklist is developed and completed for all mechanical equipment being commissioned. The checklist captures equipment nameplate and characteristics data and confirms the as-built status of the equipment or system. It ensures that the systems are complete and operational and document the installation of components and completion of systems. The checklists are prepared by the commissioning agent from manufacturer's data, drawings, and specifications to include the required installation, checkout, and start up procedures. The installing subcontractors date and initial the checklists as the construction and start-up is completed. The commissioning agent reviews and verifies the completed checklists before scheduling the functional performance testing.

## Development of Functional Test and Verification Procedures

Functional performance testing verifies the intended operation of individual components and system interactions under various conditions and modes of operation. The systems are run through all the sequences of operation and the response of components is verified. Testing proceeds from components to subsystems to systems, and finally to interlocks and connections between systems.

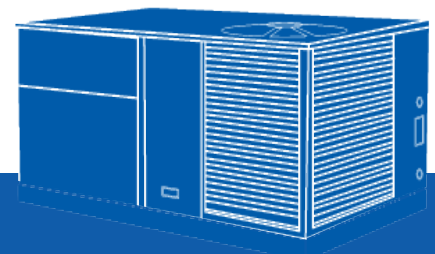
The commissioning agent prepares functional performance test plans so that the complete sequence of operations is included. The commissioning agent obtains all documentation, including an updated points list, control sequences, and setpoints. If necessary, the commissioning agent may request clarifications from contractors and the design team regarding sequences and operation. Prior to execution, the commissioning agent provides a copy of the primary equipment tests to the installing subcontractor and ABM who can review the tests for feasibility, safety, warranty, and equipment protection.

## Execution of Functional Testing Procedures

The commissioning agent schedules functional tests through ABM. Under the supervision of the commissioning agent, the installing subcontractor performs the hardware and/or software manipulations required for the testing. Owner maintenance staff may also be present to assist in system observations. The commissioning agent witnesses and records the results of functional performance testing. Any deficiencies found from functional performance testing will be documented in a Deficiency Report. The report will include all details of the components or systems found to be non-compliant with the parameters of the functional performance test plans and design documents. The deficiency report will become part of the punch list. The report will detail the adjustments or alterations required to correct the system operation and identify the responsible party. The deficiency report will be continuously updated. The commissioning agent schedules any required retesting through ABM. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between the commissioning agent, subcontractor, and ABM.

## Short-Term Diagnostic Monitoring

Short-term diagnostic testing, using data acquisition equipment or building automation system trends to record system operation over a two to three-week period, may be used to investigate the dynamic interactions between components in the building system. The monitoring occurs after occupancy to evaluate the building systems' performance under natural occupancy and ambient load conditions. The objectives of the monitoring are to evaluate scheduling, the interaction between heating and cooling, and the effectiveness of the system in meeting the comfort requirements of the occupants.





## **Operations and Maintenance Manuals**

The operation and maintenance manuals prepared by the contractors for the owner's maintenance personnel are reviewed for completeness. The contractors are encouraged to submit O&M manuals at the earliest possible date. Contractors may add or request materials to stress the importance of system interactions, troubleshooting, and long-term preventative maintenance and operation. A database of preventative maintenance information may also be created from the materials in the O&M manuals.

## **Training and Orientation of Owner Personnel and Occupants**

Effective maintenance personnel training is critical to the long-term performance of any new building. The commissioning agent will assist the owner and ABM in organizing the training sessions by identifying the appropriate staff for each session and creating an overall training plan. For each training session, the contractors provide a detailed agenda for each piece of equipment or system for which training is required. The agenda describes the training scope, duration, and methods, along with the name and qualifications of the trainers. The commissioning agent develops a plan for including in the training session contractors / trainers from different disciplines, when appropriate. The trainer documents each training session (duration, general subjects covered, and attendees). The commissioning agent may witness any of the training sessions.

## **Warranty Period**

Seasonal variation in operations or control strategies may require additional testing during peak cooling and heating seasons to verify system performance. During the warranty period, seasonal testing and other deferred testing is completed as required to fully test all sequences of operation. The commissioning agent coordinates this activity. Tests are executed and deficiencies corrected by the appropriate subcontractors, witnessed by facilities staff and the commissioning agent. Any final adjustments to the O&M manuals and as-builts due to the testing are made. The commissioning agent will request input from the owner's operations staff and occupants about the performance of the building systems. The commissioning agent also supports ABM's troubleshooting process during the warranty period. ABM's warranty team will first try and resolve the issues before requesting assistance from the commissioning agent.

## **Commissioning Report**

A final Commissioning Report will be compiled which summarizes all tasks, findings, and documentation of the commissioning process. The report will address the actual performance of the building systems in reference to the design documents. All test reports by various subcontractors, manufacturers, and controlling authorities will be incorporated into the final report. The commissioning report includes:

- An evaluation of the operating condition of the systems at the time of functional test completion
- Deficiencies that were discovered and the measures taken to correct them
- Functional test procedures and results
- Reports that document all commissioning field activities as they progressed
- A description and estimated schedule of required deferred testing

## Commissioning Approach

ABM trains our service technicians on the commissioning process, the importance it plays in achieving energy savings, and the impact it has on comfort. Our technicians are certified by the manufacturers to perform start-up and commissioning services, so they are always part of the planning process. This begins with the ECMs we are implanting and how they will interact with any existing building systems currently installed. We review existing design conditions and ways to improve the efficiency of systems. This can include adding items, such as hot or cold deck resets based on outside air. It can also include switching systems from bringing in a set amount of outside air based on the possible number of occupants to bringing in only the required amount of outside air based on the actual CO<sub>2</sub> levels.

## Operating Plan

ABM performs over \$150 Million worth of commissioning programs throughout the United States. Our proven process ensures that all systems are working as designed and as efficiently as possible. ABM understands the importance of commissioning to meet the savings guarantees and to ensure the continual system functionality and occupant comfort.

Below is an outline from a previous commissioning project for a project. This project included the commissioning of multiple systems (i.e., HVAC/Controls, Domestic Water Heating, Lighting/Controls, Building Envelope, etc.).

1. Plan Revision History.....	4
2. Commissioning Plan Objective.....	4
3. Scope of Work.....	5
4. General Description of the Building and its Commissioned Systems.....	6
5. Discrepancy Notification/Issues Log.....	7
6. Special Instructions.....	7
7. Commissioned Systems' Documentation and Testing.....	8
7.1 Documents, Drawings and Submittals Review.....	8
7.2 Pre-Functional Checklists.....	8
7.3 Start-Up Procedure Verification.....	9
7.4 TAB Verification.....	10
7.5 Functional Performance Tests (FPT) Verification.....	11
7.6 Training Verification.....	14
7.7 O&M Manuals Catalogued and Verified.....	15
8. Definitions.....	16
Appendix 1 – Cx Progress Record/Summary.....	17
Appendix 2 – Responsibilities of Cx Team Members.....	18
Appendix 3 – Discrepancy Notification Form/Issues Log.....	21
Appendix 4 – Documents, Drawings and Submittals Verification Form.....	22
Appendix 5 – Pre-Functional Checklists.....	23
Appendix 6 – TAB Verification.....	33
Appendix 7 – Functional Performance Test Checklists.....	34
Appendix 8 – Training Verification.....	49
Appendix 9 – O&M Manuals.....	50
Appendix 10 – Primary Contacts List.....	52
Appendix 11 – Preliminary Cx Sched. ....	55

## Testing Procedures

The commissioning process has a series of actions and schedules for completion, with each action including specific deliverables. These define the building and commissioning requirements, the documentation of the performance/testing results, and training for the systems. Tasks in the process include the following:

- 1. Roles, Responsibilities, and Procedures for Each ECM**

Development of each ECM, including the scope of the recommended commissioning process. ABM retains the commissioning authority at the beginning of the project. The roles and responsibilities of the project and commissioning teams are established. Procedures are developed and included in the scopes of work.



- 2. Project Requirements & Deliverables**

Project requirements for each ECM are determined and documented, including the site, and building scope and use, and performance, training, commissioning, and documentation requirements. The deliverable for this action is the Owner's Project Requirements (OPR) document, which is the guiding instruction for the ECM/project and is updated throughout the project.



- 3. Commissioning**

The initial Commissioning Plan is developed, showing the commissioning scope, roles and responsibilities, communication procedures, and design and construction requirements for providing and integrating commissioning into the project. This Commissioning Plan is updated throughout the project with checklists, functional and performance testing protocols and procedures, schedules, and documentation details.



- 4. Co-Authored Design**

ABM's design team determines and documents the design approach to meet the Owner's Project Requirements. During the design phase, the commissioning requirements are determined for each commissioned system, and commissioning specifications are included in the construction documents package. The design documents are reviewed for conformance to the OPR, and the design review report is provided.



Early in the project construction, the commissioning team reviews the materials and equipment submittals for conformance to the OPR and construction documents. Discrepancies, problems, or inadequacies are reported. This submittal review and report provides familiarity with the building systems for development of testing and commissioning requirements.

As the project is constructed, the commissioning team observes and verifies the installation and witnesses the equipment start up and testing. At system completion, performance testing is conducted and documented in checklists, logs, and reports to verify performance compliance with the OPR and design documents.

One of the main functions and benefits of the commissioning process is the identification and resolution of project issues, in both the design and construction phases, using the Issues and Resolution Log and project team collaboration. The design team and contractors should provide responses to the issues.

During design and construction, the project documents are assembled into the systems manual that provides the details and history of the design and construction, as well as information needed to properly operate the equipment/systems/building. The systems manual is used in the training of the operations and facility staff and occupants and is updated throughout the life of the project.

To operate the building in accordance with the OPR and design capabilities, the building operations, maintenance, and facility staff is trained on the installed and commissioned equipment and systems. The training plans and records are retained and updated for use in later training.

- Commissioning logs and interim reports are collected throughout the project and distributed as required by the Commissioning Plan.
- At the completion of the project, the commissioning report is assembled and provided to the owner and others as required by the OPR, project documents, and local jurisdiction requirements.

## Ongoing Monitoring

Existing building commissioning (retro- or re-commissioning) processes involve planning, development of Current Facility Requirements (CFR), investigating, testing, project selection and implementation followed by system testing, commissioning, training, and final documentation.

To maintain building performance, an ongoing commissioning plan is developed and documented during the commissioning process for the use of building staff and occupants.

## Operating Parameters

The operating parameters are established within the system design documents (i.e., specifications), control drawings, and/or submitted Sequences of Operation (SoO). These operating parameters (i.e., set-point temperatures and humidity levels, Occupied and Unoccupied schedules – times and setbacks, alarm conditions, etc.) are established and included within the control system's SoO. ABM reviews the control systems points list and does a point-to-point check for accuracy and functionality.

## Schedule

ABM will work closely with the ADEQ and all subcontractors responsible for the systems being commissioned. Once the initial construction schedule is finalized, ABM will develop the commissioning schedule. We look for the critical timing of each commissioned system's installation and start-up. All members of the team regularly attend meetings to stay current on the project's construction schedule and any issues that might affect the commissioning schedule. Systems can be tested as soon as they are verified to be installed correctly and started up properly. For systems that may operate differently from one season to the next (i.e., boilers and/or chillers), these systems are generally tested in two opposing seasons to ensure the systems function properly in the seasons for which they were primarily intended.

## Warranty Validation

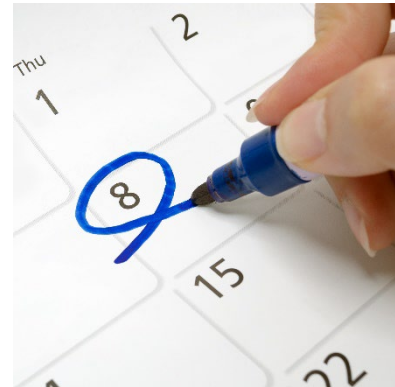
The primary warranty items to consider are those of the larger and/or more critical installed systems. For example, ABM will document the respective warranty terms with certificates from the manufacturers for large mechanical equipment such as boilers and chillers. All commissioned systems will have their respective warranty documents compiled within an appendix section of the final Commissioning Report.

## Certification Tests

While there are "generic" tests (i.e., FIVs and FPTs) that are developed as templates from the certification agencies, and other tests that the specific equipment manufacturers may require, the ADEQ will approve all test documents that would be included in the Commissioning Plan that ABM develops. These tests, having been included within the Owner-approved Commissioning Plan, are deemed satisfied once completed and signed by both the ADEQ and ABM.

## Commissioning Qualification

ABM has the experience within the industry for which systems are being commissioned as part of the project. Our team has been certified through a testing and certifying agency, validating our knowledge of the commissioning process and the systems being commissioned. The complexity of the systems being commissioned will play a major role in determining the requirement of experience and/or number of similar projects commissioned. Coordination of subcontractors to provide Owner training



The typical responsibilities of ABM and our commissioning team are:

- Commissioning Plan generation, review, and administration
- Coordination, communication, and execution of the Commissioning Plan
- Data analysis, recording and compilation
- Notification of system discrepancies
- Coordination of PCs and FPTs
- Generation and delivery of Commissioning Report



### *Identification of asbestos and other hazardous materials and abatement, recycling or disposal, as applicable*

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Our team will review relevant reports, studies, and plans such as previous master plans, renovations, mechanical and electrical system and maintenance upgrades, building plans and documents, asbestos and lead paint surveys, historical guidelines, and customer standards and guidelines.

### *Construction*

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Several construction management tasks are worth special note since they are key to a smooth implementation phase. The following describes our approach to specific tasks in managing design-build construction activities that ensures the final product meets the design intent with seamless communications between our construction team and the ADEQ.

#### **Construction Coordination**

Along with general project scheduling, our team and subcontractors are able to make maximum use of the scheduling process to generate:

- Projected drawing schedules
- Purchasing schedules
- Submittal and approval schedules
- Manpower utilization schedules
- Value earned profiles for establishment of percent completion payments
- Design schedules
- Testing, balancing, and commissioning schedules

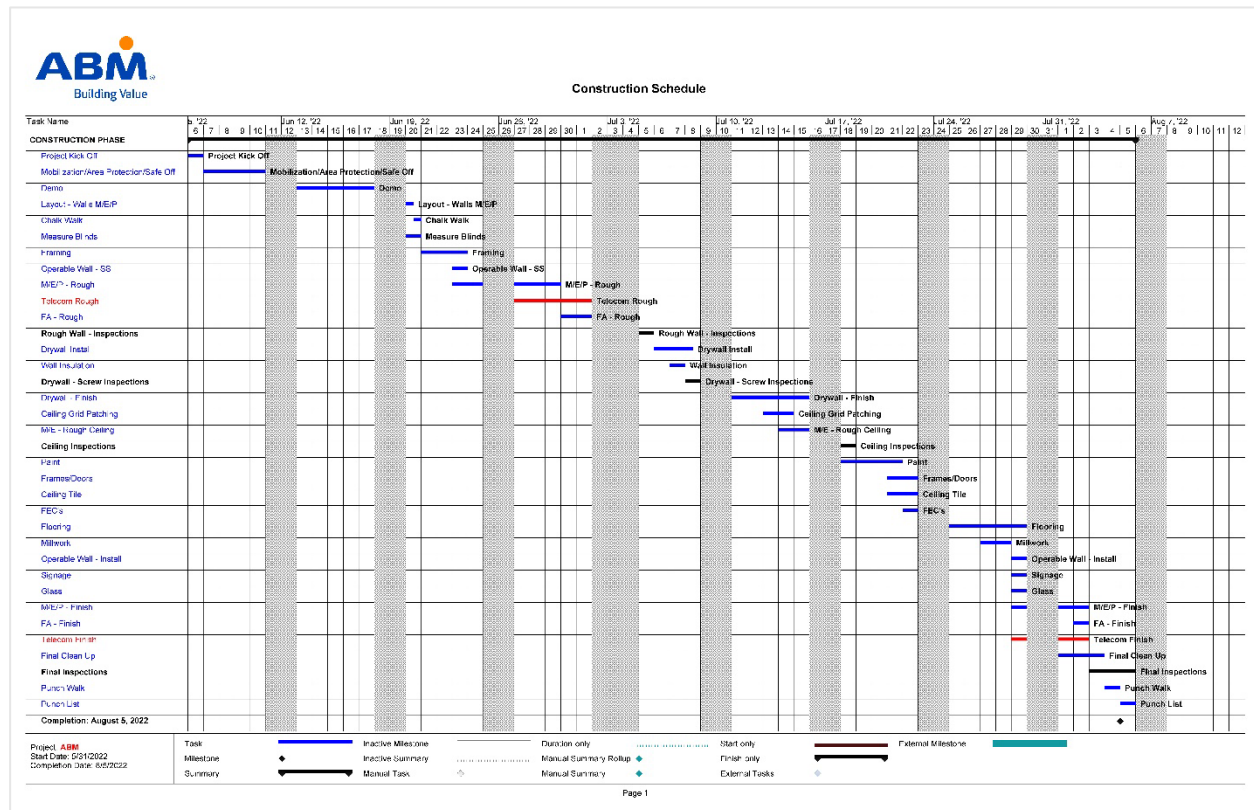
Our attention to and understanding of customer-driven requirements allows our team to be prepared to implement the project in a manner that ensures success. Disruptions to the facility environment are eliminated and systems shutdowns are performed at times when they are not required to be in service. This process has been perfected in the 20,000+ facilities we serve – a combined total of over one billion square feet of municipalities, schools, colleges, military bases, and hospitals.

#### **Scheduling**

We carefully schedule and track the performance of our projects, ensuring timely purchase and delivery of material and equipment while also securing adequate manpower and resources. For scheduling, we self-developed databases and spreadsheets. We maintain project-related documentation and correspondence in a standardized fashion within a project folder housed on our network. Our project managers rely on our real-time project cost management database to ensure the project remains on-time and on-budget.

Key milestones, such as obtaining permits and host facility approvals, have equal weight to the more labor-intensive tasks as they can impact the overall project duration. Scheduling and frequent auditing for compliance with the anticipated project construction plan is a major focus of our construction management team.

The following is an example of a recent project implementation schedule:



## We detect deviations from the schedule quickly and take corrective action to restore the schedule.

Careful attention to scheduling allows for anticipation of delays and development of a work-around plan to minimize their effects. Project scheduling documentation is available to the ADEQ for auditing, review, and comment as needed.

We complete our subcontractor pre-qualification process prior to final design. This allows our subcontractors to fully integrate their skills and experience early on, as well as provide maximum input into the design and construction processes.

## Flexibility

As emphasized throughout this proposal, we encourage flexibility and collaboration in the project development process. We exercise flexibility when it comes to inclusion of non-energy saving capital improvements within projects, as well as other types of owner participation. In fact, as a service provider within various maintenance repair and rehabilitation programs, we have amassed millions of dollars in project experience with design-build projects that do not necessarily include energy efficiency measures. In addition, we have had numerous projects with satisfied customers who awarded the company follow-up energy-related and other operational work.

### *Project Constructability*

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Once all energy conservation measure (ECM) designs and specifications are developed, presented to the ADEQ' team, and have received final approval, the project manager begins implementing the project in a collaborative effort with site personnel. Project management procedures employed by ABM include the following, at a minimum:

- Adheres to state and region statutes and regulations.
- Directs subcontractor work schedules based on coordination meetings with the ADEQ.
- Requires sub-contractors to submit status reports either daily or weekly.
- Conducts weekly construction meetings unless directed otherwise by city personnel.
- Performs work completed and schedule "look aheads" to keep the ADEQ informed of affected areas.
- Schedules informal kick-off meetings with a representative for each affected building and coordinates future work with this individual as the "primary point of contact" for that facility.
- Requires all our and sub-contractor personnel to wear identification badges, or other required form of identification, when on the building premises.
- Tracks all material and labor on a daily and weekly basis and reports project progress to our management team via percent complete reporting. This same information is used for accounting and invoicing the ADEQ.
- Oversees the preparation of all operations and maintenance documentation.
- Generates meeting minutes from the weekly construction meeting and distributes electronically to the project team.
- For these minutes to become accepted, the team requests a positive response from a the ADEQ representative within five business days of transmittal unlike the standard practice which is to accept no response as acceptance as fact.
- Inspects work during site visits and reviews work with contractor. All deficiencies and punch list items are noted at this time. As soon as practical following these walk-throughs a timeline is established and provided to the ADEQ for completion of open items.
- Documents all changes to the work and receives appropriate approvals before initiating any changes to the scope of work.
- Red lines documents and generates the project "as-builts," which are provided to the ADEQ in the project turnover package.
- Coordinates commissioning and initiates training procedures.



### *System design engineering (mechanical, electrical, etc.)*

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## Design Approach

ABM will conduct an onsite survey of the ADEQ's lighting, HVAC equipment, water usage, building envelope, and facility operations. In the survey, we evaluate the energy and utility consumption and costs (fuel oil, propane, electric, water, and sewer), as well as the existing building control strategies. We also review the operation schedules for each facility and miscellaneous "plug load" equipment (copiers, computers, and vending machines).

We will evaluate the feasibility of installing ECMs to reduce utility costs associated with operating the building. Application to each specific building will be observed, as well as the impact on the ability of the system to provide climate control. It is our engineering and design team's goal to demonstrate and evaluate how the project will improve the efficiency of the ADEQ's facilities through the reduction of utility consumption and operational expenditures. The net financial benefit of the measures will be entered into a pro forma to determine the financial impact of the program.

We will compile a detailed technical audit, involving an examination of the facility's operational budget and the relationship between expenses and services received. Our engineering and facility management reports can analyze every aspect of your operation, from utility rates to lighting upgrades. By taking these steps, we can guarantee an efficient operation and address any concerns on environmental, local, state, and federal guidelines.

## Design Strategy

The Project Development Team takes a high-level look at a summary inventory of the existing equipment and controls from the field audit and creates an upgraded governing design strategy. This strategic first step involves the entire Project Development Team, as we weight design and project implementation goals against various equipment and design strategies. Though many projects follow similar paths, the team is careful not to preclude newer, proven technologies which may not have been used on past projects. Conversely, we eliminate unproven and un-vetted technologies and design approaches from consideration. The result is the creation of a design strategy that provides the framework from which project design and engineering can be effectively performed.

## Design Plan

ABM's Project Development Team will review the project specification and scope and develop a project-specific design plan. We will conduct a review of contract documents and develop an ECM Assessment Checklist for the project. This checklist is tailored specifically for each proposed ECM and provides positive control of the development process, ensuring we properly perform the field audit and non-field collection of design and related engineering documents.

After the checklist is created, we will consult the ADEQ regarding the design plan, field audit, and plan for the collection of customer drawings and specifications. Additionally, we will discuss customer-reviewed system design deliverables to ensure you are satisfied with the proposed project development process.

The design plan for this project will include:

- Review (internal) project specifications and scope
- Review (internal) ABM's proposal for the customer site(s)
- Develop an ECM Audit Checklist for the project
- Review the Audit and Design Plan and Design Deliverables with the customer



## Customer Documents and Information

The field auditor or another member of the Project Development Team will work with the ADEQ to collect the following documents and information, where applicable:

- |  |   |
|--|---|
| • Site-specific interior and exterior lighting systems and design guidelines (if applicable)                         | • Energy policy directives (if applicable)                              |
| • Site-specific water consuming fixtures and systems and guidelines (if applicable)                                  | • Utility bill data (electricity, natural gas, water, etc.)             |
| • Site-specific HVAC equipment and control design guidelines (if applicable)   | • Interconnection and utility solar policy information (if applicable)  |
| • Materials specifications and requirements – “Buy America” and any electrical or construction material requirements | • Safety program and processes  |
|  | • General access and security requirements                              |
|  | • Environmental requirements (local endangered species, dark sky, etc.) |

Each design strategy and plan is followed by a design approach, which includes the following:

### Project Initiation

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- M/E engineering project team is assembled
- Team meets with you to discuss and clarify project scope, budget, and schedule
- Team identifies and selects sub-consultants who will use M/E CAD standards, design standards, and software
- Team reviews relevant reports, studies, and plans, such as previous master plans, renovations, mechanical and electrical system and maintenance upgrades, building plans and documents, asbestos and lead paint surveys, historical guidelines, and customer standards and guidelines.
- Team creates a detailed work plan

### Schematic Phase

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- Team assess your needs by identifying and documenting operational and strategic objectives
- We prepare systems schematics and outline specifications, as well as schematic estimates of probable construction costs based on identified scope
- We create a schematic report and outline specifications and engineer estimates of probable construction costs based on your priorities and budget



## Design Development

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- We prepare design development floor plans and system schematics to identify equipment locations, utility distribution routing, systems zoning, and project phasing
- We create a first draft of technical specifications for systems materials and installation requirements
- We develop design estimates of probable construction costs
- We review previous needs assessments, confirm schematic phase needs, and address any design concerns
- Team participates in the design development review meeting to review value engineering options, assess systems design, finalize implementation and packaging of contract documents, and refine project schedule

## Contract Documents

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- We prepare contract documents for competitive bidding based on approved design documents
- We create separate bid packages when necessary to accommodate project scheduling
- We develop estimates of construction costs based on refinement of project scope and adjustment to contingencies

## Pricing

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- Design team members attend estimating conferences and walkthroughs with construction team
- We submit addenda required for clarification to the estimating documents
- Team reviews estimates and makes recommendations to the agency regarding final design and budget

## Construction

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- Team reviews shop drawing submittals, schedule of values, and the contractor's installation schedule
- Project managers attend scheduled project meetings and prepare meeting minutes
- Team conducts periodic pre-approved site visits to review work progress and progress payment applications, and verify installation conformance to contract documents
- We schedule on-site systems start-up training sessions with contractors, suppliers, and owner reps
- Team conducts final site observation, inspection, and completion of documentation

## Commissioning

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- M/E recommends that we be retained to provide commissioning for your mechanical and electrical building systems to confirm they are installed and performing to the standards for which they were designed
- The commissioning process involves on-going interaction with you and the installing contractors
- The process involves installation verification, operational performance testing, functional performance testing, owner training, and preparation of a final commissioning report

*Project/construction management*

## Project Management

Project management traditionally refers to managing a project's installation or proposed upgrades upon completion of engineering and signed contracts. Our project managers provide support throughout the entire project, offering insight into the design and estimation of the job, approving the proposed schedule, and remaining a key team player through project close-out.



Our project managers, each with at least 15 years of experience in the industry, are experienced working within both large and small project environments. The most complicated projects run smoothly because of our clear communication on schedules and ability to meet or exceed customer expectations. ABM-employed project and construction managers oversee each of our projects and follow an Implementation Management Plan consisting of seven categories:

- Project management
- Cost management
- Time management
- Contract administration
- Quality management
- Safety management
- Professional practice

## Implementation Management Plan

Our implementation management plan process encompasses all the management activities that are over and above the normal architectural and engineering services conducted during the pre-design, design, and construction phases of a project, contributing to the control of cost and time. Our project management is just that – the management of all aspects of planning and construction for any given project.

Your dedicated project manager ensures:

### Start-up

- All equipment operating
- Proper air flows
- Proper supply air temperature
- Proper space condition
- Audit process in place
- Proper building conditions
- Proper water flows
- Proper water temperature
- EMCS operating per specification
- Training

### Performance

- 100% customer satisfaction
- Drawing delivered
- Customer sign-off
- Customer training complete
- O&M manuals delivered
- Final reports

Specific responsibilities of the project manager include:

- Review projects
- Schedule customer meetings
- Track savings as upgrades progress
- Negotiate all subcontracts
- Obtain insurance certificate and workers' compensation
- Develop progress schedules
- Start coordination of drawings
- Manage change order inspections
- Perform job start-up meetings
- Schedule jobsite meetings
- Purchase all equipment
- Track labor of all trades
- Check equipment arrival schedules
- Obtain necessary bonding and permits
- Line up proper labor
- Schedule sheet metal fabrication
- Provide bi-monthly status reports

### *Procurement, Bidding, Cost estimating*

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## Procurement and Cost Analysis

### Requirement for multiple quotes

In our equipment and materials estimating we typically request three quotes from various local suppliers and or manufacturer's (when appropriate) and carefully evaluate any differences in specification; weight, noise or decibel ratings, efficiency, warranty, etc. If there are significant differences or an impact to cost or energy savings, we bring this information to the ADEQ's attention to discuss the best selection.

### Vendor neutrality

Our team brings the advantage of vendor neutrality to the project. We don't represent any manufacturer, allowing us and unbiased analysis of equipment and services the customer uses based solely on operational and cost benefits to our customer. Even product manufacturers who will provide other brand equipment still must bear the burden in their overhead dollars for research and development, manufacturing facilities, and marketing campaigns.

### National purchasing agreements

We have national purchasing agreements with multiple vendors and contractors. These agreements allow us to leverage our national buying power to further reduce equipment and service costs and provide even greater value to our customers.

## 8C. SUPPORT SERVICES:

### *Measurement and verification of savings*

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## Measurement and Verification

As with most certified ESCOs, ABM uses the International Performance Measurement and Verification Protocol (IPMVP). The National Association of Energy Service Companies (NAESCO), DOE, and other high-profile Energy Saving organizations recognize this protocol as the standard guideline for measuring savings resulting from energy conservation projects.

### Electrical, Natural Gas and Water Savings

We measure electrical, natural gas, and water savings through the IPMVP process. We carefully assess each ECM for its specific interaction on the baseline and include the savings in our M&V report.

## Measurement and Verification (M&V) Overview

The M&V team works closely with our customers throughout the three major life cycle components of a project: Plan, Install, and Maintain. Customer participation throughout these components results in clear expectations and a solid understanding of technical M&V tasks, calculations, and deliverables.

### Step 1 – Plan

The first component of planning includes a thorough review of baseline utility usage, cost patterns, and utility rate analysis. Understanding rate structures allows our development team to target energy conservation measures (ECMs) that provide the biggest return on investment for the ADEQ. In addition, proper application of rates ensures that savings are not overstated or understated.

We suggest an onsite M&V workshop be conducted when final baseline data analysis is completed and a preliminary list of ECMs is identified. During this workshop, we present and discuss a preliminary M&V approach in addition to providing any clarification needed. The goal of following a collaborative M&V selection process is to create an M&V plan that optimizes the balance of costs versus the confidence level of reported savings. M&V best practices have evolved over the past few decades, and our M&V and engineering teams have extensive knowledge regarding the proper application of M&V options.

After the workshop, we finalize the M&V plan, tasking, and cost estimating for inclusion in the contract. In addition, the M&V team work with the project manager and engineer to ensure proper metering, equipment selection, and trend point. The sequence of operation programming expenses is accounted for in our scope.

#### Overview:

- Identify ECMs
- Document baseline energy
- Plan and coordinate M&V activities
- Design ECMs



## Step 2 – Install

During the implementation phase of the project, our M&V team works closely with the project manager to ensure any remaining pre-retrofit measurements, logging, or other tasking are completed prior to demolition or changes to existing equipment and programming. In addition, regular meetings are conducted to review progress and obtain any pre/post data on ECMs as they are completed. Site visits are conducted to physically inspect each ECM.

Finally, the M&V team works with the ADEQ and the project manager to provide confirmation that each ECM has the potential to perform before final acceptance occurs. This establishes agreement that each ECM has been installed in alignment with the basis of design and has been properly commissioned. Within 90 days after final project acceptance, a Post-Install Report (PIR) is provided. This documents the overall project's potential to perform, along with calculated Install Period savings and a projection of year one savings.

#### Overview:

- Install ECMs
- Commission
- Verify operations





### Step 3 – Maintain

After final project acceptance, the M&V plan is executed throughout the reporting period. Our team gathers data accordingly and may conduct site visits to determine if ECMs are still in place and operating per design. These site visits are coordinated with the ADEQ.

We recommend regular communication throughout the performance period. If any issues or changes occur within the buildings, providing that information to our team allows us to determine possible energy impact and provide suggestions on resolution. This results in timely resolution and maximizes the ADEQ's ability to achieve desired savings. Conversely, if the M&V plan includes regular site visits, remote BAS inspection, or trend data analysis, interim feedback is provided if any concerns are uncovered in the data or while on site.

Overview:

- Gather data
- Verify savings
- Issue report
- Document project feedback
- Assure persistence



**We provide a savings report detailing the results of the performance period on an annual basis.**

### Overview of IPMVP M&V Options

The IPMVP defines four broad options for measurement and verification of energy savings. More than one option may be applicable to any one specific situation. The option that provides acceptable confidence with the lowest cost to the customer is typically selected. M&V options are determined by where you place the boundary of the analysis. The first approach is the Retrofit Isolation Method (RIM), where performance is evaluated at the specific equipment or system level. The second approach is the whole building method, where performance is evaluated at the building or utility meter level.



## Measurement and Verification Details

This section specifically details the options available for verifying the energy savings after we implement the selected ECMs. The key to successfully achieving the predicted savings of this project is the accuracy of the energy baselines and the measurement and verification of savings.

The IPMVP defines four broad options for measurement and verification of energy savings. Each option is applicable to specific situations and having more than one option for any single situation is possible. The broad categories of the IPMVP lay out as follows:

<b>Option A</b>	<ul style="list-style-type: none"> <li>• Retrofit Isolation – Key Parameter Measurement</li> <li>• Measurement of key parameter(s), some agreed-upon parameters</li> </ul>
<b>Option B</b>	<ul style="list-style-type: none"> <li>• Retrofit Isolation – All Parameter Measurement</li> <li>• Measurement of all key parameters</li> </ul>
<b>Option C</b>	<ul style="list-style-type: none"> <li>• Whole Building – Utility Bill Comparison</li> <li>• Baseline utility data is normalized for weather, then compared to current data</li> </ul>
<b>Option D</b>	<ul style="list-style-type: none"> <li>• Whole Building – Calibrated Simulation</li> <li>• ECM savings are generated through a computer modeled building simulation</li> </ul>

Often overlooked is the necessity of identifying the M&V plan concurrently with the project development. In some cases, it is necessary to drop or ignore a portion of savings associated with a specific measure because a portion is immeasurable or unreasonably expensive to measure.

Implementation of a verification plan for the diverse types of ECMs typically involved in a performance contract usually requires a combination of methods to successfully measure savings. For any given ECM, we may cross verification categories by combining a stipulated and an end-use measurement component into the savings calculation.



### Factors that guide the selection of an M&V method for each ECM include:

- Cost of measurement vs. savings
- Complexity of ECMs to be installed
- Likelihood of sustainable savings
- Probability of future construction or ECMs
- Timing of measure installation
- Level of interaction between ECMs
- Dynamics of the facility's energy baseline
- Degree of sub-metering in the facility

Due to the variables and dynamics unique to each performance contract and often to each facility, we must develop an individual measurement and verification plan for each situation. While the specifics may vary, the general method employed will always follow one of the methods outlined in the IPMVP.

The following paragraphs detail the potential M&V methods and where we typically use them on our projects, followed by a sample chart from a reference project listing the M&V protocols used for each ECM measure.

### Option A

- Retrofit Isolation – Key Parameter Measurement
- Measurement of key parameter(s), some agreed-upon parameters

This option calculates energy savings using a sampling of field measurements combined with stipulated parameters. Once calculated, we stipulate the savings for the life of the project. Ongoing actual measurements may or may not be used in this verification technique depending on whether predicted savings and/or the volatility of the measures implemented warrant the expenditure on additional field measurements.

An application for using this option is for lighting efficiency and water efficiency improvements where performance may be relatively stable and not interdependent with other measures. We quantify the savings for the lighting upgrade by measuring before and after power consumption for a representative sample of lighting circuits and by stipulating or agreeing to the hours of operation of each circuit.

### Option B

- Retrofit Isolation – All Parameter Measurement
- Measurement of all key parameters

We measure and verify energy savings performance of energy conservation measures at the end-use site. Option B techniques are designed for projects where long-term continuous measurement of performance is desired and warranted. Under Option B, we continuously monitor individual loads to determine performance. To determine savings, we compare this measured performance with a baseline.

A possible application for Option B measurement is chiller efficiency improvements in a setting of continuous change at a facility. We quantify the savings for the chiller upgrade by measuring the existing chiller's performance in kW/Ton at several points in load while maintaining steady condensing temperature. For other steady condensing temperatures, we develop the same chiller performance curve, resulting in a three-dimensional load curve for the existing chiller(s). After the retrofit, we measure a similar 3-D load curve and install instrumentation. This will sample the actual tonnage being delivered to the building cooling loads during the entire measurement period and measure the power reduction interpolated from the before and after performance curves.

### Option C

- Whole Building – Utility Bill Comparison
- Baseline utility data is normalized for weather, then compared to current data

Option C verification techniques calculate savings by comparing the post-retrofit overall energy use in a building or facility with pre-retrofit energy baselines. Implicit in this measurement option is the necessity of identifying and accounting for the effects of changes to the facilities during the measurement period that are beyond the scope of the measures installed. The impact of building additions, changes in operating hours, and remodeling projects that the ADEQ implements during the measurement period must have their energy impact accounted for if the true savings from the energy conservation measures is to be assessed. This process can be time-consuming and expensive in facilities that are very dynamic.

There are many benefits to an Option C measurement. When significant interactions between energy-consuming systems and energy conservation measures are present, and when assessing savings for measures that we cannot easily measure directly, Option C may be the only viable method. Option C savings calculations also most closely emulate the bills from the utility company, and the calculations are easy to understand and explain.

#### Option D

- Whole Building – Calibrated Simulation
- ECM savings are generated through a computer modeled building simulation

Option D verification techniques calculate savings by using a carefully calibrated hourly building simulation model to examine building performance before and after the digital implementation of energy conservation measures. A high degree of comfort in both the simulation and the operator is necessary for this method to work to the satisfaction of both parties.

## Deemed Savings

While not directly defined as an IPMVP option, the protocol recognizes that there are instances when measurement and verification of savings is not warranted. In cases where the cost of measurement is too high in comparison to the savings, where the parameters preclude accurate measurements, or where the confidence of the savings projections is high, the ADEQ and ABM may agree to deem those projected savings satisfied for the term of the project. This decision should be based on proper installation, successful functional performance test results, or equipment specification documents without any measurement or recalculation of the savings. One example of this is window tinting – if the specified Solar Heat Gain Coefficient (SHGC) is confirmed in the product specification sheets, the savings would be deemed satisfied.

### Customer Benefits Associated with Savings Measurement

The following lists some of the main benefits associated with any M&V plan. The benefits listed are included in an Option C plan.

#### Maximize the Energy Savings

Through careful investigation of building scheduling parameters, HVAC equipment performance, and occupancy patterns, our M&V team delivers the maximum amount of energy savings achievable using the equipment installed under the program.

#### Sustain the Energy Savings

Without measurement and verification, energy savings tend to erode over time. This can be due to changes in HVAC control parameters, maintenance strategies, space use, building structure, and equipment replacement. While some items are unavoidable, it is vital to quantify the effects of those changes to see if the installed measures are still functioning correctly.

### **Defend the Performance Contracting Decision**

The decision to join in an energy savings performance contract (ESPC) involving champions and detractors within a customer's organization can be difficult. Signing an ESPC requires an understanding that the energy service company honors the guarantee should a shortfall in savings result. Our Measurement and Verification (M&V) team works hard to ensure that all the ADEQ' entities understand the results of the measurement and verification activities. We accomplish this through periodic reporting, annual site visits, and council presentations. Should the energy savings fall short of the guaranteed level, ABM will make up the shortfall.

### **Identify Additional Opportunities**

During the initial ECM installation, we encounter measures that are not fully evaluated. Other potential measures may come to light only after the completion of the initial installation. In these cases, our M&V team will continue to investigate for energy savings, from changes in the operation and maintenance of the facilities to projects that will increase comfort and reduce energy consumption.

### **Ongoing Training and a Consistent Knowledge Base**

If facility personnel changes, we will train the ADEQ' new team members on issues specific to your facilities. With a team of professionals who know systems, controls, and the details of your facilities, we train new team members quickly and guide them through the learning process.

### **Forecast Changes in Energy Consumption and Making Energy-Smart Choices**

As facilities equipment and usage change, so does energy usage. Our M&V team can quantify that change, enabling the ADEQ to more accurately budget for the required energy upgrades. Also, we can help you make decisions about the proposed changes at their facilities, giving you the tools to evaluate the long-term energy impact of different buying choices.

### **Identify Utility Billing Errors**

As part of many performance contracts, we collect customer utility bills on an ongoing basis to determine savings. During the process of examining and entering the data and comparing the usage to expected usage, we have detected utility-billing errors.

### **Monitoring Services (M&V)**

We offer monitoring services as part of the guarantee that focuses on measurement, verification, and maintenance of the energy savings.

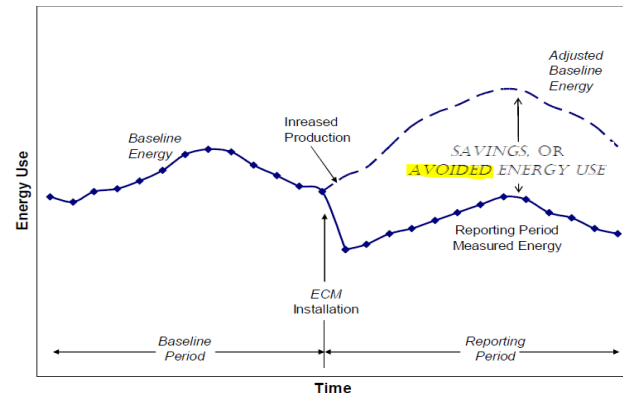
### **Entirely Stipulated Savings**

While not directly defined as an IPMVP option, the protocol recognizes that there are instances when measurement and verification of the savings is not warranted. In cases where the cost of measurement is too high as compared to the savings, where the parameters preclude accurate measurements, or where the confidence of the savings projections is high, the ADEQ and ABM may agree to stipulate those projected savings for the term of the project without any additional measurement and verification of the savings.



## What is “Avoidance”?

One important concept to remember is “Avoidance.” To provide an accurate estimate of savings, the pre-retrofit baseline data must be normalized for factors like weather. The purpose of M&V is to estimate the absence of energy, which simply asks the following: What amount of energy would the old equipment and building have consumed under the current conditions? Savings are calculated by comparing current data to a baseline that has been adjusted to current conditions.



## Proper Sampling

For some ECMs within the project scope, a sampling plan may be proposed. The purpose of monitoring a sample as an alternative to monitoring an entire population is to characterize specific attributes of a population from which a sample is drawn with adequate accuracy and reliability while reducing monitoring costs and effort.

Sampling is typically a two-stage process that can address one or both components of ECM savings, which are “performance” (efficiency, power draw, etc.) and use, also known as “operation” (run hours, space requirements, etc.) Performance is typically addressed by separating equipment by scale, such as lighting fixture model, motor rated horsepower size, etc.

Operation is typically addressed by separating the equipment by usage groups, which reduces the variation and therefore the sample size required.



### Usage groups should be developed from certain criteria:

- Area type (for example, office, hallway, meeting room)
- Annual operating hours
- Similar function use
- Timing / usage patterns of the operating hours, load, or other variable
- Variability of operating hours, load, or other variables

## Sampling Size Calculation

Measurement and verification guidelines suggest using sample sizes that meet a confidence level of at least 80% and a precision of 20%. Using a Cv of 0.5 will increase the initial sample size but reduce the risk of under-sampling.

Confidence refers to the probability that the estimate will fall in the range of precision:

- P – Precision. The value estimated by sampling cannot be expected to be the actual value, therefore it is useful to state an interval in which we have confidence the true value lies. Confidence interval is also often referred to as precision.
- Cv – Coefficient of Variation, defined as the standard deviation of the readings divided by the mean.
- Z – Z-Statistic (1.645 for 90% confidence, 1.282 for 80% confidence).

The sample size can be calculated using the following equation:

(where n = sampling size): 
$$n = \frac{z^2(Cv)^2}{p^2}$$

### Sampling Plan Process

We follow the following process for any suggested sample plan:

- Review the baseline data to determine the full population size.
- Arrange the data and clearly identify each item for future cross-referencing.
- Identify any equipment that heavily impacts the possible savings. For example, lighting fixtures that represent at least 75% of the lighting energy use or savings are measured. Less impactful fixture types that are found in smaller populations will not be included in the sampling plan to control costs.
- Calculate the sampling size (n) using the equation above (80% confidence, 20% precision, Cv = 0.5).
- Randomly select equipment from the population to meet the sampling size.

## Energy Management Services (EMS) Overview

Remote electronic monitoring of a customer's Energy Management Services (EMS) is the only proactive mechanism available to detect and prevent increasing energy consumption.

### Start-up Activities

- Software and hardware set-up
- Data logging report

### Monthly Activities

- Review temperature trends
- Review digital inputs
- Review weekly schedules
- Review holidays and daylight savings time changes
- Phone calls

The overall purpose is to ensure the correct operation of the EMS. Our technicians look for changes to the program outside the current scope or areas that are not achieving the expected temperatures or setbacks, which may indicate Energy Management System (EMS) or HVAC equipment failure. When differences or difficulties are found, they will notify the ADEQ and work with them to make any necessary corrections.

Below is an overview of the technology platform's capabilities based on which the EMS services are dependent. They include:

- **Central data aggregation** – Continuous monitoring of key performance parameters, fault and consumption data for assets across the customer sites
- **Business intelligence/data warehousing** – Identify mismatch in the operation of assets vs. the policy, of inefficient operations and establishing the thermal profile thus improving comfort conditions
- **Analytical reports** – Analyzes consumption trends against defined benchmarks & policies. Optimizes energy consumption taking into consideration weather information & other energy impacting parameters.
- **Management information system (MIS) reports** – Reporting as per routine needs and for any regulatory requirements



The platform has built in algorithms and intelligence to convert the raw data received from site into meaningful actionable to reduce energy consumption. Our platform understands the sites through a proprietary energy model which divides the sites into logical groupings based on type of energy services usage. These are called Service Consumption Area (SCA) and Meter Service Areas (MSA). Multiple SCAs are grouped together to build a single MSA.



## Monitoring Variables

We examine the assets on site on a continuous basis in order to monitor the variables that are used for the energy savings. All points that are provisioned into the open protocol building management system (BMS) can be mapped onto the platform to perform the services in consideration. Some parameters are stipulated based on product ratings and specifications.

## Deviation Management

Based on the schedules and policies mutually agreed during the base lining period, these are programmed into the energy management platform to monitor any deviates from the same. Upon any breach of policy (e.g., overcooling or undercooling) or any schedule breach (e.g., cooling system in a switch 'ON' mode post operational hours) the platform generates an incident/alert.

A report of all deviations are generated on a periodic basis and are submitted to the ADEQ. These reports help in the determination of actual energy savings achieved or take corrective action or adjust the baselines. The ADEQ should inform our team of any pre-planned changes in operational schedules so that the necessary adjustments can be made and incidents during that period disregarded.

## Platform-Based Commissioning

In addition to deviation management, we also collect data points against the weather RSS feeds. For instance, economizer operations are programed on the basis that the outside air temperature sensors can be faulty at times. However, having an RSS feed of external weather data will assist in providing validation to systems/sensors that are not working for one reason or another.

## Sample Analytics Reports

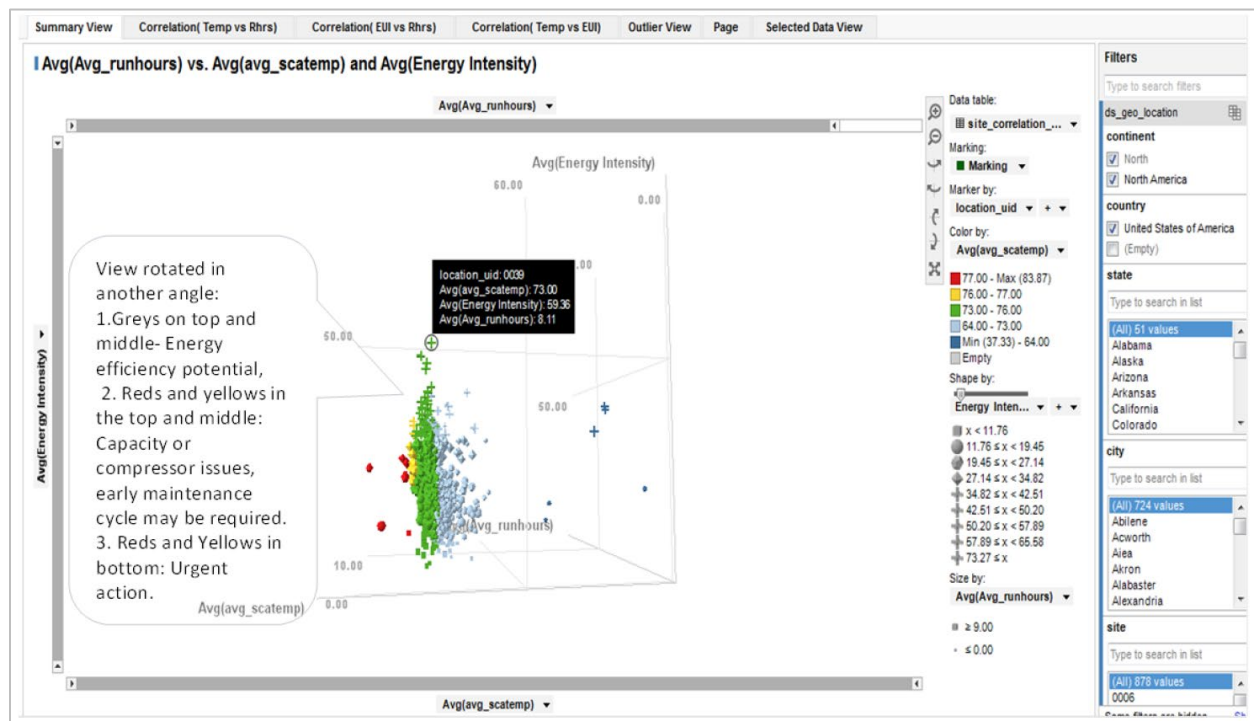
As a part of the EMS services there are certain reports that are generated to assist in identifying energy leakages and in evaluating energy performance. The main goals of reporting are:

- Deliver access to and transparency of data
- Report against Key Performance Indicators (KPIs)
- Facilitate decision making through advanced analytics





The graph below provides an insight into the advanced capabilities of the energy management services. Here, the average run hours are plotted against the average temperature profile of an SCA and the average energy intensity. Here, the color coding helps us in understanding of any leakages/operational optimization that may need to be implemented. For the red and yellow marked points (SCAs), an in-depth analysis would be conducted based on the processed data collected by the platform to improve energy performance of these areas within the building.



The following analysis reports maybe the standard reports provided based on the availability of data. They will be provided periodically as mutually discussed.

### Energy Consumption (kWh)

- All sites total
- Site wise consumption
- Energy intensity report
- Cluster reports (by climate zone and equipment type)

### Consumption Profile by Service

- All sites average
- Site wise

### Consumption Profile by Service Window

- Site wise
- League report
- Working hours report (occupied, employee, unoccupied hours)

### Asset Run Hours Reports

- Assets wise
- Asset system wise

## Site Trips

ABM's M&V Group will typically visit each job site at least once per year. This is our opportunity to interface with the administrative and maintenance staff to see how active the energy program is. It also gives us an opportunity to look for additional ECMs.

Some of the services performed on the site trip may include:

- Review project status with customer
- Present to board/decision makers
- Inquire about past and future changes
- Inspect all ECMs
- Take quantitative measures
- Look for additional ECMs
- Review and inspect O&Ms

### *Equipment warranties*

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During the warranty period contractor shall be responsible for equipment repairs, outside of warranty period owner shall be responsible for repairs and replacements. All manufactures warranties will be in effect.

Operations and Maintenance (O&M) savings will be established by thorough review of maintenance records provided by the ADEQ. The service calls are categorized into lighting, controls, air handling equipment, chillers, boilers, unitary equipment, and other. The annual operating and maintenance costs avoided through the implementation of the energy conservation measures are developed by attributing all, or a portion of, the maintenance cost directly affected by the energy conservation measures. The energy conservation measures could affect maintenance costs through new or extended warranties or re-commissioning of an existing system.

### *Calculation and reporting of emissions reductions*

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We help reduce your environmental footprint by setting carbon reduction targets based in science and developing a carbon reduction roadmap that impacts your sustainability efforts with regard to fleet and electricity procurement.

### *Marketing and promotion of a State or Federal EPC Program*

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The marketing plan will be managed at the division and corporate level in coordination with local state office representatives. Once awarded the, ABM will commit to promoting and publicizing our affiliation with the ADEQ. Using our energy and education industry marketing expertise and our internal and external marketing resources, ABM has the ability to carry out our promise as a ADEQ preferred vendor.

One of our main news outlets is <https://www.globenewswire.com/>.

### *Performance guarantee for every year of the financing term*

We provide a 100% guarantee of energy savings as part of the energy savings performance contract, ensuring enough energy and operational savings will result over the term of the program to pay for all associated costs.

### *Insurance per contract requirements*

Current Limits	Amount	Current Carrier
<b>Commercial General Liability</b>	\$2,000,000 per occurrence	ACE
<b>Automobile Liability</b>	\$5,000,000 per accident	AIG
<b>Workers' Compensation</b>	Statutory per accident	ACE
<b>Employers Liability</b>	\$1,000,000 each accident \$1,000,000 disease – each employee \$1,000,000 disease – policy limit	ACE
<b>Umbrella*</b>	\$10,000,000	ACE

**Additional Limits or Coverage:** ABM carries other types of insurance coverage, including crime, environmental liability, and aviation general liability. If other coverages or higher limits are required, please contact us for additional information.

*\*Umbrella applies in excess of General Liability, Automobile Liability and Employers Liability limits.*

### *Application for an Energy Star Label Application for LEED certification*

## Energy Star®

Commercial and industrial buildings' energy use is accountable for around half of U.S. greenhouse gas emissions. The U.S. Environmental Protection Agency (EPA) estimates that if the energy efficiency of commercial and industrial buildings in the U.S. improved by 10%, Americans would save about \$20 billion and reduce greenhouse gases equal to the emissions from almost 30 million vehicles.



The Energy Star® program is the EPA's energy performance rating system designed to recognize top performing buildings when it comes to energy efficiency and environmental leadership. An Energy Star® certified facility meets strict energy performance standards set by the EPA, uses less energy, operates more cost effectively, and causes fewer greenhouse gas emissions than its peers.

We want to help you and your facility use less, save more, and become more environmentally responsible. To achieve certification, each building must be evaluated for an Energy Star® rating. To qualify, the facility must perform better than at least 75% of similar buildings nationwide. With an Energy Star® certification, your facility can become a leader in sustainability and environmental stewardship.

As an Energy Star® partner, ABM will work with you to benchmark your building's current performance and develop an energy management strategy to put you on the path to certification. As your long-term partner in energy solutions, we will also continue to provide service on an annual basis to maintain your facility at peak efficiency and preserve or even improve your rating.



## Leadership in Energy and Environmental Design (LEED)

Leadership in Energy and Environmental Design (LEED) is the most widely used green building rating system in the world. Available for virtually all building types, LEED provides a framework for healthy, highly efficient, and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement and leadership.

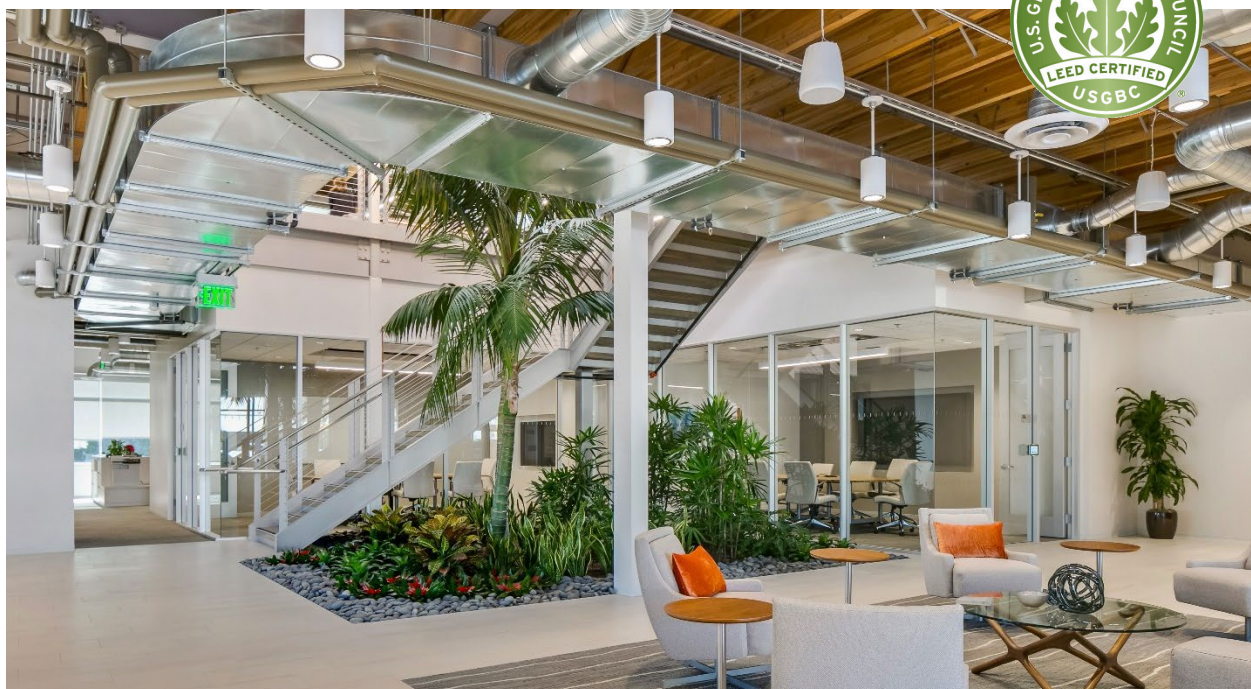
### LEED Certification

ABM is committed to preserving the natural environment by reducing the negative impact of operations on the environment. We encourage the LEED accreditation of employees and actively promote sustainable building programs among our customers. While we tailor our operations to meet the needs and objectives of each individual customer, we also pursue:

- LEED professional accreditation with representatives of our engineering, project management, and operations staff.
- LEED accreditation of the buildings we manage on behalf of customers.

We are an active member of the U.S. Green Building Council (USGBC), which is the world-renowned accreditation organization for LEED certification. As member of the USGBC, we manage a wide variety of energy conservation and environmental initiatives across the country, including the following within the designated LEED categories:

- Sustainable sites
- Water efficiency
- Energy & atmosphere
- Materials & resource efficiency





## *Training of maintenance staff and occupants*

### Training

It is critical for current facility staff to understand the operating procedures for the new equipment and their role in properly maintaining the systems to maximize savings. Our experience has shown that the manner in which systems are operated can cause **up to a 20%** variation in energy usage. Training is important in achieving and sustaining energy savings over time and can easily be an additional energy savings measure.

ABM is a nationally recognized service provider and many of our customers will ask us to design a customized training program supported with an ongoing maintenance offering. No matter the approach you choose, ABM involves your facility staff members over the course of the program, gathering their input through the study, design, and construction phases. We ensure that they are both knowledgeable and committed to the success of the program and maintaining the integrity of the new assets.

### Processes for Technicians & Contractors

#### Initial Training

Each team member presently involved in operating or maintaining a process, and each team member before working in a newly assigned process, will be trained in an overview of the process and in the operating procedures. The training will include emphasis on the specific safety and health hazards, procedures, and safe practices applicable to the team member's job tasks.

#### Refresher & Supplemental Training

At least every three years, and more often if necessary, refresher and supplemental training will be provided to each maintenance or operating team members to ensure safe operation of the facility. The employer, in consultation with team members involved in operation or maintenance of a process, will determine the appropriate frequency of refresher training.

#### Training Certification

The employer will ensure that each team member involved in the operation or maintenance of a process has received and successfully completed training. The employer, after the initial or refresher training, will prepare a certification record which contains the identity of the team member, the date of training, and the signatures of the persons administering the training. Testing procedures will be established by each employer to ensure competency in job skill levels and safe and healthy work practices.



Our training programs typically include a structured program on each technology installed, such as:

- New Energy Management Systems (EMS)
- New HVAC Systems
- Lighting Systems
- Automatic Meter Reading Devices
- Variable Speed Drives
- IR Heating Systems
- Heat Pumps
- Circulating Pumps
- EV Charging Stations

**The manner in which systems are operated can cause up to a 20% variation in energy usage.**

## The Training Process

After a specific piece of equipment is installed and accepted, ABM will provide O&M manuals to the ADEQ to serve as a permanent record and a training tool. Upon contract award, the ADEQ will receive a proposed training course content agenda and schedule to approve for the operating program.

Training will begin shortly after the receipt and approval of these documents by the state. ABM's professional training staff, in conjunction with the equipment manufacturer's personnel, as appropriate, will train all applicable team members in the operation, troubleshooting, and maintenance of each measure installed.

The training includes on-site instruction and practical application phases. The application phase consists of giving hands-on training in one or more locations where the equipment under study is installed. Maintenance manuals, as-built drawings, visual aids, and other customized training documents will be provided. Comprehensive documentation and systematic labeling will reinforce the initial training. As part of the periodic check of the equipment, ABM will also ensure that it is being operated and maintained properly.



Typical training sessions account for only a small portion of the knowledge required for effectively operating and maintaining the equipment.

**ABM often schedules a 30 to 60-day follow-up training session for each major equipment item or system, allowing the O&M personnel to have a good working knowledge of the equipment operation and provides a follow-up forum to gain a higher level of understanding.**

## Ongoing Training

The development of a co-authored, long-term maintenance and training action plan is important. We base this plan on the type of maintenance currently being performed, the tools that are being used, and the ADEQ's maintenance goals. Before implementing the plan, ABM will work with the ADEQ to assess the skills of their maintenance staff. Based on this evaluation, we will formulate a training program that best suits the needs of each staff member, which may be a combination of on-the-job training at each respective location and formal, off-site classroom instruction.

## NETA Technician Training

The InterNational Electrical Testing Association (NETA) is a trade association dedicated to improving electrical testing standards in the United States and sharing those standards internationally. NETA is accredited by the American National Standards Institute (ANSI) as a standards developing entity. It is guided by an active Board of Directors consisting of professionals within the electrical testing industry. The Board meets quarterly for official meetings. Board members also participate on various NETA committees, such as the Standards Review Council, Certification Exam, Membership, Finance, Association Development and Strategy, Promotions and Marketing, Nominations and Mission Based Programs.



NETA Accredited Company (NAC) membership is tailored for third-party, independent firms involved in full-service testing, analysis, and maintenance of electrical power systems. This includes low-, medium-, and high-voltage distribution, substation, and generation equipment. About the Two-fold Accreditation Process NETA maintains a two-fold accreditation process that certifies the company and its individual technicians to assure consumers of both the qualifications of the company as well as the credentials of the individual technician. Following accreditation, the qualifications of each NETA Accredited Company and its technicians are reviewed on a regular basis.

### Electrical Technician Certification

Certification of competency is particularly important in the electrical testing industry. Inherent in the determination of the equipment's serviceability is the prerequisite that individuals performing the tests be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved.

Technicians must also evaluate the test data and make an informed judgment on the continued serviceability, deterioration, or non-serviceability of the specific equipment.

NETA, a nationally recognized certification agency, provides recognition of four levels of competency within the electrical testing industry in accordance with ANSI/NETA ETT Standard for Certification of Electrical Testing Technicians. This standard is available as a free download in the NETA Bookstore.

#### The ANSI/NETA ETT establishes:

- Minimum requirements for qualification & certification of the electrical testing technician (ETT)
- Minimum training and experience requirements for ETTs and provides criteria for documenting qualifications and certification
- Minimum qualifications for an independent & impartial certifying body to certify electrical testing technicians

Four levels of classification are defined in terms of the skills and knowledge required in a given method or methods to perform specified electrical testing and maintenance activities. To proceed to a higher level, an individual shall meet the qualifications set forth and pass the examination for all previous levels.

- ETT Trainee Level 1
- ETT Certified Assistant Level 2
- ETT Certified Technician Level 3
- ETT Certified Senior Technician Level 4

### Level 3 - Certified Technician

The ETT Certified Level 3 is capable of supervising ETT Trainee Level 1 and ETT Certified Assistant Level 2. Typical duties include, but are not limited to, performance and management of routine and moderately complex tasks and projects, record keeping, evaluation of test data, and responsibility for the safety of others. Individual is qualified to provide guidance and is capable of performing electrical power switching.

To gain a more complete understanding of the requirements of this certification, the ANSI/NETA ETT and Level 3 Detailed Content Outline should be reviewed in detail.

### Education & Training

- 24 hours of safety in addition to Level 2 requirements (64 hours total)
- 240 hours of electrical in addition to Level 2 requirements (400 hours total)

### Related Experience

- 5 years (Completion of 2+ years technical education in an electrical field shall be equal to a maximum one year of related experience)
- Candidates for Level 3 must have met the qualifications for Levels 1 & 2 in successive order

### Examination

- 100-item, multiple choice, closed-book, onsite proctored exam
- 2 hours allowed to complete exam
- Passing score of 410 or higher on a scale of 200 – 500

### Exam Composition

- 13% - Safety
- 23% - Electrical Testing Fundamentals & Theory
- 47% - Component Testing
- 17% - Systems & Commissioning



### *Hazardous material handling*

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## Hazardous Material Handling Approach

This Standard Operating Procedure (SOP) provides procedural requirements for the disposal of used fluorescent, High Intensity Discharge (HID) lamps, ballasts, and removed fixtures. We handle all materials in accordance with applicable state, federal, OSHA, and EPA guidelines.

## Fluorescent and HID Lamps

### Non-Broken Lamps

- Once lamps are removed, they are to be immediately placed in a container (recycle box, fiber drum) to prevent breakage.
- The container will be closed once lamps are placed in the container and it is full.
- Boxes will then be sealed
- Full boxes will be palletized
- Upon project completion, ABM will arrange for pickup by a recycling company

### Broken Lamps

- Broken lamps are to be immediately bagged and boxed separately.
- This container is to be closed once a broken lamp is placed in the container
- Boxes are to be sealed and palletized
- Upon project completion, ABM will arrange for pickup by a recycling company

## Ballasts

### Non-Polychlorinated Biphenyls (PCB) Ballasts

- Once ballasts are removed, they are to be placed in a container (work trash can or box)
- When container is full, the ballasts are to have the wires snipped as close to the can as possible and placed into a barrel
- When the barrel is full, the lid will be tightened
- Barrels will be labeled "Non-PCB"
- Upon project completion, ABM will arrange for pickup by a recycling company.



### **Polychlorinated Biphenyls (PCB) Ballasts**

- Once ballasts are removed, they are to have the wires snipped as close to the can as possible and be placed into a barrel immediately
- Lid of the barrel is to be closed after each ballast is placed inside
- The barrel is to be labeled "PCB"
- When the barrel is full, the lid will be secured
- Upon project completion, ABM will arrange for pickup by a recycling company

### **Discarded Light Fixtures**

- Once the fixture is removed, the lamps need to be removed and handled in accordance to the lamp SOP A or B
- The ballast(s) in the fixture need to be removed in accordance with the ballast SOP
- Any plastic parts need to be discarded in the general waste roll off container on job site
- Any metal (steel, aluminum, etc.) will be placed in a Gaylord box, on a pallet, or in the metal roll off container on the job site
- Upon project completion, ABM will arrange for pickup by a recycling company

### **Mechanical Equipment**

This Standard Operating Procedure (SOP) provides procedural requirements for the disposal of all removed Mechanical Equipment. We handle all materials in accordance with applicable state, federal, OSHA, and EPA guidelines.

#### **Refrigerant Handling**

- All refrigerants will be handled according to EPA guidelines
- Recovered with approved recovery equipment by certified technicians
- Contained in approved cylinders at all times.
- Mechanical Equipment Disposal and Recycling
- All removed mechanical equipment will be disposed of through proper recycling agents to reduce unnecessary landfill waste.
- All metals and plastics to be separated and recycled.
- All contaminants such as refrigerant oils will be handled according to EPA guidelines to prevent spills and disposed of properly.

## Plumbing Fixtures and Accessories

This Standard Operating Procedure (SOP) provides procedural requirements for the disposal of removed Plumbing Fixtures and Accessories. We handle all materials in accordance with applicable state, federal, OSHA, and EPA guidelines.

### Porcelain Items (Toilets, Sinks, etc.)

All porcelain items will be disposed of through proper recycling agents to reduce unnecessary landfill waste. All metals and plastics to be separated and recycled.

### *Long-term maintenance services of energy systems*

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## Mechanical Service and Repair

According to the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), the number-one way for a facility to sustain energy savings is through a structured maintenance program. By implementing a proactive program, the ADEQ can ensure projected annual energy savings and protect the integrity of the assets installed. ABM can train ADEQ's staff on new systems to ensure all equipment remains operating at optimum performance. As your staff's comfort level and knowledge of the new systems increase, the potential exists for all maintenance to be brought back in-house and additional savings to be recognized.



We understand the importance of implementing a program that protects the integrity of your budget. Our aim is to influence all costs associated with owning and operating facilities, including capital, maintenance, energy, and labor. Our program reflects all cost requirements and all funding sources to make a complete solution economically viable.

### Why ongoing support is important to us, and meaningful to the ADEQ

1. Protects your capital investment
2. Promotes environmental control and budget integrity
3. Maintains system reliability and indoor air quality (IAQ)
4. Monitors and records maintenance tasks
5. Sustains reduced energy consumption
6. Handles changes in regulations and codes
7. Minimizes downtime
8. Reduces emergency maintenance
9. Specializes maintenance functions
10. Establishes best practices

## 9. Project History

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## 9. Project History

*In a single table, list ALL public energy efficiency projects developed and implemented by your locally represented firm or its key members within the past five (5) years; Indicate whether project was through your firm or a key member's previous firm. For the Project Timeline entry, include key milestone dates, such as year IGA signed, IGA completed, contract signed and/or construction completed.*

Our local branch oversees energy savings performance contracts (ESPCs) in the states of Alabama, Arkansas, Georgia, Mississippi and South Carolina. We have completed over \$1 billion in ESPCs across the nation. Below is a list of our projects in this region over the last five years.

Owner/Project Name	Facility Type	ESCO	City & State	Project Size	Total Energy Savings (\$)	Total Energy Savings (kWh)	Total Energy Savings (MMBtu)	Project Timeline	Assigned Staff
Orangeburg County School District	K-12	ABM	Orangeburg, SC	\$39,957,149	\$17,603,637	114,421,980	11,580	Install in progress, est. completion Oct 2023	Engineer: Joey Groveman M&V: Brian Walker Project Manager: Brian Ciepierski Project Developer: Clint Knudson Quality Assurance: Matt Whitenack
Simpson County	Local Government	ABM	Mendenhall, MS	\$3,775,500	\$1,759,593	10,523,160	34,880	Install in progress, est. completion Oct 2022	Engineer/Project Developer: Joey Groveman M&V: Kevin Oni Project Manager: Tim Lester Quality Assurance: Matt Whitenack
Abbeville County School District	K-12	ABM	Abbeville, SC	\$24,863,703	\$2,861,731	17,530,290	1,365	Install in progress, est. completion Sep 2023	Engineer: Joey Groveman M&V: Brian Walker Project Manager: Trevor McDonald Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
DeSoto County Government	Local Government	ABM	Hernando, MS	\$2,811,991	\$1,927,772	12,765,390	21,585	Install completed Aug 2022	Engineer/Project Developer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Holly Springs School District	K-12	ABM	Holly Springs, MS	\$1,140,315	\$1,207,094	7,837,803	48,823	Install completed Jul 2022	Engineer/Project Developer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack



Owner/Project Name	Facility Type	ESCO	City & State	Project Size	Total Energy Savings (\$)	Total Energy Savings (kWh)	Total Energy Savings (MMBtu)	Project Timeline	Assigned Staff
Wilkes County Schools	K-12	ABM	Washington, GA	\$12,141,527	\$9,105,472	29,558,680	1,242	Install completed Jun 2022	Engineer/Project Developer: Joey Groveman M&V: Brian Walker Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Lowndes County Government	Local Government	ABM	Valdosta, GA	\$42,999,426	\$11,226,663	87,741,200	58,600	Install in progress, est. completion Apr 2023	Engineer/Project Developer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Cusseta Chattahoochee County	Local Government	ABM	Cusseta, GA	\$5,096,052	\$282,730	1,343,620	N/A	Install in progress, est. completion May 2023	Engineer/Project Developer: Joey Groveman M&V: Sarah Khor Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Itawamba County School District	K-12	ABM	Fulton, MS	\$2,463,467	\$2,322,473	14,531,355	14,070	Install completed Aug 2021	Engineer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Project Developer: Clint Knudson Quality Assurance: Matt Whitenack
Inwin County Schools	K-12	ABM	Ocilla, GA	\$9,821,480	\$6,450,334	56,143,544	N/A	Install completed Aug 2021	Engineer: Kevin Brown M&V: Sarah Khor Project Manager: Brian Ciepierski Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
Madison County Schools	K-12	ABM	Danielsville, GA	\$23,454,924	\$15,269,320	82,701,292	189,610	Install completed Aug 2021	Engineer/Project Developer: Joey Groveman M&V: Brian Walker Project Manager: Trevor McDonald Quality Assurance: Matt Whitenack
Grady County Government	Local Government	ABM	Cairo, GA	\$5,652,240	\$1,474,241	6,208,845	92,340	Install completed Sep 2021	Engineer/Project Developer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack

Owner/Project Name	Facility Type	ESCO	City & State	Project Size	Total Energy Savings (\$)	Total Energy Savings (kWh)	Total Energy Savings (MMBtu)	Project Timeline	Assigned Staff
Irwin County Government	Local Government	ABM	Ocilla, GA	\$1,783,527	\$478,480	3,016,860	N/A	Install completed Feb 2021	Engineer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
Chattahoochee County Schools	K-12	ABM	Cusseta, GA	\$5,484,156	\$2,531,822	17,509,128	N/A	Install completed Jan 2021	Engineer: Joey Groveman M&V: Kevin Oni Project Manager: Brian Ciepierski Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
Pulaski County Government	Local Government	ABM	Hawkinsville, GA	\$2,885,307	\$1,624,264	9,417,840	36,100	Install completed Oct 2020	Engineer: Joey Groveman M&V: Brian Walker Project Manager: Trevor McDonald Project Developer: Robert Han Quality Assurance: Matt Whitenack
Georgia Institute of Technology	Higher Education	ABM	Atlanta, GA	\$6,448,462	\$5,224,573	2,637,139	119,280	Install completed Aug 2020	Engineer: Joey Groveman M&V: Brian Walker Project Manager: Robert Daw Project Developer: Robert Han Quality Assurance: Matt Whitenack
Aiken County Schools	K-12	ABM	Aiken, SC	\$42,282,240	\$50,126,524	268,193,900	286,620	Install completed Jan 2021	Engineer: Joey Groveman M&V: Brian Walker Project Manager: Brian Ciepierski Project Developer: Clint Knudson Quality Assurance: Matt Whitenack
Dooly County Government	Local Government	ABM	Vienna, GA	\$4,859,413	\$1,251,319	5,960,175	49,665	Install completed Aug 2020	Engineer: Joey Groveman M&V: Kevin Oni Project Manager: Owen Miller Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
Grady County Schools	K-12	ABM	Cairo, GA	\$14,054,240	\$11,757,577	52,284,860	71,620	Install completed Aug 2021	Engineer/Project Developer: Joey Groveman M&V: Kevin Oni Project Manager: Owen Miller Quality Assurance: Matt Whitenack

Owner/Project Name	Facility Type	ESCO	City & State	Project Size	Total Energy Savings (\$)	Total Energy Savings (kWh)	Total Energy Savings (MMBtu)	Project Timeline	Assigned Staff
Bryan County Government	Local Government	ABM	Pembroke, GA	\$11,834,384	\$2,692,528	14,418,435	9,480	Install completed Sep 2020	Engineer: Joey Groveman M&V: Sarah Khor Project Manager: Brian Ciepierski Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
Boaz City Schools	K-12	ABM	Boaz, AL	\$4,335,651	\$4,336,376	21,550,890	6,045	Install completed Oct 2019	Engineer: Kevin Brown M&V: Brian Walker Project Manager: Brian Ciepierski Project Developer: Kent Sauls Quality Assurance: Matt Whitenack
Guntersville City Schools	K-12	ABM	Guntersville, AL	\$6,145,690	\$5,477,003	21,250,245	73,050	Install completed Jan 2020	Engineer/Project Developer: Kevin Brown M&V: Brian Walker Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Colquitt County Government	Local Government	ABM	Moultrie, GA	\$12,508,480	\$5,327,324	30,316,788	525,600	Install completed Aug 2019	Engineer/Project Developer: Kevin Brown M&V: Brian Walker Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Turner County Government	Local Government	ABM	Ashburn, GA	\$4,929,240	\$1,235,219	6,521,115	3,360	Install completed Jun 2020	Engineer/Project Developer: Kevin Brown M&V: Kevin Oni Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Putnam County Schools	K-12	ABM	Eatonton, GA	\$2,458,290	\$2,868,720	20,888,895	11,625	Install completed Dec 2018	Engineer/Project Developer: Kevin Brown M&V: Sarah Khor Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack

Owner/Project Name	Facility Type	ESCO	City & State	Project Size	Total Energy Savings (\$)	Total Energy Savings (kWh)	Total Energy Savings (MMBtu)	Project Timeline	Assigned Staff
Lowndes County Board of Education	K-12	ABM	Valdosta, GA	\$9,646,925	\$5,889,467	36,426,825	53,280	Install completed Jul 2020	Engineer: Kevin Brown M&V: Sarah Khor Project Manager: Brian Ciepierski Project Developer: Clint Knudson Quality Assurance: Matt Whitenack
Oglethorpe County Schools	K-12	ABM	Lexington, GA	\$10,188,240	\$2,330,460	26,591,265	1,350	Install completed Apr 2019	Engineer/Project Developer: Kevin Brown M&V: Brian Walker Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack
Brooks County Schools	K-12	ABM	Quitman, GA	\$10,539,747	\$6,020,740	39,853,440	N/A	Install completed Oct 2018	Engineer/Project Developer: Kevin Brown M&V: Sarah Khor Project Manager: Brian Ciepierski Quality Assurance: Matt Whitenack

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## 10. Project References

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## 10. Project References

*Provide detailed information for a maximum of three (3) public energy efficiency projects your firm completed or were completed by members of your locally represented firm, which can be used for references. Expand on the information provided in the previous section to give details on individual projects. Include the following information on each project as a minimum (maximum five pages per project reference)*

### Aiken County Public Schools

*1. Project Identification: Owner name, city/state, and facility type (hospital, school, college, city, county, etc.)*

Aiken County Public Schools  
 1000 Brookhaven Drive, Aiken, SC 29803  
 K-12 educational facilities

*2. Contact Information: Names and contact information of owner(s) representatives who can serve as references*

Mr. King Laurence, Interim Superintendent  
 803.641.2430, [klaurence@acpsd.net](mailto:klaurence@acpsd.net)

*3. Project Size: Number of buildings and total project square footage*

38 buildings, 3,162,462 sq. ft.

*4. Project Dollar Amount: Total contract amount and the total project capital expenditure amount*

\$42,474,240

*5. Source of Funding: A description of the source of funding used for the project and the company's role (if any) in securing that funding*

Bond

*6. Project Dates: Actual dates of audit start and acceptance; actual construction starting and ending dates*

Actual reporting start date: February 1, 2021  
 Account kick-off date: May 9, 2019  
 Original estimated install completion date: March 31, 2021  
 Actual installation completion date: January 31, 2021

*7. Contract Terms: A description of the type of contract, financing arrangement, and contract term*

Energy savings performance contract with 20-year payback period.

**8. Project Personnel:** *A list of the name(s) of individuals involved in the project, their role(s) and if these personnel will be assigned to Arkansas projects. (Attach their resumes in the Project Management and Staffing section)*

Energy Engineer: Joey Groveman  
 M&V Manager: Brian Walker  
 Project Manager: Brian Ciepierski  
 Project Developer: Clint Knudson  
 Quality Assurance: Matt Whitenack  
 M&V and Commissioning: Lucas Price

**9. Project Schedule:** *Indicate if project was completed on schedule and, if not, please explain.*

This original project/installation completion date was March 31, 2021. Construction for this project was completed ahead of schedule and the actual completion date was January 31, 2021.

**10. List of Improvements:** *The types of retrofits and operational improvements implemented related to energy, water and other cost savings*

Lighting upgrade to LED, building automation upgrades, HVAC replacement, Outside air reduction, HVAC rejuvenation, Building envelope, Water conservation, Transformer replacement, Refrigeration optimization, Roof replacement at Board of Education, and solar PV fields at 6 school locations.

**11. Project Performance:** *The amounts of projected annual savings, guaranteed annual savings, and actual annual savings for each project in a table.*

Projected Annual Savings	Guaranteed Annual Savings	Actual Annual Savings
\$1,749,559 (Year 1)	\$1,606,226 (Year 1)	\$1,569,358 (Year 1)

**12. Measurement and Verification (M&V):** *A brief description of the M&V approach for each project including which savings were stipulated, if any*

IPMVP Option A, Partially Measured Retrofit Isolation.

**13. Performance Guarantee:** *A description of the savings guarantee for each project and, if the guaranteed savings were not achieved (explain if so), how the company compensated the public entity for any annual shortfall (e.g. paid funds to meet the guarantee, etc.)*

This project is currently under a 20-year M&V contract. We recently completed year one and issued the annual M&V savings report to the customer in May 2022.



*14. Project Status: Post M&V, Closed M&V term completed), Additional EPC Phase in Progress (audit or construction), Non-EPC work in progress, other (explain).*

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ABM's Annual Energy Unit Savings Agreement states the following:

*"Should the sum of Customer's Energy Unit Savings for a given Measurement Year be less than the Guaranteed Energy Unit Savings for that Measurement Year, Contractor shall pay to the Customer, within 30 days of the acceptance of the annual Energy Unit Savings report, the difference between the Guaranteed Energy Unit Savings for such year and the Energy Unit Savings for that Measurement Year, with such amount not to exceed the Guaranteed Energy Unit Savings amount set forth in Energy Contract. The difference shall be converted from units of energy to dollars (\$) by use of the Base Energy Rates or the actual energy rates in effect during the Measurement Year, whichever results in a lesser Guarantee Payment. If in the judgment of the Customer, Customer would benefit from additional energy services or energy saving retrofits, Customer and Contractor may mutually agree upon such services or retrofits in lieu of the Guarantee Payment.*

*For the purposes of this Contract, such services or retrofits delivered by Contractor will be considered a Guarantee Payment for that Measurement Year. There shall be no carryover with respect to either Excess Savings or negative Energy Unit Savings for any Measurement Year into future Measurement Years; provided, however, that any Pre-M&V Savings shall be credited towards the Guaranteed Energy Unit Savings for the first Measurement Year."*

This customer did experience a raw shortfall due some ECMs not being completely installed at the time of guarantee commencement. Lost savings were covered by the installation period savings, so no payout was necessary for the customer. Since all ECMs are now fully installed, no further shortfalls are expected for this project.

*15. Additional Comments: Comments on any special features, services, conditions, creative approaches, special needs of customer, etc. that may be relevant to the AEPC Program and clientele.*

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*Please see our case study for Aiken County Public Schools on the following pages.*



## Aiken County Public Schools, SC

ABM initiated an energy savings performance contracting program with Aiken County Public Schools in Aiken County, South Carolina. ABM's customized solution is projected to save Aiken County Public Schools more than \$70 million in energy and operating costs over a 20-year period. Revenue from savings will address aging infrastructure needs, while also providing budget relief.

Energy and operations savings will be achieved by implementing lighting, HVAC, and control upgrades, as well as water conservation throughout the school system's 40 plus facilities, and installation of a solar field at six campuses. The upgrades are projected to save Aiken County Public Schools more than \$2.2 million in energy and operating costs in the first year alone. Savings will climb during the life of the 20-year program, resulting in a projected totals savings of \$70 million.

"Aiken County Public Schools is a large school system faced with a substantial amount of infrastructure needs, which ABM will help them address, while providing budget relief," said Mark Newsome, former President of ABM Technical Solutions. "By implementing ABM's Energy Performance Contracting Program, Aiken County Public Schools will be able to focus on providing its students with a quality education in a safe, comfortable and reliable learning environment."

Aiken County Public School system officials selected ABM to develop a customized solution to take a long-term, comprehensive approach to modernize and extend the lifetime of the school system's facilities, while decreasing energy and operations expenses and improving the learning environment for its students and faculty. The school system is looking forward to more than \$42 million in facility improvements, without upfront costs.

The program also includes sealing building envelopes to control airflow and humidity levels, transformer upgrades, and the installation of water conservation measures at several facilities.

Highlights of the project estimated to conclude in 2021 include:

- Retrofitting lighting systems to energy-efficient LED lighting, and replacing or retrofitting HVAC units, which will be controlled by state-of-the-art HVAC control systems to maximize energy and operational efficiency
- Installing building automation controls, providing maintenance officials to remotely monitor and quickly address maintenance needs
- Installing solar fields at Byrd, Gloverville and Redcliffe Elementary Schools, Jackson STEM Middle School, Leavelle McCampbell Middle School, and the campus of Cyril B. Busbee Elementary and A.L. Corbett Middle Schools
- Upgrading transformers and installing water conservation measures at several facilities  
Improving ventilation and outside air intake systems at several facilities by sealing building envelopes to increase occupant comfort, control humidity and drive energy savings





ABM worked with Total Comfort Solutions to provide preventive maintenance and mechanical services for the school system's HVAC system. Total Comfort Solutions is part of ABM Franchising Group's Linc Service franchise network.

Solar fields were installed at the campuses of Byrd, Gloverville and Redcliffe Elementary Schools, Jackson STEM Middle School, and Leavelle McCampbell Middle School, and the shared campus of Cyril B. Busbee Elementary and A.L. Corbett Middle Schools. The solar fields are enclosed spaces near the schools and the electricity generated is now used to offset the school district's electrical load. Remaining electricity produced from the solar array can be sold to their local energy provider. The solar fields are expected to generate more than \$10.9 million in savings over 20 years.

ABM's Energy Performance Contracting Program enabled the school system to make facility upgrades without impacting their capital budget. The program is designed as a financial solution to meet Aiken County School District's technical facility needs and sustainability goals. The goal is to drive costs out of the operating budget, allowing savings to be reallocated to fund mission critical facility needs.

“

***“The customized program that is being provided by ABM will have a tremendous impact on the school system, its facilities and, most importantly, our students. This solution delivers essential infrastructure updates for our school system and a significant amount of savings that we will utilize to further educational opportunities for our students.”***

-Sean Alford  
Superintendent

”

## Colquitt County

*1. Project Identification: Owner name, city/state, and facility type (hospital, school, college, city, county, etc.)*

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Colquitt County Government  
101 East Central Avenue, Office 261-A, Moultrie, GA 31768  
Local government facilities

*2. Contact Information: Names and contact information of owner(s) representatives who can serve as references*

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Chas Canon, County Administrator  
229.616.7404, [ccannon@ccboc.com](mailto:ccannon@ccboc.com)

*3. Project Size: Number of buildings and total project square footage*

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34 buildings, 349,343 sq. ft. (Phase 1); 15 buildings, 480,824 (Phase 2)

*4. Project Dollar Amount: Total contract amount and the total project capital expenditure amount*

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\$7,671,240 (Phase 1); \$4,837,240 (Phase 2)

*5. Source of Funding: A description of the source of funding used for the project and the company's role (if any) in securing that funding*

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Third party operating lease (Phase 1); Third party operating lease (Phase 2)

*6. Project Dates: Actual dates of audit start and acceptance; actual construction starting and ending dates*

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Actual installation end date – November 30, 2016 (Phase 1)  
Actual reporting start date – December 1, 2016 (Phase 1)  
Original estimated installation completion date – June 30, 2019 (Phase 2)  
Actual installation end date – August 31, 2019 (Phase 2)  
Actual reporting start date – September 1, 2019 (Phase 2)

*7. Contract Terms: A description of the type of contract, financing arrangement, and contract term*

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Energy savings performance contract with 15-year payback period (Phase 1).  
Energy savings performance contract with 20-year payback period (Phase 2).

*8. Project Personnel: A list of the name(s) of individuals involved in the project, their role(s) and if these personnel will be assigned to Arkansas projects. (Attach their resumes in the Project Management and Staffing section)*

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Energy Engineer: Kevin Brown  
M&V Manager: Brian Walker  
Project Manager: Brian Ciepierski  
Quality Assurance: Matt Whitenack  
M&V and Commissioning: Lucas Price

**9. Project Schedule: Indicate if project was completed on schedule and, if not, please explain.**

Phase 1 of this project was completed on schedule. The original estimated installation completion date for Phase 2 of this project was June 30, 2019, but the actual installation end date was August 31, 2019.

**10. List of Improvements: The types of retrofits and operational improvements implemented related to energy, water and other cost savings**

New HVAC and maintenance, new transformer, repair sewer leak, new sewer auger, roof replacement, generator controls, sally port, controls re-commissioning, water conservation, building envelope, electric hand dryers (Phase 1). 812 KW solar panel solution (annex, jail, and prison), HVAC upgrades, new chillers, outside air reduction, LED lighting retrofit, building envelope improvements, roof replacement/coating, generator upgrades, water filtration solution for jail (Phase 2).

**11. Project Performance: The amounts of projected annual savings, guaranteed annual savings, and actual annual savings for each project in a table.**

Projected Annual Savings	Guaranteed Annual Savings	Actual Annual Savings
\$256,402 (Phase 1)	\$256,402 (Phase 1)	\$256,876 (Phase 1)
\$30,030 (Phase 2)	\$30,030 (Phase 2)	\$41,647 (Phase 2)

**12. Measurement and Verification (M&V): A brief description of the M&V approach for each project including which savings were stipulated, if any**

IPMVP Option A – Retrofit Isolation – Key Parameter Measurement and IPMVP Option B – Retrofit Isolation – All Parameters Measurement (Phase 1). IPMVP Option A – Retrofit Isolation – Key Parameter Measurement and IPMVP Option C – Whole Building – Utility Bill Comparison (Phase 2).



*13. Performance Guarantee: A description of the savings guarantee for each project and, if the guaranteed savings were not achieved (explain if so), how the company compensated the public entity for any annual shortfall (e.g. paid funds to meet the guarantee, etc.)*

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ABM's Annual Energy Unit Savings Agreement states the following:

*"Should the sum of Customer's Energy Unit Savings for a given Measurement Year be less than the Guaranteed Energy Unit Savings for that Measurement Year, Contractor shall pay to the Customer, within 30 days of the acceptance of the annual Energy Unit Savings report, the difference between the Guaranteed Energy Unit Savings for such year and the Energy Unit Savings for that Measurement Year, with such amount not to exceed the Guaranteed Energy Unit Savings amount set forth in Energy Contract. The difference shall be converted from units of energy to dollars (\$) by use of the Base Energy Rates or the actual energy rates in effect during the Measurement Year, whichever results in a lesser Guarantee Payment. If in the judgment of the Customer, Customer would benefit from additional energy services or energy saving retrofits, Customer and Contractor may mutually agree upon such services or retrofits in lieu of the Guarantee Payment.*

*For the purposes of this Contract, such services or retrofits delivered by Contractor will be considered a Guarantee Payment for that Measurement Year. There shall be no carryover with respect to either Excess Savings or negative Energy Unit Savings for any Measurement Year into future Measurement Years; provided, however, that any Pre-M&V Savings shall be credited towards the Guaranteed Energy Unit Savings for the first Measurement Year."*

This contract exceeded projected and guaranteed savings figures; therefore no shortfall payments have been paid out to the customer.

*14. Project Status: Post M&V, Closed M&V term completed), Additional EPC Phase in Progress (audit or construction), Non-EPC work in progress, other (explain).*

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This project is currently under a 15-year M&V contract. We recently completed year two and have issued the annual M&V savings report to the customer.

*15. Additional Comments: Comments on any special features, services, conditions, creative approaches, special needs of customer, etc. that may be relevant to the AEPC Program and clientele.*

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*Please see our case study for Colquitt County Government on the following pages.*



## Colquitt County Government, GA

### The Hub of Southwest Georgia

Colquitt County's buildings were in dire need of infrastructure updates due to years of deferred maintenance. As county government, many of their facilities run 24 hours a day, 7 days a week; making energy efficiency a necessity in order to maintain proper stewardship of taxpayer funds.



Through a contract that not only enabled Colquitt County to utilize Special Local Option Sales Tax (SPLOST) proceeds, but also guaranteed energy savings, the county was able to address their facility maintenance issues via a cost-effective method without compromising quality or expertise.

The overall energy project for Colquitt County included, but was not limited to, the installation of new lighting and HVAC systems, internal controls, hand dryers, as well as extensive roofing repairs to their historic courthouse. The county also entered into a maintenance contract for their HVAC systems.

Evidence of the outstanding relationship between Colquitt County and ABM was shown when their Board decided to embark on Phase II, which was inclusive of new lighting opportunities, infrastructure upgrades, and solar opportunities.

#### Phase I

**Project Cost:** \$7.6 Million

**Annual Operational Savings:** \$185,235

**Projected Annual Energy Savings:** \$253,759

**Guaranteed Annual Energy Savings:** \$231,129

**Additional Savings:** \$25,273 in Water Savings

**Scope:** New HVAC and maintenance, new transformer, repair sewer leak, new sewer auger, roof replacement, generator controls, sally port, controls re-commissioning, water conservation, building envelope, electric hand dryers

#### Phase II

**Project Cost:** \$4.8 Million

**Annual Operational Savings:** \$98,358

**Projected Annual Energy Savings:** \$103,614

**Guaranteed Annual Energy Savings:** \$103,614

**Scope:** 812 KW solar panel solution (annex, jail, and prison), HVAC upgrades, new chillers, outside air reduction, LED lighting retrofit, building envelope improvements, roof replacement/coating, generator upgrades, water filtration solution for jail

***“Throughout this entire process, Jason Anderson, as well as Joel Lowery, have been outstanding and attentive to our needs and concerns. From the initial point of contact, throughout the construction process, and upon the completion of infrastructure updates, these two individuals have been steadfast and their dedication has never once wavered. Our partnership with ABM Building Solutions is based on mutual trust and respect and continues to this day.”***

— Charles H. “Chas” Cannon, County Administrator

## Colquitt County Government, GA

### Colquitt County Annex

*Roof mounted solar array constructed for Colquitt County's Annex building - Moultrie, GA.*



### Colquitt County Jail

*Solar array constructed for Colquitt County's Jail - Moultrie, GA.*



## Georgia Institute of Technology

*1. Project Identification: Owner name, city/state, and facility type (hospital, school, college, city, county, etc.)*

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Georgia Institute of Technology  
North Ave NW, Atlanta, GA 30332  
Higher educational facilities

*2. Contact Information: Names and contact information of owner(s) representatives who can serve as references*

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Greg Spiro, Senior Mechanical Engineer  
470.351.9867, [greg.spiro@facilities.gatech.edu](mailto:greg.spiro@facilities.gatech.edu)  
  
Kynthia Gaines, Construction Manager  
404.769.2565, [Kynthia.gaines@facilities.gatech.edu](mailto:Kynthia.gaines@facilities.gatech.edu)

*3. Project Size: Number of buildings and total project square footage*

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2 buildings, 391,966 sq. ft.

*4. Project Dollar Amount: Total contract amount and the total project capital expenditure amount*

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\$6,448,462

*5. Source of Funding: A description of the source of funding used for the project and the company's role (if any) in securing that funding*

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Tax-exempt lease

*6. Project Dates: Actual dates of audit start and acceptance; actual construction starting and ending dates*

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Actual reporting start date: September 1, 2020  
Actual installation completion date: August 31, 2020

*7. Contract Terms: A description of the type of contract, financing arrangement, and contract term*

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Energy savings performance contract with 10-year payback period.

*8. Project Personnel: A list of the name(s) of individuals involved in the project, their role(s) and if these personnel will be assigned to Arkansas projects. (Attach their resumes in the Project Management and Staffing section)*

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Energy Engineer: Joey Groveman  
M&V Manager: Brian Walker  
Project Manager: Robert Daw  
Project Developer: Robert Han  
Quality Assurance: Matt Whitenack  
M&V and Commissioning: Lucas Price



**9. Project Schedule:** *Indicate if project was completed on schedule and, if not, please explain.*

Installation of this project was completed on time.

**10. List of Improvements:** *The types of retrofits and operational improvements implemented related to energy, water and other cost savings*

Lab ventilation and fume hood controls conversion for 150 labs, retro commissioning, ACH Adjustment to meet new standards. Johnson Controls trunk infrastructure upgrade from N2 to N4.

**11. Project Performance:** *The amounts of projected annual savings, guaranteed annual savings, and actual annual savings for each project in a table.*

Projected Annual Savings	Guaranteed Annual Savings	Actual Annual Savings
\$389,478 (Year 1)	\$389,478 (Year 1)	\$629,885 (Year 1)
\$465,371 (Year 2)	\$465,371 (Year 2)	\$657,756 (Year 2)

**12. Measurement and Verification (M&V):** *A brief description of the M&V approach for each project including which savings were stipulated, if any*

IPMVP Option A, Partially Measured Retrofit Isolation

**13. Performance Guarantee:** *A description of the savings guarantee for each project and, if the guaranteed savings were not achieved (explain if so), how the company compensated the public entity for any annual shortfall (e.g. paid funds to meet the guarantee, etc.)*

ABM's Annual Energy Unit Savings Agreement states the following:

*"Should the sum of Customer's Energy Unit Savings for a given Measurement Year be less than the Guaranteed Energy Unit Savings for that Measurement Year, Contractor shall pay to the Customer, within 30 days of the acceptance of the annual Energy Unit Savings report, the difference between the Guaranteed Energy Unit Savings for such year and the Energy Unit Savings for that Measurement Year, with such amount not to exceed the Guaranteed Energy Unit Savings amount set forth in Energy Contract. The difference shall be converted from units of energy to dollars (\$) by use of the Base Energy Rates or the actual energy rates in effect during the Measurement Year, whichever results in a lesser Guarantee Payment. If in the judgment of the Customer, Customer would benefit from additional energy services or energy saving retrofits, Customer and Contractor may mutually agree upon such services or retrofits in lieu of the Guarantee Payment.*

*For the purposes of this Contract, such services or retrofits delivered by Contractor will be considered a Guarantee Payment for that Measurement Year. There shall be no carryover with respect to either Excess Savings or negative Energy Unit Savings for any Measurement Year into future Measurement Years; provided, however, that any Pre-M&V Savings shall be credited towards the Guaranteed Energy Unit Savings for the first Measurement Year."*

This contract exceeded projected and guaranteed savings figures; therefore no shortfall payments have been paid out to the customer.

*14. Project Status: Post M&V, Closed M&V term completed), Additional EPC Phase in Progress (audit or construction), Non-EPC work in progress, other (explain).*

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This project is currently under a 10-year M&V contract. We recently completed year two and have issued the annual M&V savings report to the customer.

*15. Additional Comments: Comments on any special features, services, conditions, creative approaches, special needs of customer, etc. that may be relevant to the AEPC Program and clientele.*

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*Please see our case study for Georgia Institute of Technology on the following pages.*

## Georgia Institute of Technology

### Overcoming the Challenges of Schedule Management



**Improved STEM lab ventilation and fume hood controls are guaranteed to save \$11.7 million in energy and operating costs for Georgia Tech.**

#### Challenge

The Georgia Institute of Technology (Georgia Tech) discovered that 5% of their campus square footage was driving nearly 30% of their campus energy use. Identifying laboratory space as intensive energy consumers, Georgia Tech facility engineers investigated methods for cutting lab space energy cost, reducing their carbon footprints, and providing safer, more reliable working environments for researchers.



## Solution

An energy savings performance contract from ABM provided the combined technical and financial solution needed to upgrade fume hood controls for more than 140 lab spaces without upfront costs.

For fiscal year 2020, the project reduced energy use by 73.7% and 52.7% respectively for the ES&T and UA Whitaker science buildings from the measured baseline, surpassing the guaranteed utility cost savings for that period with an additional cost reduction of \$173,167.



## Safer and More Sustainable

New safety control devices for fume hoods and snorkels helped improve the cost-effectiveness of proper ventilation and empower reliability. Real-time data now alerts an on-site technician ready to respond to performance issues that endanger airflow and could result in expensive lab downtime. Collected data also informs the preventative maintenance needed to optimize performance and mitigate the risk of airflow issues.

## Prioritizing Lab Uptime

Updating critical ventilation assets for more than 140 lab spaces required careful coordination with approximately 100 different research teams. To help minimize impact on millions of dollars of ongoing research, ABM project leaders worked closely with Georgia Tech leadership, Environmental Health and Safety, lab safety officers, and research team contacts. With a proactive communication plan in place, ABM met the commitment to complete work in each lab space in under a week.



## Proven Expertise and Self-Performance

To meet a strict timeline, project development had to fit entirely within a four-month window. ABM completed the engineering and development schedule for more than 140 labs while simultaneously completing construction in 4 labs to test and verify the solution. ABM then self-performed control installations and commissioning for the remaining 136 labs within the rigid 13-month project schedule.

## Benefits

ABM's Energy Performance Contracting Program enables investment in sustainability goals and reliably healthier, safer, and productive spaces by helping to drive costs out of facility operating budgets which can then redirect savings to critical facility needs. In addition to guaranteed savings of \$11.7 million over a ten-year period, the project helped provide:

- Safer and more reliable research environments
- Opportunities to address deferred maintenance and existing problems
- Air pressure issues and excessive air exchange rates
- Temperature extremes
- Significant gains in sustainability goals
- Reduced carbon footprint
- Energy-efficient lab spaces
- On-site, ongoing technical support and preventive maintenance

*"Laboratory spaces are a known cause of high energy and maintenance costs for universities. When Georgia Tech wanted to implement a Smart Lab strategy to achieve sustainability and efficiency goals, our ABM team was able to bring together the engineering, financial, and project management expertise needed to achieve multiple measurable goals on an aggressive timetable that prioritized research teams' schedules."*

- Former Senior Account Executive, ABM

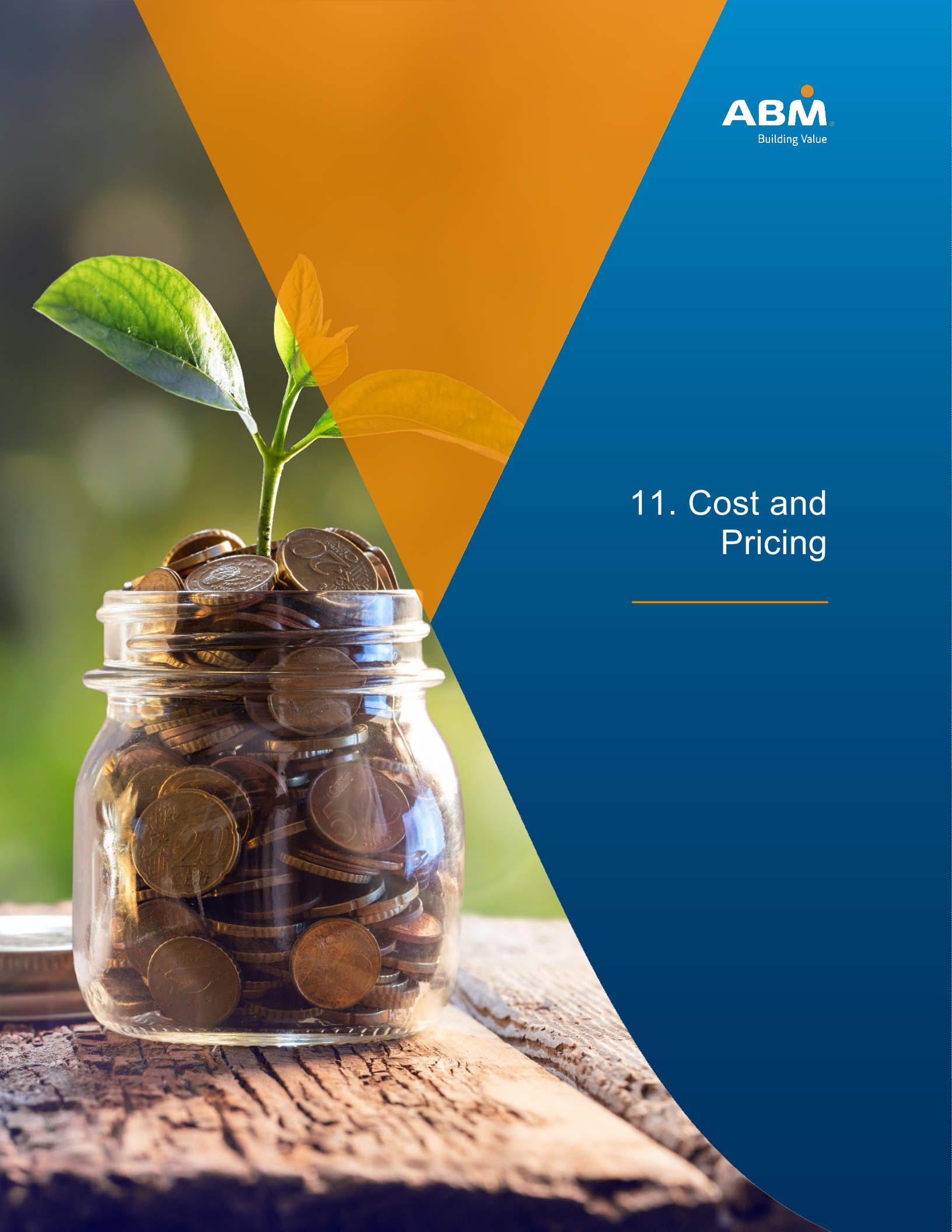


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## 11. Cost and Pricing

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# 11. Cost and Pricing

## 11A. INVESTMENT GRADE AUDIT (IGA) COSTS

*Please describe your company's approach to IGA Pricing.*

### Cost of Investment Grade Audit

The Investment Grade Audit (IGA) portion of the Performance Contracting process will be formalized with a Master Development Agreement (MDA). The MDA is a simple agreement that ensures the ESCO performs the necessary and appropriate engineering, subcontractor vetting, scope pricing, savings calculations and code compliance work that generates your installation agreement and ensures a timely project schedule.

The MDA may be written in the following way:

#### Price and Payment Terms

Customer agrees to pay ABM the **sum of \$\_\_\_\_\_** within 30 days after the delivery to Customer of the documentation described under Paragraph 1 of this Agreement. Customer, however, will have no obligation to pay this amount if:

**A. The Parties enter into an “Implementation Contract” (as defined in Paragraph 3) within 30 days after the delivery to Customer of the documentation described under Paragraph 1 of this Agreement. The above cost will be included in the total cost of the Implementation Agreement and be subject to the payment terms outlined in the Implementation Contract.**

The cost of the IGA will only be charged outright to the ADEQ if you choose to not proceed with the installation agreement, otherwise that cost will be absorbed into the overall contract.

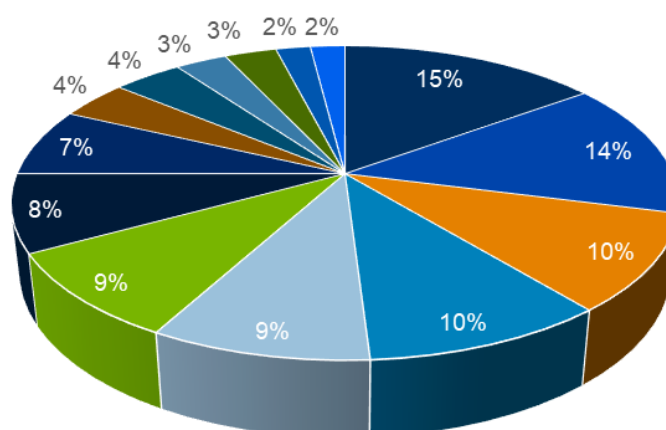
Each project that ABM develops is unique in its own way, and the ADEQ is no exception. You have a mix of very old facilities and somewhat newer facilities. You also possibly have plans for new additions and/or improvements that may be ongoing in a parallel path to this project. One thing that is consistent with the ABM project development process is that you, the ADEQ, will be collaborated with every step of the way.

Once we have been selected as your performance contractor, we will meet with your team to determine the scope of your development. That may include all your buildings, or it may not. It may include only certain facility improvement measures at certain buildings while extensive mechanical work and roofing replacements might be considered at another. Once the scope is determined, ABM will provide a firm cost for development.

The cost per square foot of an IGA in the State of Arkansas would be as follows:

IGA pricing per sq. ft.	Under 250,000 sq. ft.	250,000 – 500,000 sq. ft.	501,000+ sq. ft.
	\$0.20	\$0.18	\$0.15

From a cost breakdown perspective, historically, these are the disciplines involved in your project development:



- Client Meetings
- Site Visits
- ABM Engineering
- Savings Calculations
- Measurement & Verification Workshop
- Outside Engineering Consultants
- Legal Workshop
- Scope Development
- Investment Grade Audit Workshop
- Scope and Pricing Workshop
- Onsite Contractor Walkthroughs
- Financing Workshop
- Contract Development
- Financing Structure & Solicitation

## 11B. FUEL ESCALATION.

*Please describe your company's approach to fuel escalation rates.*

We use linear regression software to analyze utility bill data such as usage costs, kilowatt-hours used, kilowatt-demand, and gas volume to determine a baseline for which a comparative analysis is done. The regression models are designed to include weather data for tuning, or modeling, the expected usage had the project not been done. This is done since weather has a large impact on heating or cooling expenses, and in turn allows us to present more accurate findings.

## 11C. EQUIPMENT/LABOR COST COMPETITION

*Describe your company's process to solicit bids on equipment/labor or to ensure price/cost competition and the best value for the public entity.*

### Requirement for multiple quotes

In our equipment and materials estimating we typically request three quotes from various local suppliers and or manufacturer's (when appropriate) and carefully evaluate any differences in specification; weight, noise or decibel ratings, efficiency, warranty, etc. If there are significant differences or an impact to cost or energy savings, we bring this information to the ADEQ's attention to discuss the best selection.

### Vendor neutrality

Our team brings the advantage of vendor neutrality to the project. We don't represent any manufacturer, allowing us an unbiased analysis of equipment and services the customer uses based solely on operational and cost benefits to our customer. Even product manufacturers who will provide other brand equipment still must bear the burden in their overhead dollars for research and development, manufacturing facilities, and marketing campaigns.

### National purchasing agreements

We have national purchasing agreements with multiple vendors and contractors. These agreements allow us to leverage our national buying power to further reduce equipment and service costs and provide even greater value to our customers.

## 11D. OPEN BOOK PRICING

*Open book pricing is full disclosure by the contractor to the public entity and AEO of all costs and markups for materials, labor, and services received during the project development, implementation, construction, and performance period phases. Open book pricing requires that all costs, including itemized costs of subcontractors and vendors, are fully disclosed if requested by the public entity at any time during a project, not just at the closing of the project. Describe your company's approach to open book pricing and its method for maintaining cost accounting records on authorized work performed under actual costs for labor and material, or other basis requiring accounting records.*

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We agree to a contract that requires open book pricing and abides by all of the rules set forth in the AEPC IGA contract and understands the requirements and obligations in regard to open book pricing, access to all invoicing, job cost reports, sub-contract ledger reports, etc.

## 11E. PROJECT COST AND PRICING ELEMENTS

*Once the public entity has selected a project scope, estimated project costs and open-book pricing elements will be negotiated and become part of the final EPC proposal and contract. The pricing table format to be used is provided as the AEPC Cost & Pricing Tool.*

*For the purposes of the IGA contract, an ESCO may provide estimated cost percentage ranges for each of the elements. Once the IGA is completed and final scope is developed, the ESCO will provide true costs and for which each category must fall within the proposed percentage range. ESCOs agree to use the cost and pricing values when developing a final IGA and EPC Project Proposal.*

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We understand the requirements and agree to utilize the AEPC Cost and Pricing Tool for all AEPC programs with the AEO.

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## Appendix A

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Firm's Annual Financial  
Report Summary

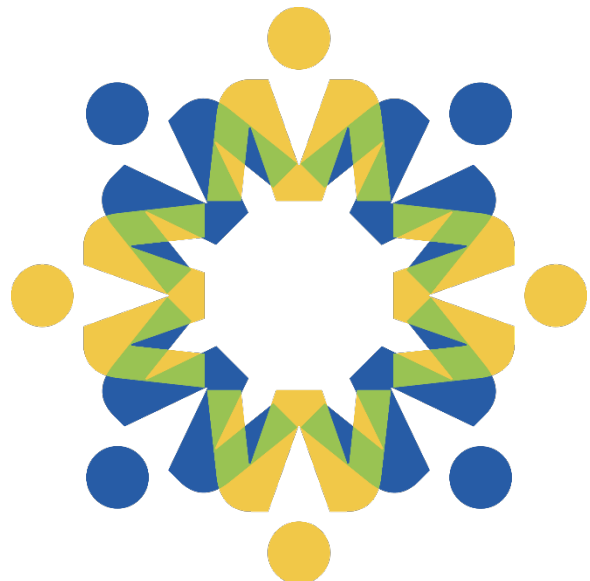






## Appendix A – Firm’s Annual Financial Report Summary

*Please our most recent audited financial statements on the following pages.*



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**ABM INDUSTRIES INCORPORATED AND SUBSIDIARIES**  
**CONSOLIDATED BALANCE SHEETS**

	October 31,	
	2021	2020
<i>(in millions, except share and per share amounts)</i>		
<b>ASSETS</b>		
Current assets		
Cash and cash equivalents	\$ 62.8	\$ 394.2
Trade accounts receivable, net of allowances of \$32.7 and \$35.5 at October 31, 2021 and 2020, respectively	1,137.1	854.2
Costs incurred in excess of amounts billed	52.5	52.2
Prepaid expenses	88.7	85.4
Other current assets	60.0	55.9
Total current assets	1,401.2	1,441.9
Other investments	11.8	11.1
Property, plant and equipment, net of accumulated depreciation of \$274.7 and \$241.3 at October 31, 2021 and 2020, respectively	111.9	133.7
Right-of-use assets	126.5	143.1
Other intangible assets, net of accumulated amortization of \$389.3 and \$343.8 at October 31, 2021 and 2020, respectively	424.8	239.7
Goodwill	2,228.9	1,671.4
Other noncurrent assets	131.2	136.1
Total assets	<u>\$ 4,436.2</u>	<u>\$ 3,776.9</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities		
Current portion of long-term debt, net	\$ 31.4	\$ 116.7
Trade accounts payable	289.4	273.3
Accrued compensation	238.0	187.6
Accrued taxes—other than income	124.9	45.5
Insurance claims	171.4	155.2
Income taxes payable	11.4	6.2
Current portion of lease liabilities	31.8	35.0
Other accrued liabilities	387.4	167.3
Total current liabilities	1,285.8	986.9
Long-term debt, net	852.8	603.0
Long-term lease liabilities	116.6	131.4
Deferred income tax liability, net	22.5	10.8
Noncurrent insurance claims	413.3	366.3
Other noncurrent liabilities	123.5	168.1
Noncurrent income taxes payable	12.5	10.1
Total liabilities	2,827.0	2,276.6
Commitments and contingencies		
<b>Stockholders' Equity</b>		
Preferred stock, \$0.01 par value; 500,000 shares authorized; none issued	—	—
Common stock, \$0.01 par value; 100,000,000 shares authorized; 67,302,449 and 66,748,157 shares issued and outstanding at October 31, 2021 and 2020, respectively	0.7	0.7
Additional paid-in capital	750.9	724.1
Accumulated other comprehensive loss, net of taxes	(22.5)	(30.8)
Retained earnings	880.2	806.4
Total stockholders' equity	1,609.2	1,500.3
Total liabilities and stockholders' equity	<u>\$ 4,436.2</u>	<u>\$ 3,776.9</u>

See accompanying notes to consolidated financial statements.

**ABM INDUSTRIES INCORPORATED AND SUBSIDIARIES**  
**CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)**

	Years Ended October 31,		
	2021	2020	2019
<i>(in millions, except per share amounts)</i>			
<b>Revenues</b>	\$ 6,228.6	\$ 5,987.6	\$ 6,498.6
Operating expenses	5,258.2	5,157.0	5,767.5
Selling, general and administrative expenses	719.2	506.1	452.9
Restructuring and related expenses	—	7.6	11.2
Amortization of intangible assets	45.0	48.4	58.5
Impairment loss of goodwill and other intangibles	—	172.8	—
<b>Operating profit</b>	206.3	95.7	208.3
Income from unconsolidated affiliates	2.1	2.2	3.0
Interest expense	(28.6)	(44.6)	(51.1)
Income from continuing operations before income taxes	179.8	53.3	160.2
Income tax provision	(53.5)	(53.1)	(32.7)
Income from continuing operations	126.3	0.2	127.5
Income (loss) from discontinued operations, net of taxes	—	0.1	(0.1)
<b>Net income</b>	126.3	0.3	127.4
Other comprehensive income (loss)			
Interest rate swaps	4.5	(7.6)	(22.4)
Foreign currency translation and other	5.3	(1.8)	1.6
Income tax (provision) benefit	(1.5)	2.4	5.9
<b>Comprehensive income (loss)</b>	<u>\$ 134.5</u>	<u>\$ (6.6)</u>	<u>\$ 112.5</u>
<b>Net income per common share — Basic</b>			
Income from continuing operations	\$ 1.87	\$ 0.00	\$ 1.92
Income from discontinued operations	—	—	—
Net income	<u>\$ 1.87</u>	<u>\$ 0.00</u>	<u>\$ 1.91</u>
<b>Net income per common share — Diluted</b>			
Income from continuing operations	\$ 1.86	\$ 0.00	\$ 1.91
Income from discontinued operations	—	—	—
Net income	<u>\$ 1.86</u>	<u>\$ 0.00</u>	<u>\$ 1.90</u>
<b>Weighted-average common and common equivalent shares outstanding</b>			
Basic	67.4	66.9	66.6
Diluted	68.0	67.3	66.9

See accompanying notes to consolidated financial statements.



**ABM INDUSTRIES INCORPORATED AND SUBSIDIARIES**  
**CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY**

	Years Ended October 31,					
	2021		2020		2019	
	Shares	Amount	Shares	Amount	Shares	Amount
<i>(in millions, except per share amounts)</i>						
<b>Common Stock</b>						
Balance, beginning of year	66.7	\$ 0.7	66.6	\$ 0.7	66.0	\$ 0.7
Stock issued under employee stock purchase and share-based compensation plans	0.6	—	0.3	—	0.6	—
Repurchase of common stock	—	—	(0.2)	—	—	—
Balance, end of year	67.3	0.7	66.7	0.7	66.6	0.7
<b>Additional Paid-in Capital</b>						
Balance, beginning of year		724.1		708.9		691.8
Taxes withheld under employee stock purchase and share-based compensation plans, net		(6.7)		—		(0.3)
Share-based compensation expense		33.5		20.3		17.5
Repurchase of common stock		—		(5.1)		—
Balance, end of year		750.9		724.1		708.9
<b>Accumulated Other Comprehensive Loss, Net of Taxes</b>						
Balance, beginning of year		(30.8)		(23.9)		(9.0)
Other comprehensive income (loss)		8.2		(6.9)		(14.9)
Balance, end of year		(22.5)		(30.8)		(23.9)
<b>Retained Earnings</b>						
Balance, beginning of year		806.4		856.3		771.2
Net income		126.3		0.3		127.4
<b>Dividends</b>						
Common stock (\$0.760, \$0.740, and \$0.720 per share)		(51.0)		(49.3)		(47.7)
Stock issued under share-based compensation plans		(1.5)		(0.9)		(1.0)
Cumulative effect adjustment for adoption of ASU 2014-09		—		—		6.5
Balance, end of year		880.2		806.4		856.3
<b>Total Stockholders' Equity</b>		<u>\$ 1,609.2</u>		<u>\$ 1,500.3</u>		<u>\$ 1,542.0</u>

See accompanying notes to consolidated financial statements.

**ABM INDUSTRIES INCORPORATED AND SUBSIDIARIES**

**CONSOLIDATED STATEMENTS OF CASH FLOWS**

	Years Ended October 31,		
	2021	2020	2019
<i>(in millions)</i>			
<b>Cash flows from operating activities</b>			
Net income	\$ 126.3	\$ 0.3	\$ 127.4
(Income) loss from discontinued operations, net of taxes	—	(0.1)	0.1
Income from continuing operations	126.3	0.2	127.5
<b>Adjustments to reconcile income from continuing operations to net cash provided by operating activities of continuing operations</b>			
Depreciation and amortization	89.9	96.4	107.4
Impairment loss on goodwill and other intangibles	—	172.8	—
Impairment loss on fixed assets	9.1	—	—
Deferred income taxes	(48.0)	(36.6)	9.7
Share-based compensation expense	33.5	20.3	17.5
Provision for bad debt	0.6	19.6	6.7
Amortization of accumulated other comprehensive gain on interest rate swaps	(6.4)	(6.7)	(5.7)
Discount accretion on insurance claims	0.1	0.8	0.8
Loss (gain) on sale of assets	0.2	2.1	(0.6)
Reserves on other assets	—	17.6	—
Income from unconsolidated affiliates	(2.1)	(2.2)	(3.0)
Distributions from unconsolidated affiliates	1.9	0.1	5.4
Changes in operating assets and liabilities, net of effects of acquisitions			
Trade accounts receivable and costs incurred in excess of amounts billed	(124.5)	141.4	(78.3)
Prepaid expenses and other current assets	6.8	(15.5)	(13.2)
Right-of-use assets	19.3	24.4	—
Other noncurrent assets	13.8	(10.4)	4.5
Trade accounts payable and other accrued liabilities	265.7	(53.5)	85.8
Long-term lease liabilities	(16.3)	(22.9)	—
Insurance claims	(28.4)	5.7	3.9
Income taxes payable	8.3	7.6	3.2
Other noncurrent liabilities	(35.4)	96.2	(8.7)
Total adjustments	188.0	457.2	135.3
Net cash provided by operating activities of continuing operations	314.3	457.4	262.8
Net cash provided by (used in) operating activities of discontinued operations	—	0.1	(0.1)
<b>Net cash provided by operating activities</b>	<b>314.3</b>	<b>457.5</b>	<b>262.7</b>
<b>Cash flows from investing activities</b>			
Additions to property, plant and equipment	(34.3)	(38.0)	(59.6)
Proceeds from sale of assets	4.4	5.5	1.3
Proceeds from redemption of auction rate security	—	5.0	—
Purchase of business, net of cash acquired	(710.2)	—	—
<b>Net cash used in investing activities</b>	<b>(740.0)</b>	<b>(27.5)</b>	<b>(58.3)</b>
<b>Cash flows from financing activities</b>			
Taxes withheld from issuance of share-based compensation awards, net	(8.1)	(0.9)	(1.3)
Repurchases of common stock	—	(5.1)	—
Dividends paid	(51.0)	(49.3)	(47.7)
Deferred financing costs paid	(6.4)	(4.4)	—
Borrowings from credit facility	357.7	1,058.5	1,755.9
Repayment of borrowings from credit facility	(194.2)	(1,141.6)	(1,896.5)
Changes in book cash overdrafts	(17.9)	41.2	(0.2)
Financing of energy savings performance contracts	15.1	11.1	8.1
Repayment of finance lease obligations	(2.8)	(3.4)	(3.1)
<b>Net cash provided by (used in) financing activities</b>	<b>92.4</b>	<b>(94.1)</b>	<b>(184.8)</b>
<b>Effect of exchange rate changes on cash and cash equivalents</b>	<b>1.9</b>	<b>(0.2)</b>	<b>(0.2)</b>
<b>Net (decrease) increase in cash and cash equivalents</b>	<b>(331.4)</b>	<b>335.7</b>	<b>19.4</b>
<b>Cash and cash equivalents at beginning of year</b>	<b>394.2</b>	<b>58.5</b>	<b>39.1</b>
<b>Cash and cash equivalents at end of year</b>	<b>\$ 62.8</b>	<b>\$ 394.2</b>	<b>\$ 58.5</b>

**ABM INDUSTRIES INCORPORATED AND SUBSIDIARIES**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**  
**(continued)**

<i>(in millions)</i>	Years Ended October 31,		
	2021	2020	2019
<b>Supplemental cash flow information</b>			
Income tax payments, net	\$ 93.5	\$ 82.2	\$ 20.6
Interest paid on credit facility	14.3	32.9	39.9

See accompanying notes to consolidated financial statements.

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