



**Energy Efficiency  
Qualifications**



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# 2018

*Engineering News-Record's*  
2018 Top 500 Design Firm  
Survey recognized us as the  
industry's #2 firm overall.

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#1 General Building  
#1 Transportation  
#2 Top Design Firm  
#2 International Markets  
#2 Sewer and Waste  
#3 Water  
#3 Power

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## most admired

Considered one of  
Fortune 500's most  
admired companies



From road, rail, energy and water systems to enhancing environments and creating new buildings and communities, our vision is to make the world a better place.

What differentiates us from others is the collaborative way we work globally and deliver locally. A trusted partner to our clients, we draw together teams of engineers, planners, architects, landscape architects, environmental specialists, economists, scientists and program managers—all dedicated to finding the most innovative and appropriate solutions and improving the quality of life for those affected by each project.

Formed from many of the world's finest engineering, design, environmental and planning companies, AECOM's technical expertise and creative excellence combine to provide fully integrated planning, design, engineering, environment and program management capabilities to a broad range of markets. Our adaptable and flexible approach to projects allows us to deliver with consistency, longevity, high quality and with efficiencies in cost and time.

**AECOM is built to deliver a better world.**

**We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries.**

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**87,000**  
employees

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**500**  
offices worldwide

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**150+**  
countries

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**20.2B**  
revenue 2018

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**7**  
continents

AECOM's energy efficiency projects enhance system infrastructure, reduce energy and water consumption, generate on-site energy from traditional or renewable sources and provide financial solutions backed by a performance guarantee.

# Power markets we serve

## Energy Efficiency



- Energy Savings Performance Contracting (ESPC)
- Energy efficiency facility modernization
- Retro- and monitoring-based commission services
- Demand management and demand response
- Energy master planning
- Resiliency planning
- Innovative project financial solutions
- Investment-grade audit
- Design/build

### Our technologies include:

- Cogeneration, distributed generation and renewable energy
- Facility improvement and optimization projects — heating and cooling
- Lighting design and implementation
- Industrial Controls Systems (ICS)
- New and expanded central utility plants

## Clean Energy



- Strategic energy planning
- Engineering and design
- Project development support
- Project management
- Construction management
- Financial investment

### Integrated energy networks

- Microgrids/smart grids
- Distributed generation
- Energy efficiency
- Smart City development
- System resilience
- Systems integration and communication

## Combined Heating and Power



- Facility energy consumption/requirements evaluation
- Review and selection of appropriate technology
- Engineering and design
- Major equipment procurement
- Construction management

- Turnkey construction
- EPC (engineer/procure/construct)
- Start-up and commissioning
- Owner's engineer

## Energy Storage



- Compressed Air Energy Storage (CAES)
- Battery Energy Storage System (BESS)
- Battery Back-Up
- Pumped hydro
- Asset and property transfer due diligence

- Interconnection studies
- Geotechnical studies and analyses
- Groundwater modeling, hydrology studies, scour analysis and hydrologic design

## Renewable Energy



### Alternative and renewable energy

- Solar
- Wind
- Hydroelectric
- Biomass
- Geothermal

- Preliminary project analysis
- Wind assessments
- Load forecasting
- Private participation / financing advice
- Preliminary engineering
- Civil, mechanical and electrical engineering design

- Stakeholder meetings, planning and implementation
- Environmental resource studies and impact assessment
- Permitting
- Project and construction management

## Smart Energy



### Energy management consulting

- Master planning and analysis
- Auditing
- Monitoring-based commissioning
- Energy efficient renovation and construction
- Commissioning services
- LEED certification management
- Energy sustainability consulting

### Grid/infrastructure

- Microgrids and smart cities
- Distributed generation
- Infrastructure reliability upgrades

# Energy efficiency capabilities

AECOM recommends the most cost-effective energy solutions to provide our clients with optimal long-term project performance and exceptional results.

As one of the only global planning, engineering and construction management firms that is also a National Association of Energy Service Companies (NAESCO)-accredited energy services company, AECOM is increasingly sought out by our clients to develop and execute comprehensive energy efficiency, renewable energy and power generation projects. As an engineering-based ESCO, we bring a variety of unique skills and capabilities to our clients from a vendor-neutral perspective.

AECOM does not manufacture, sell or represent any specific equipment or technology. We focus on recommending the most cost-effective energy solutions that provide our clients with optimal long-term project performance and exceptional results.

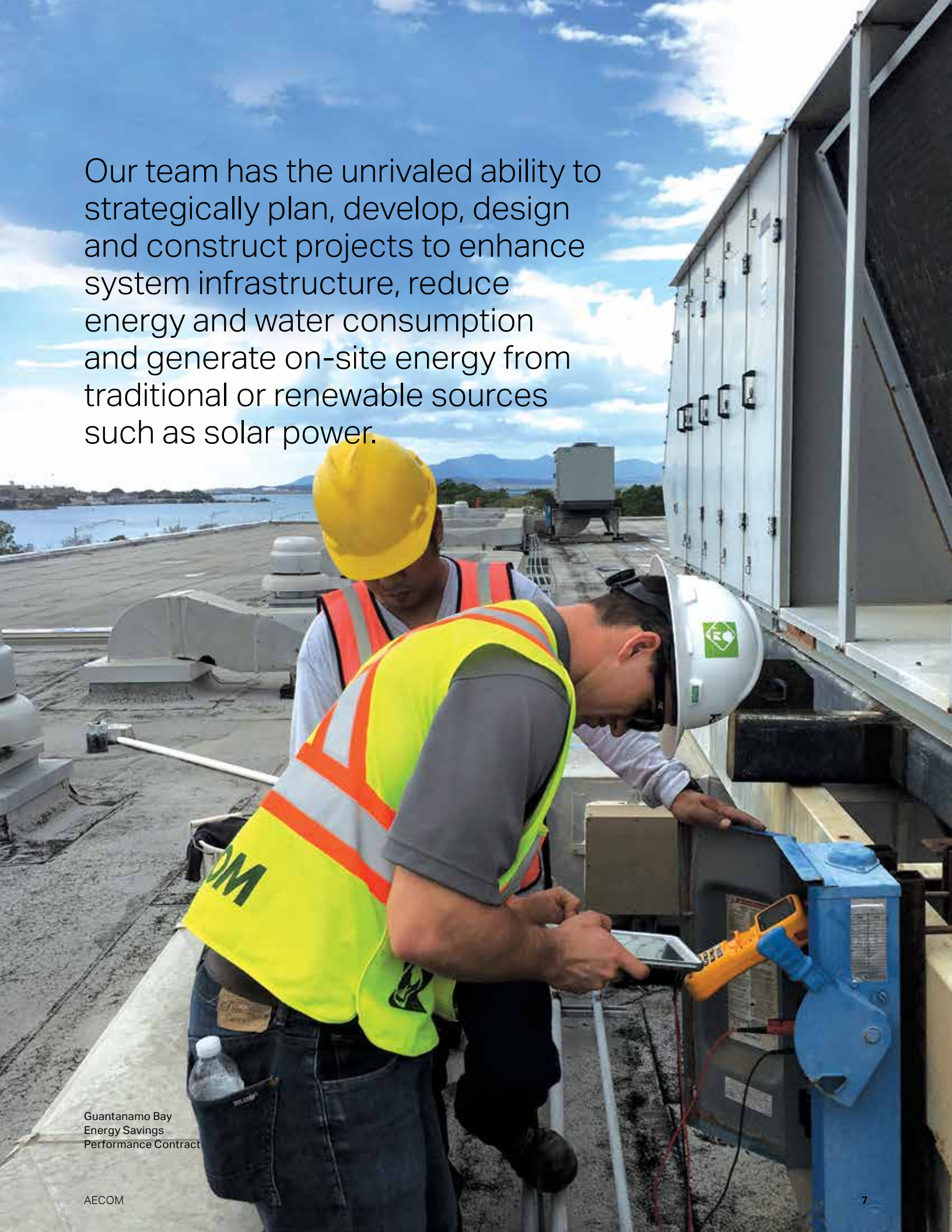
AECOM has provided energy efficiency solutions for 28 years. These facilities include federal, state and municipally-operated office buildings, higher education and K-12 facilities, courthouses and correctional facilities as well as healthcare, transportation, industrial, residential, water and wastewater treatment plants.



Air Force Civil Engineer Center (AFCEC) Sustainable Infrastructure Assessment in Europe and Southeast U.S.

California State University Fullerton, Comprehensive Energy Efficiency Program — Construction of a new \$18 million Trigenation Power Plant

Our team has the unrivaled ability to strategically plan, develop, design and construct projects to enhance system infrastructure, reduce energy and water consumption and generate on-site energy from traditional or renewable sources such as solar power.



# Why choose AECOM

AECOM Technical Services, Inc. is a fully accredited Energy Services Company (ESCO) that provides a wide range of services from traditional consulting and engineering design services to engineering, procurement and construction (EPC) to our power, energy efficiency and renewable energy clients throughout the United States.

AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies have an annual revenue of approximately US \$17.4 billion.

Our team has the unrivalled ability to develop, design and/or construct projects to enhance electrical system infrastructure, reduce energy use and generate energy on site from traditional or renewable sources such as solar power and can guarantee the outcomes in all these areas. AECOM has successfully undertaken numerous energy projects in the past five years alone, including power projects for transmission systems, substations, on-site power generation, utility-scale conventional and renewable power generation for clients such as Long Island Power Authority, Pacific Gas and Electric, Noble Wind Farms, New York Power Authority, Los Angeles Department of Water and Power, Space and Warfare System Command, NASA Ames Research Center, Air Force Civil Engineer Support Agency, California State University and Solar Millennium.

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## +90 years

**of legacy company experience; we have conceived, planned and built energy projects of every type and size**

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## integrated energy services framework

**achieves speed-to-market by bringing together a unique combination of engineers, planners, scientists and project managers**

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## capabilities

**energy analysis and planning, environmental management, conceptual design, detailed design, engineering, procurement, project management, construction management and asset management**



**New York Presbyterian Hospital  
Bronx, New York, U.S.**

Installation of a Cogeneration System to enable the hospital to produce their own electricity and generate their own steam.



**NASA Ames Research Center  
Utility Energy Services Contract**

AECOM partnered with Pacific Gas & Electric (PG&E) through its Utility Energy Services Contract (UESC). The project included 128 buildings encompassing 2,600,000 square feet and the cost was \$23 million.

**Castle Hill Houses Heating and  
Lighting Upgrade**

AECOM worked with New York Power Authority on the replacement of eight 350 BHP boilers that served the facility for 50 years with five new, high-efficiency 600 BHP boilers.



# Project experience

AECOM's project experience ranges from energy efficiency work that saves megawatts of power at California State University campuses and transmission line upgrades in Australia, to wind farm design and construction in the United States and hydroelectric power in Laos that supplies power to Thailand.

Whether we're designing a system to reduce nitrogen oxide emissions at coal-fired plants in Canada, creating a detailed handbook to help London's developers implement sustainable energy policies, installing a 200-kilowatt fuel cell at a Texas medical clinic or developing a turbine-generator unit at a geothermal field in West Java, AECOM strives to meet today's global energy challenges.



**NASA Ames, UESC project with PG&E**  
San Jose, California, U.S.

**Salinas Valley Memorial Hospital Energy Services, Sustainable Solutions Turnkey (SST) Program with PG&E**  
Salinas, California, U.S.

**Locomotive Shop Energy Systems Site Assessment (ESSA)**  
Altoona, Pennsylvania, U.S.

**Riker's Island Cogeneration**  
East Elmhurst, New York, U.S.

**SPAWAR System Center Pacific, Energy Savings Performance Contract, Task Orders #1-3**  
San Diego, California, U.S.

**CSU San Bernardino Comprehensive Energy Efficiency Project**  
San Bernardino, California, U.S.



# SPAWAR System Center Pacific, Energy Savings Performance Contract, Task Orders #1-3



"Our staff was impressed with the quality of the work and how AECOM has gone beyond what is expected. AECOM performed at a very high level of professionalism and I'm very impressed with their troubleshooting, communications, organization and planning of all aspects of the project."

Randy Peacock, SSC PAC Facilities Director

## Client

Army Corp of Engineers Support Center

## Location

San Diego, California, U.S.

## Project Size

225 buildings | 3,032,000 square feet

## Project Cost

\$38.5 million

## Years

January 2011–June 2014

## Services

- Facility audits
- Energy and economic analysis
- Project design engineering
- Utility incentive procurement
- Project/construction management
- Savings measurement and verification
- Project commissioning

## Annual Savings Results

Electrical: 29,310,978 (kWh)

Gas: 11,665 (Mbtu)

Water: 24,587,714 (Gal)

Total cost savings: \$7,324,078

## Project Overview

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 is contracted through the Army Corps of Engineers Support Center in Huntsville, Alabama.

SSC PAC is the U.S. Navy's premier research, development, acquisition testing and evaluation (RDAT&E), engineering and fleet support center for ocean surveillance, command and control and communication systems. SSC PAC has an extensive footprint in California and Hawaii, operating approximately 224 buildings with a combined workspace of 3,032,000 square feet.

To help SSC PAC achieve their energy and financial goals, AECOM developed a turnkey project solution that included 100 percent up-front project financing for the effort and enough energy and operation savings to pay for itself—the result was SSC PAC spent no money throughout the entire process, thus preserving its own budget monies for its core operations. In fact, the project's energy and water savings were large enough to pay for a variety of other much-needed infrastructure upgrades that could not be funded from SSC PAC's budget.

**Task Order #1:** In January 2012, AECOM successfully completed the first in a series of three task orders for SSC PAC. This first task order of \$12.3 million included comprehensive lighting; domestic water; heating, ventilation, air conditioning (HVAC); and Energy Management Control System upgrades throughout SSC PAC's San Diego facilities. It is anticipated to produce more than \$950,000 per year in energy and operational savings.

**Task Order #2:** In April 2013 AECOM Successfully completed the second Task Order. This second task order of \$3.8 million included comprehensive lighting; domestic water; heating, ventilation, air conditioning (HVAC); and Energy Management Control System upgrades throughout SSC PAC's San Diego facilities. It is anticipated to produce more than \$950,000 per year in energy and operational savings.

**Task Order #3:** In May 2014, AECOM successfully completed the Third Task Order. This third task order of \$21.3 million included comprehensive lighting; domestic water; heating, ventilation, air conditioning (HVAC); Window Film, Demand Response and Energy Management Control System upgrades throughout SSC PAC's San Diego facilities. It is anticipated to produce more than \$950,000 per year in energy and operational savings.

# SPAWAR System Center Pacific ESPC Delivery Task Order #4



This project involved complex major infrastructure upgrades in sensitive occupied areas, and it was executed on time while minimizing impacts to building operations.

## Client

Space and Navy Warfare Systems Command

## Location

Pearl City, Oahu, Hawaii, U.S.

## Project Size

1 building | 60,000 square feet

## Contract Value

\$4.9 million

## Years

July 2015–June 2016

## Services

- Project development
- Energy engineering
- Commissioning
- Construction / project management
- Training and measurement and verification (M&V)
- Design engineering services

## Annual Savings Results

Electrical savings: 1,251,172 kWh

Water savings: 473,051 Gal

Total cost savings: \$493,289

## Project Overview

AECOM helped SPAWAR to be one of the first facilities to meet its federal mandates—two years ahead of schedule.

The fourth ESPC task order for SSC PAC addressed the work identified in the ESPC Master Plan for its Pearl City, Hawaii, facility. Prior to implementation of this ESPC project, they were faced with rapidly increasing utility rates/costs, aging/failing HVAC systems and no automation system for control and monitoring of the HVAC systems. This project reduced the facility's annual electrical use by 32 percent, domestic water consumption by 42 percent and annual utility costs by 31 percent. Scope elements included chilled water system and chiller plant improvements, HVAC Improvements, Building Automation and Controls (UMCS/EMCS/DDC), lighting improvements, electric motors and drives and water and sewer systems.

The project's scope of work included a comprehensive mix of energy efficiency, renewable energy and water conservation measures.

- Replaced all exterior light fixtures with LED fixtures; replaced all warehouse light fixtures with LED fixtures having integrated occupancy sensor control; retrofit all interior light fixtures with high efficiency lamp/ballast solutions and de-lamping in select areas
- Upgraded chilled water (CHW) system including 60 percent increase in capacity, integration of two CHW systems into one for improved redundancy, new high-efficiency variable-speed oilless chiller, expansion of the CHW distribution system, conversion to all variable flow pumping, all new controls with energy and performance monitoring
- Installed a completely new BACnet-based EMCS for control and monitoring of the HVAC systems
- Replaced DX HVAC systems with new CHW units
- Replaced all 11 existing air handling units with new units having variable speed fans and components selected for long-life/reduced maintenance including direct drive fans and stainless steel condensate pans
- Installed new HVAC systems in sensitive computer labs (e.g., server rooms) to improve efficiency and redundancy
- Replaced all toilets and urinals with high-efficiency fixtures
- Added four new pumps, 12 new fan coils and air handling units

# NASA's Ames Research Center Utility Energy Services Contract



## Client

NASA AMES Research Center  
(PG&E UESC Project)

## Location

San Jose, California, U.S.

## Project Size

128 buildings, 2,600,000 square feet

## Project Cost

\$22 million

## Years

January 2011–June 2014

## Services

- Facility audits
- Energy and economic analysis
- Project/construction management
- Savings measurement and verification
- Project commissioning

## Annual Savings Results

Electrical: 7,600,000 kWh

Water: 15,779 kgal

Total cost savings: \$1,336,000

## Project Overview

With over \$3 billion in capital equipment, 2,300 research personnel and a \$600 million annual budget, NASA's Ames Research Center's (ARC) economic impact is significant. Ames plays a critical role in virtually all NASA missions in support of America's space and aeronautics programs.

Through an agreement with the Western Area Power Administration (WAPA), ARC receives electricity at a very low cost—typically less than \$0.06/kWh. While this power agreement has significantly reduced ARC's utility costs, it has also created a challenging environment for ARC to develop financially viable energy projects that are necessary for ARC to meet federally mandated energy efficiency goals. To help ARC with this dilemma, AECOM partnered with PG&E through its UESC. The project included 128 buildings and 2,600,000 sq ft and the cost was \$23 million.

Work performed includes:

- Facility-wide indoor lighting upgrades (fluorescent and LED)
- Facility-wide outdoor lighting upgrades
- Facility-wide hot water and steam boiler upgrades
- Replacement and upgrade of inefficient chillers with high-efficiency, longer life, water-cooled chillers
- Variable flow chilled water and heating water conversions
- Conversion of steam heating systems to HHW systems including retirement of aged district steam system
- Facility-wide water conservation upgrades including bathroom equipment, kitchen equipment and cooling tower systems
- Facility-wide controls retro-commissioning, energy management and control system (EMCS) upgrades
- Rooftop PV system at new building N232
- Expansion and upgrade of the EMCS for improved control and visibility of energy consuming and mission critical systems across the facility

# Air Force Civil Engineer Center Sustainable Infrastructure Assessment



## Client

Air Force Civil Engineer Support Center (AFCEC)

## Location

Europe, Southeast U.S.

## Project Size

730 buildings, 18,000,000 square feet

## Project Cost

\$6.1 million

## Services

- Energy auditing
- Space utilization
- Energy engineering
- Condition assessment
- Cost estimation

## Annual Savings Results

Energy savings: 48,180,000 kWh electricity,  
149,200 million Btu and 67 million gallons water

Cost savings from recommended projects: \$8,405,486

Total recommended project implementation costs:  
\$46,130,000

## Project Overview

AECOM was chosen by the AFCEC to provide base-wide, investment-grade facility energy assessments for three air bases located in Europe and the United Kingdom, and sustainable infrastructure assessments at six bases located on the U.S. eastern seaboard. AECOM mobilized multiple audit teams and visited more than 730 buildings totaling 18,000,000 square feet. The buildings ranged from standard office space to vehicle maintenance shops, district central plants, water plants, paint complexes, hangers and secure communications facilities.

The purpose of the assessments was to help the Air Force meet federally mandated goals for energy reductions by developing technically and financially viable energy projects. Part of the field auditing effort involved use of a tablet-based data collection system to efficiently gather detailed inventory data and photos of electrical, mechanical and architectural systems, including component condition. This data was quality checked and provided to the Air Force for input into BUILDER.

Each base-wide audit included:

- Preliminary evaluation of historical utility data including consumption, costs and rate structure
- Engagement with base and facility energy managers to understand current facility needs and inefficiencies as well as O&M practices
- On-site data collection of facility HVAC equipment, lighting and water installations in accordance with ASHRAE Level 2 Procedures for Commercial Building Energy Audits
- Identification and development of Energy Conservation Measures (ECMs) for HVAC, lighting, water, central heating and cooling system and industrial operations
- Preparation of all project findings, recommendations, cost analyses and preliminary scope of work for all proposed measures in a final report format

# City of San Luis Obispo Water Reclamation, Sustainable Solutions Turnkey, PG&E Program



## Client

City of San Luis Obispo

## Client Contact

Pam Ouellette  
Chief Operator  
P 805-781-7241  
E pouellette@slocity.org

## Location

San Luis Obispo, California, U.S.

## Project Cost

Construction \$9,521,063

## Years

August 2014–September 2015

## Annual Savings Results

Electricity: 1,080,275 kWh  
Natural gas: 29,038 therms  
Operations and maintenance: \$75,749  
Total cost savings (include O&M): \$231,749

## Project Overview

AECOM and Pacific Gas & Electric (PG&E) were selected by the City of San Luis Obispo to implement a turn-key, design-build, energy efficiency retrofit project to improve the City's Water Reclamation Facility by decreasing operating costs and reducing its greenhouse gas (GHG) emissions.

The PG&E/AECOM team worked in collaboration with the City for over two years to develop this comprehensive retrofit program.

Facility improvement measures:

- Upgrade/replace the existing cogeneration system to use available bio-gas and to maximize cost savings
- Upgrade existing Supervisory Control and Data Acquisition (SCADA) controls to maximize energy and operational efficiency at the various facilities
- Replace the aging and energy-inefficient head works and solids dewatering systems with new energy-efficient systems
- Install new RAS pumps equipped with variable-frequency drives (VFD) and new controls
- Retrofit outdoor LED lighting
- Retrofit primary sludge pumps
- Install new high-efficiency screw press
- Implement aeration tank air pressure set point control improvements

Benefits to the client:

- Streamlined project development and project implementation to construction timeline and costs
- Substantial annual energy and operational cost savings
- Annual carbon offset exceeding 16.8 million pounds of CO<sub>2</sub> per year
- Offset in planned bond and CIP cost of approximately \$1,800,000
- Replacement and/or upgrade of critical systems that have reached the end of their useful economic life
- Significant improvement in overall system efficiency and operation



## City of Huntington Beach



### Client

City of Huntington Beach

### Location

Huntington Beach, California, U.S.

### Project Size

Nine buildings, 753,857 square feet

### Project Cost

\$3 million

### Years

June 2011–September 2013

### Services

- Energy auditing
- ECO identification
- Condition assessment
- System design
- Cost estimation
- Construction management

### Annual Savings Results

Predicted annual energy savings:

Electric: 454,746 kWh

Gas: 1,622 Therms

Total cost savings: \$57,104

### Project Overview

AECOM was chosen by the City of Huntington Beach to perform an Energy Savings Performance Contract (ESPC). This project included an evaluation of their top energy-consuming facilities, which led to the implementation of system replacements or improvements at multiple buildings owned and occupied by the City.

List of improvements included:

**Server Room Virtualization:** This energy savings measure involved a mixture of cutting-edge software and hardware, which allowed the City to consolidate their IT services hardware that directly resulted in a 40 percent reduction in the energy consumption related to IT system hardware.

**Server Room HVAC upgrades:** With the elimination of approximately 50 percent of the physical hardware related to the City's IT services and its associated heat loads, the existing HVAC system was redesigned. Included in this redesign was the addition of an energy-efficient cooling system that was relocated into the physical space within the server room, which also included a hot/cold aisle conversion. A side benefit of the HVAC relocation was that the City was able to re-purpose approximately 800 sq ft to much needed office space.

**Chilled Water Plant Upgrades (Civic Center):** This measure involved the consolidation of two independent chilled water systems that served the Civic Center office tower and the police department. To accomplish this effort, the existing chillers in the civic office tower were replaced with new high-efficiency chillers, and a piping interconnection between the two sites was performed. To ensure proper cooling to all areas, the pumping systems were converted to variable flow throughout. In addition, optimized sequences and strategically located system sensors were integrated into the existing building management system. There was an approximately 40 percent reduction in annual cooling energy consumption for the two facilities because of this measure.

## Rikers Island Cogeneration Facility



This initiative established a combined heat and power facility on the island that reduced annual energy costs and emissions to the environment.

### Client

New York Power Authority  
Randy Solomon  
123 Main Street, White Plains, New York 10606  
P 914-390-8205

### Location

New York, New York, U.S.

### Project Size

>15 MW Electric, >80,000 #/hr steam

### Contract Value

\$108 million

### Years

September 2011-January 2015

### Services Performed

- Planning and scoping
- Feasibility studies
- Alternatives analysis
- Design and construction
- Commissioning

### Annual Savings Results

Cost Savings: \$7.1 million  
Reduction of 25,000 tons in CO<sub>2</sub> emissions  
Reduction of 45 tons a year in NO<sub>x</sub> emissions

### Project Overview

The New York City Department of Corrections (NYCDOC) retained the services of NYPA/AECOM to evaluate building a reliable, energy efficient cogeneration facility on Rikers Island. This initiative established a combined heat and power facility on the island that reduced annual energy costs, and emissions to the environment and improved energy reliability, thereby enhancing security on Rikers Island. The project also included a future option for a centralized emergency generation plant that improved existing emergency generation on Rikers Island and reduced annual maintenance costs.

The Rikers Island project includes a Natural Gas Turbine Power Plant nominally rated at 5 kilovolt (kV) and 26.5 kV Medium Voltage Electrical Distribution System, high pressure gas compression station, and a Controls Room, as well as controls experience including integration of controls with an existing ICS and implementation of a new microgrid controls system. AECOM completed this project as both the prime contractor and lead design/engineering firm under two separate contracts.

### Project Scope

- The electrical microgrid scope consisted of revamping existing Rikers Island 26.5 kV feeder systems and loads. Utility grade feeder isolation devices installed resulted in the entire system complying with all utility required mandates. The system can operate in a true island mode in case of faults or complete failures detected on the larger utility grid as well as the ability to take individual load banks offline and coordinate them with the cogeneration and other sources. Well-defined and utility-approved procedures are in place for islanding from the grid in preparation for any anticipated extended outages.



- **Natural Gas Plant Power Plant Scope:** The project includes the installation of two modular 7.5 MW gas turbine generators and Heat Recovery Steam Generators with supplemental firing that provide the prime source of electrical and thermal energy to the island, while maintaining a synchronized connection to the utility grid so that the utility can supplement Rikers Island's electrical load as conditions warrant.
- **Medium Voltage Scope:** Rikers Island was supplied with electrical power from Con Edison's utility grid system via four main 26.4 kV electrical feeders.
- The existing system was designed so that only two of the four feeders are required to supply the island with 100 percent of its required power. Gas turbine generator voltage output is 5 kV and is stepped up to 27.5 kV via four Generator Step-Up Transformers. A 27 kV utility substation is included in project. Scope also included, ductbanks, manholes, switchgear, all required protective relaying and cabling.
- **Data Center, Operations Center, or Control Room Scope:** The project featured a complete control room equipped with CPUs and monitors from Solar Turbines, Emerson Delta V Balance of Plant, Feeder Distribution Mimic Panel, kW import control panel and remote manual/auto synch panel.
- In addition to monitoring and control of new CHP equipment, the plant was designed to analyze fuel and steam loads in the old powerhouse in order to properly integrate the output of the new Combustion Turbine Generators. All new breaker statuses and protective relaying conditions are also constantly monitored locally and remotely at the Con Ed Utility control center
- **Desired Experience | Higher Rating Evaluation Criteria**
  - Integration of microgrid controls with diverse energy generation sources, such as intermittent renewable energy with diesel and natural gas generators: In addition to the true "island" mode of operation, the plant operates in parallel with the utility and can produce approximately 16.5 mW during cold weather. Island loads range from 12 to 24 mW seasonally. Individual substation loads (11 in total) are summed and are wirelessly transmitted to the CHP control room import/export controller and turbine output(s) are adjusted accordingly. At no time is power exported to the utility.

The combined cycle efficiency of this plant is significantly higher than the individual efficiencies of the past energy sources serving Rikers Island. The operation of this plant also produced a significant reduction in CO<sub>2</sub> and NO<sub>x</sub> emissions to the environment.

# Owls Head Waste Water Treatment Plant (WWTP) Upgrades



The project contained specific system upgrades to the fuel gas supply system to reduce Greenhouse Gas (GHG) air emissions, improve operating reliability, and reliance on purchased electrical power.

## Client

New York Power Authority  
 Andrew Kittel, Plant Superintendent  
 6700 Shore Road, Brooklyn, New York 11220  
 P 718-748-3177  
 E akittel@dep.nyc.gov

## Location

Brooklyn, New York, U.S.

## Project Size

120 MGD

## Contract Value

\$38 million

## Years

November 2011-October 2017 (estimated)

## Services Performed

- Feasibility Study
- Economic Analysis
- Peak-Load Reduction Strategies
- Water and Wastewater Services
- Three Engine Generator Improvements

## Estimated Annual Savings

Cost Savings: \$1 Million  
 Electrical: 13,639,000 kWh  
 Gas: 46,536 MMBTU

## Project Overview

AECOM has provided engineering services at the Owls Head WWTP since the early 1970s. At that time, the Owls Head WWTP was a 160 MGD modified aeration plant constructed in 1952. Under the Clean Water Act, New York City (NYC) was required to upgrade the facility to meet more stringent waste standards. AECOM was commissioned to lead the conversion of the existing facility to a 120 MGD conventional activated sludge facility. Services included feasibility studies, planning construction phases, development of preliminary designs, preparation of construction bidding packages, design services during construction (DSDC), construction management, construction permitting assistance, and preparation of Operation and Maintenance (O&M) manuals.

AECOM was appointed by the New York Power Authority (NYPA) to conduct the feasibility study, project design, and construction management plan to upgrade the existing fuel gas system at the Owls Head WWTP. The project also required AECOM to determine necessary modifications that allowed for improved long-term operation of the three engine-generators. The project contained specific system upgrades to the fuel gas supply system to reduce Greenhouse Gas (GHG) air emissions, improve operating reliability, and reliance on purchased electrical power. This project upgraded the continuous-duty engine generators while maintaining uninterrupted plant operations. Upon completion of the project, when required, the Owls Head WWTP can operate independently from the primary power grid.

## Sutter Health SST Project



The project was implemented in four phases and addressed a variety of energy efficiency, water conservation and operational upgrades.

### Client

Sutter Health  
Wayne Bader, Energy Manager  
2800 Gateway Oaks Drive, Suite 250  
Sacramento, California 95833  
P 916-614 2480

### Location

San Francisco, California, U.S.

### Contract Value

USD \$4,125,000

### Years

February 2014–July 2015

### Project Size:

4 hospitals | 3.9M square feet

### Guaranteed Annual Savings:

- Electrical Savings: 2,171,992 kWh
- Natural Gas: 384,982 therms
- Water: 24,638,482 gal
- Cost Savings: \$1,076,031

### Project Overview

Through a competitive process, Sutter Health selected PG&E/AECOM to develop and implement a comprehensive design-build energy retrofit project that would significantly reduce Sutter Health's California Pacific Medical Centers (CPMC) annual energy and operating costs, exceed their corporate mandated energy and water conservation goals, and address significant infrastructure needs.

This comprehensive project included significant work at Sutter's four (4) CPMC facilities located in downtown San Francisco. The project was implemented in four phases and addressed a variety of energy efficiency, water conservation, and operational upgrades.

The project's scope of work included a comprehensive portfolio of cost effective solutions that met Sutter Health's stringent simple payback criteria of 3.5 year.

### Work Performed

- Facility-wide indoor lighting upgrades including fluorescent and LED technologies
- Air Handling Unit (AHU) Variable Air Volume (VAV) retrofits and system optimization
- Upgrade and replacement of aging steam system infrastructure
- Optimization of chilled and hot water plants
- Retro-commissioning of HVAC, lighting, and process systems at each facility
- Measurement and Verification (M&V)
- Utility incentive procurement

# Norfolk Southern Railway, Energy Systems Site Assessment (ESSA)



## Client

Norfolk Southern Railway

## Location

Altoona, Pennsylvania, U.S.

## Project Cost

Energy audit fees \$240,000

Design fees through 2014 \$922,000

## Years

April 2014–December 2015

## Project Overview

This Class 1 Railroad client faced a significant infrastructure investment in the existing systems at a locomotive shop and chose to develop a solution that would provide a return on investment in the form of lower energy and operational costs. AECOM was engaged to perform an Energy Systems Site Assessment (ESSA) with the primary focus on retiring a coal-fired steam plant and developing alternate heating solutions for the 20+ buildings currently heated by steam. In addition to the steam system assessment, AECOM performed a condition assessment of the complex electrical and building envelope infrastructure and developed recommendations for improving reliability and performance of this critical infrastructure. A key component of the study was to investigate the opportunity for Combined Heat and Power (CHP) at the complex.

The ESSA recommendations included (i) a coal plant retirement plan, including direct gas-fired heating solutions for all buildings currently heated with steam, with destratification technologies and improved controls to manage ventilation needs; (ii) window replacements and roof and wall insulation improvements; (iii) upgrade of key electrical distribution infrastructure to increase safety and reliability and support the installation of a CHP system; (iv) selection of a gas engine CHP system to provide on-site electricity, hot water and steam; and (v) space utilization recommendations including the demolition of under-utilized buildings and relocation of activities to other buildings.

The \$48 million project eliminated the combustion of approximately 13,531 tons of coal annually. Converting the building heating from steam to gas reduced water consumption by approximately 50 million gallons of water annually. Accounting for future avoided replacement costs, which were used to offset the cost of non-energy related scope items (i.e., electrical and envelope recommendations that must be implemented to ensure safety and reliability), the project had a simple payback of approximately five years.

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We design, build, finance and operate infrastructure assets for government, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges.

Our projects have set new standards for industry-wide best practices. This success is due to our dependable, trustworthy, responsible consulting practices; the relationships we build with our clients; and our ability to understand their needs.

## About AECOM

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