AECOM

Architectural and General Engineering Services

Emphasis on Microgrid Design and Engineering Services

April 2019

Capability Statement

AECOM is the world's largest multi-disciplinary engineering firm. Through our predecessor firms, we have provided engineering services for over 100 years. Our most recent acquisition (2014), AECOM purchased URS Corporation and the URS family of companies joined AECOM, bringing together two of the largest AE and Engineering providers into a single organization with an unmatched pool of talent with nearly 82,000 employees located in 150 countries around the world.

Our capabilities include:

1. Corporate Information
2. Technical Capability
3. Relevant Project References
4. Personnel, Capacity, and Facilities

1. Corporate Information

Company: AECOM Technical Services, Inc.
Business Size: Large
DUNS Number: 003184462
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2. Technical Capability

Our clients benefit from AECOM's history of exceptional performance providing comprehensive engineering design services on complex microgrid projects such as the 15MW, $108M microgrid system AECOM installed and commissioned for NY State Power Authority at Rickers Island. Our staff brings the full range of capabilities to enable our clients to successfully support microgrid work as highlighted below.

Engineering and Design: AECOM is ranked by ENR as the #2 Engineering Design firm and #3 in Power in 2018. We have seasoned experts in all areas expected to be critical to our clients' microgrid program, including **electrical engineering**, electrical modeling, distribution design, low-medium-high voltage design engineering, transformer design, motor design, and deep familiarity with a variety of modeling codes. Our **mechanical engineers** have extensive design expertise in HVAC systems, industrial process control, plumbing, piping, steam systems, chiller systems, district energy systems and distributed energy resources including, renewables, storage and combined heat and power (CHP) design. Our architects integrate advanced lighting solutions, building envelope improvements, building design and compliance with historical preservation requirements. Our **certified energy managers** and master planners provide conceptual designs for highly efficient and sustainable energy system, leverage recent developments in cyber secure microgrid hardware, software and Supervisory Control and Data Acquisition (SCADA) systems. These specialized capabilities and depth cannot be found within the small business community.

Inspection and Condition Survey: AECOM is an experienced Energy Services Company (ESCO) – delivering extraordinary results through energy performance contracting to Government clients. We are NAESCO-accredited and a DOE-qualified ESCO. Our engineers have vast experience in site inspection and survey, performing **investment grade audits** as a part of our ESCO programs for a wide variety of federal and publicly traded clients.

Estimating: Our clients benefit from our experienced bench of **professional cost estimators**. Our team provides independent cost estimates for major design-build projects such as the NJ TRANSIT GRID system. Our high volume of work attracts the best estimators, **construction managers** and **program managers** on hallmark programs such as the new World Trade Center complex.

Testing, Commissioning, Measurement & Verification: AECOM's **systems test engineers** are expert at ensuring installed electromechanical systems meet performance specifications and requirements. Our engineers hold LEED/GA and CEM certifications proving their capability to successfully commission large systems and microgrids. As an example, our team is a major partner to Siemens providing a microgrid, solar, battery storage and new combined cycle power plant design services at the US Navy Base, Guantanamo Bay in which AECOM provided advanced testing sensor to validate system baseline requirements.

Environmental Cleanup: AECOM has successfully completed thousands of projects that have included site characterization, risk assessment, remedial alternative development and evaluation, or remedial designs nationwide. Our efforts have led to the regulatory closure of sites in every single US State and Territory. Our efforts include site characterization involving every sort of media collection from field investigations (water, sediments, soil, soil vapor, air, and/or wastes).

Sustainability: AECOM is a leader in sustainability and asset management for a wide variety of federal clients. Our experience includes multiple efforts supporting the implementation for a variety of facility and mission types, identification and quantification of Other Environmental Liabilities, encroachment management and compatibility analysis. As well as environmental site design, incorporating Leadership in Energy and Environmental Design (LEED) principles, and low-impact development methodologies to provide innovative and effective water quality improvements.

Standards and Codes: The AECOM team uses the following design and data standards and codes as well as client specific requirements, including:

- **CADD and BIM:** The AECOM team has developed CAD standards that cover the specific aspects and issues of CAD production, such as layers, colors, line types, electronic file names, etc. Our architectural and graphics programs and software include Autodesk AutoCAD 2016 and Bentley MicroStation v.8i.
- **Tri-Service Spatial Data Standards:** AECOM's Information Management Solutions Practice Group has supported federal, industrial and power client Geospatial Information and Services Programs for over 20 years and we have maintained an excellent record of compliance with all applicable DoD geospatial standards.
- **UFC/Building Codes:** AECOM is very familiar with the UFC and UFGS. Our staff have a strong understanding of structural design requirements of UFC 1-200-01, General Building Requirements, UFC 1-300-09N, Design Procedures, UFC 3-310-04 Seismic Design for Buildings and UFC 3-301-01, Structural Engineering, which AECOM wrote, consolidating 10 structural UFCs into a comprehensive document to align DoD structural criteria with current industry standards. As an established global AE firm, our designers are familiar with the IBC and various state and local building codes and licensed to provide AE services in every state.
- **Federal regulations or requirements:** AECOM is familiar with federal regulations related to issues such as physical security, cybersecurity, security clearances, and comply with these on a regular basis. Through our environmental services, we are aware of the requirements of the EPA as well as guidance including NEPA and other regulations.

3. Relevant Project References

Rikers Island Microgrid

Reference: Randy Solomon, (914) 390-8205; **Completed:** January 2015**;** $108 million

This critical infrastructure project consisted of commissioning two new 7.5 MW gas turbines and heat-recovery steam generators with duct burners, new switchgear and distribution upgrades. Our team designed the microgrid islanding concept and executed this full design-build project. The benefits to users at Rikers Island include a cost savings of $7.1M through elimination of costly, individual emergency generators and an upgrade to the combined heat and power facility. The microgrid enables an annual reduction of 25,000 tons of CO2 and 45 tons of NOX. The microgrid provided energy security to the facility in the event of a power outage from the servicing utility.

Figure 1. AECOM Designed and commissioned a 15MW microgrid in New York State.

NJ TRANSIT Grid

Reference: Charles Hentz, (973) 491-7082; Ongoing; Cost: $3.5 million

AECOM is providing the 20 percent conceptual design to support a design/build acquisition of distributed generation for certain critical transit infrastructure supporting the NJ TRANSIT microgrid system. Distributed generation design consists of various types of distributed energy, renewable energy, and other technologies to provide resilient power to key NJ Transit stations, maintenance facilities, bus garages, and ferry terminals. The Project is a result of a partnership between NJ TRANSIT, the New Jersey Board of Public Utilities, the U.S. Department of Energy (DOE), and the Federal Transit Administration (FTA). The distributed generation project will maintain and enhance mobility and regional security in the event of power outages and emergency situations. It will also

minimize disruption to the regional work force and economy; enhance electrric grid reliability by providing additional sources of efficient power as well as minimize source pollutants by replacing older, less efficient energy generation equipment and by installing environmentally desirable technologies as fuel cell and solar PV.

Figure 2. Map of New Jersey showing location of project

Energy Assurance Microgrid, Berkeley, CA

Reference: Katie Van Dyke, (510) 981-7403; Ongoing;
Cost: $1 million

AECOM was selected to provide comprehensive services for the planning, design, and development of an energy assurance microgrid for the City's downtown area. AECOM is leading a consulting team that includes staff from the Lawrence Berkeley National Laboratory (LBNL). Initial work under the assignment is focusing on system feasibility and configuration. AECOM assisted the City in securing and is now implementing a California Energy Commission (CEC) grant to develop the business plan and technical configuration of the Microgrid system. Central to the project work is a triple bottom line analysis of microgrid benefits and detailed technical modeling of microgrid scenarios integrating both AECOM's Sustainable Systems Integration Model (SSIM) district energy modeling tool and Lawrence Berkley National Lab's Distributed Energy Resources Customer Adoption model.

The project also includes outreach to key stakeholders and facilitation of their input. In addition to detailed system modeling, work under the CEC grant covers detailed evaluation of microgrid feasibility including preliminary engineering design, distributed generation modeling, regulatory analysis, business model identification/review, financial and economic evaluation, and identification of operational models for microgrid implementation.

Microgrid and Smart City Support, Chicago, IL

Reference: Sahar Hendabadi, (630) 576-6705; Ongoing;
Cost: $685 thousand

AECOM is supporting ComEd's Exelon utility serving Northeastern Illinois with its Bronzeville Microgrid and Community of the future smart city initiative. The historic Bronzeville neighborhood, located on Chicago's Southside is proposed as the location of ComEd's first microgrid. Additionally, the Bronzeville neighborhood has been targeted for a broader ComEd Smart Community of the Future initiative that builds on the utility's investments in grid modernization to pilot and deploy a range of smart city technologies.

AECOM developed an integrated resilience performance metrics for the Bronzeville microgrid and related grid modernization and smart city improvements. The metrics analysis focuses on the measurable and deliverable benefits of grid modernization initiatives such as the Bronzeville microgrid system on the resilience of the electrical system, critical infrastructure, and community as a whole. The project is one of the first efforts to define integrated metrics covering all three areas. Community of the Future smart city support includes development and implementation of strategies for stakeholder outreach and engagement related to ComEd's Community of the Future, smart city, grid modernization, and microgrid initiatives in Bronzeville. Outreach approaches consider both general awareness and engagement related to the development of specific technology applications associated with grid improvements the smart city investments. AECOM has also developed a detailed implementation approach that optimizes energy savings, prioritizes critical system upgrades, and targets smart city service enhancements to areas of high need.

SPAWAR System Center Pacific, Energy Savings Performance Contract, TOs #1-3
Reference: Gabriel Haduch, (619) 553-3865;
Completion: June 2014; Cost: $ 38.5 million
As part of their continued effort to meet federally mandated energy efficiency and water conservation goals, SPAWAR Systems Center Pacific (SSC PAC) selected AECOM to develop and implement an Energy Savings Performance Contract (ESPC) of their facilities in San Diego, California. This ESPC contracted through the Army Corps of Engineers Support Center in Huntsville, Alabama. This project

enabled SPAWAR to reduce energy consumption by 37 percent. This drastic energy reduction directly supports their efforts to properly size and design a microgrid.

US Navy, Guantanamo Bay

Reference: Greg Bowman, OCONUS Director, Siemens Government Technologies, Inc., (571) 888-6008; Ongoing; **Cost:** $68 million

AECOM and Siemens are partnered on a major ESPC to upgrade the efficiency and lower the cost of power at Guantanamo Bay Naval Base. Our engineers are currently performing an investment grade audit and are developing engineering systems concepts for Navy consideration. The solution includes the installation of a new installation wide microgrid with the integration of distributed energy resources like battery energy storage, solar PV and a new combined cycle power plant.

Town of Hempstead Microgrid Feasibility Study, New York

Reference: Tara Schneider Moran, (516) 897-4109; **Completed:** April 2016 **Cost:** $2.6 million

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4. Personnel, Capacity, and Facilities

AECOM offers a deep pool of qualified technical and project management professionals with recent, relevant experience working on microgrid design and engineering projects; SCADA control systems, mechanical systems interfaces and accompanying energy efficiency and distributed generation projects. We have the depth of resources in all required disciplines to adequately staff and successfully accomplish multiple, concurrent, geographically dispersed projects.

AECOM offers over 6,000 personnel across the U.S., including electrical engineers, mechanical engineers, civil engineers, project managers, environmental engineers, geotechnical engineers, biologists, environmental scientists, economists, planners regulatory experts and risk assessors, who have worked on relevant projects as well as other private and government customers. Key offices providing engineering services are located in Germantown, MD; Arlington and Richmond, VA; Newark, DE; Conshohocken, Mechanicsburg, and Philadelphia, PA; Princeton, Burlington, Clifton, and Piscataway, NJ; Buffalo, Latham, and New York, NY; Boston and Chelmsford, MA; Rocky Hill, CT; and Portland, ME. With such a wide bench of staff in various disciplines, we have the capacity to take on assignments immediately. As a large, Fortune 500 company, our clients can rely on AECOM having staff available for any future contract.

Contract / Task Order Primary, Secondary and Tertiary Contract Work	NYSPA – Rikers Island Microgrid	NJ TRANSIT Grid	Energy Assurance Microgrid, Berkeley, CA	Microgrid and Smart City Support, Chicago, IL	USACE / SPAWAR System Center Pacific, ESPC, Task Orders #1-3	US Navy – Guantanamo Bay ESPC	AFCEC, Ali Al Salem Engineering and Construction Management Support, Kuwait	Town of Hempstead Microgrid Feasibility Study, New York
Inspection and Condition Surveys	✓	✓			✓	✓	✓	✓
Verification of Existing Reference Materials	✓	✓	✓	✓	✓	✓	✓	✓
Concept Development	✓	✓	✓	✓	✓	✓	✓	✓
Engineering & Design	✓	✓	✓	✓	✓	✓	✓	
Drafting	✓	✓			✓	✓	✓	
Estimating	✓	✓	✓	✓	✓	✓	✓	✓
System Modeling	✓	✓	✓	✓	✓	✓	✓	
Tech Spec Preparation	✓	✓			✓	✓	✓	
Installation Verification	✓	✓			✓		✓	
Testing Support	✓	✓			✓		✓	
Commissioning Support	✓	✓			✓		✓	
Report Preparation	✓	✓	✓	✓	✓	✓	✓	✓
Construction/Renovation	✓	✓			✓		✓	
Repair & Maintenance	✓	✓			✓	✓	✓	
Surface Transportation							✓	
Utility Systems	✓	✓	✓	✓	✓	✓	✓	
Energy Conservation & Improvement Projects	✓	✓	✓	✓	✓	✓	✓	✓
Economic and life-cycle cost analysis	✓	✓	✓	✓	✓	✓		✓

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About AECOM
AECOM is a premier, fully integrated professional and technical services firm positioned to design, build, finance and operate infrastructure assets around the world for public- and private-sector clients. The firm's global staff — including architects, engineers, designers, planners, scientists and management and construction services professionals — serves clients in over 150 countries around the world. AECOM is ranked as the #1 engineering design firm by revenue in *Engineering News-Record* magazine's annual industry rankings, and has been recognized by *Fortune* magazine as a World's Most Admired Company. The firm is a leader in all of the key markets that it serves, including transportation, facilities, environmental, energy, oil and gas, water, high-rise buildings and government. AECOM provides a blend of global reach, local knowledge, innovation and technical excellence in delivering customized and creative solutions that meet the needs of clients' projects. A *Fortune 500* firm, AECOM companies, including URS Corporation and Hunt Construction Group, have annual revenue of approximately $20 billion.

More information on AECOM and its services can be found at www.aecom.com.

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