ARCH ENERGY

A DIVISION OF **CONSIGLI CONSTRUCTION CO., INC.**

U.S. General Services Administration, Margaret Chase Smith Federal Building

Contents

ARCH ENERGY

Building for the Future

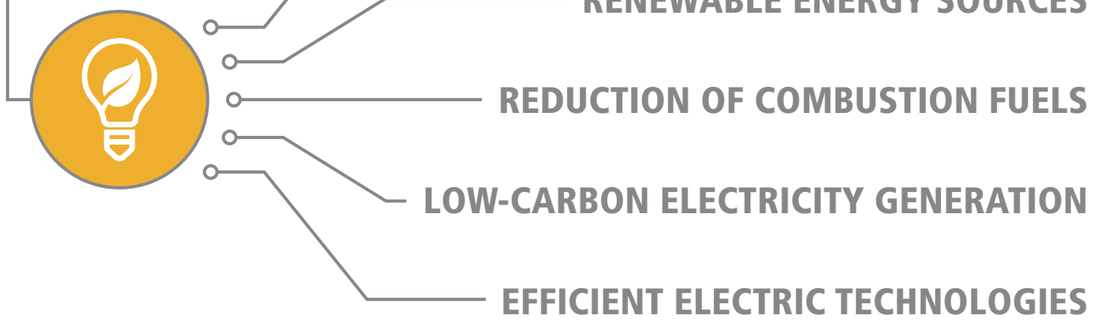
Union Theological Seminary, Hastings Hall Dormitory Renovation & Utility Plant Replacement

ARCH ENERGY

Companies & institutions across all markets are making carbon reduction commitments towards a low-carbon society.

Building for the Future

Through the adoption of smart, high-performance buildings, low-carbon infrastructure & deep energy efficiency upgrades, Arch Energy helps clients meet their goals in shifting towards a low-carbon society. With over 100 years of helping our customers discover innovative & integrated solutions, we understand the importance of shifting towards low-carbon infrastructure & building systems. Through energy-efficient building methods, we are committed to helping our clients build for the future.



Energy Services Overview

Saint Elizabeth's Medical Center, Connell 6 Intensive Care Unit Fit-out

ARCH ENERGY

GENUINE **BUILDERS**

ENERGY EXPERTS

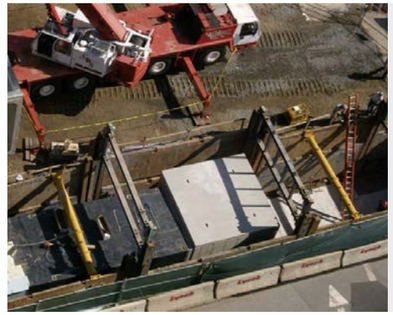
Energy Services Overview

WHY ARCH ENERGY SERVICES?

Consigli's Arch Energy group provides and implements integrated solutions to create sustainable, resilient, healthy and intelligent buildings powered by a low-carbon infrastructure. Our services extend beyond constructing new buildings, as we also reduce costs and increase efficiencies for our clients to meet their energy and carbon reduction goals.

SOLUTIONS

- Energy Optimization
- Deep Energy Retrofit
- Building Intelligence
- Infrastructure
- Financing
- Resiliency
- Net Zero / WELL



KEY MARKETS

- Life Sciences
- Healthcare
- Institutional
- Public K-12
- Higher Education
- Developer
- Corporate
- Industrial

CAPABILITIES & SERVICES

- Program Management
- Feasibility Assessments / Project Development
- Design-Build Services
- Energy Engineering
- Incentives Management with Utilities
- Self-performance of Building Automation Systems
- Financing Solutions
- Fault Detection & Diagnostics

Our Capabilities

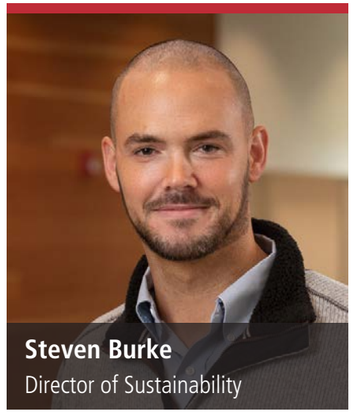
General Electric, North Point

ARCH ENERGY

Our Team of Specialists

Todd McCabe
Vice President of Project Services

Kailash Viswanathan
Director of Energy



Steven Burke
Director of Sustainability

ADDITIONAL ARCH ENERGY TEAM MEMBERS

- **Project Manager**
  - Project Development
  - Building Intelligence
  - Lighting
  - Engineering
- **Project Engineer**
- **Building Intelligence**
  - Lead Controls Specialist
  - Controls Specialist
- **Assistant Superintendent**

CROSS FUNCTIONAL DEPARTMENTS

- **Pre-construction**
- **M/E/P Services**
- **Project Management**
- **Field Operations**

In-House Resources

Address project risks & provide comprehensive deliverables to our clients through our Project Services Group (PSG)

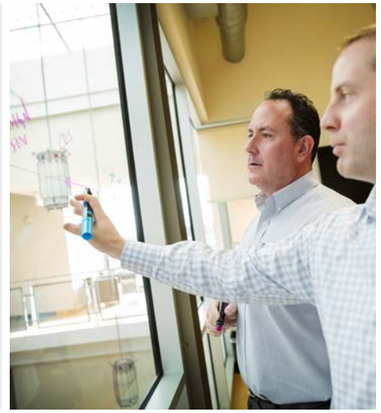
Analyze sustainable health & wellness building options critical to end users

60+
Consigli
PSG Resources

Provide financial options for budget-neutral infrastructure upgrades coupled with utility incentives

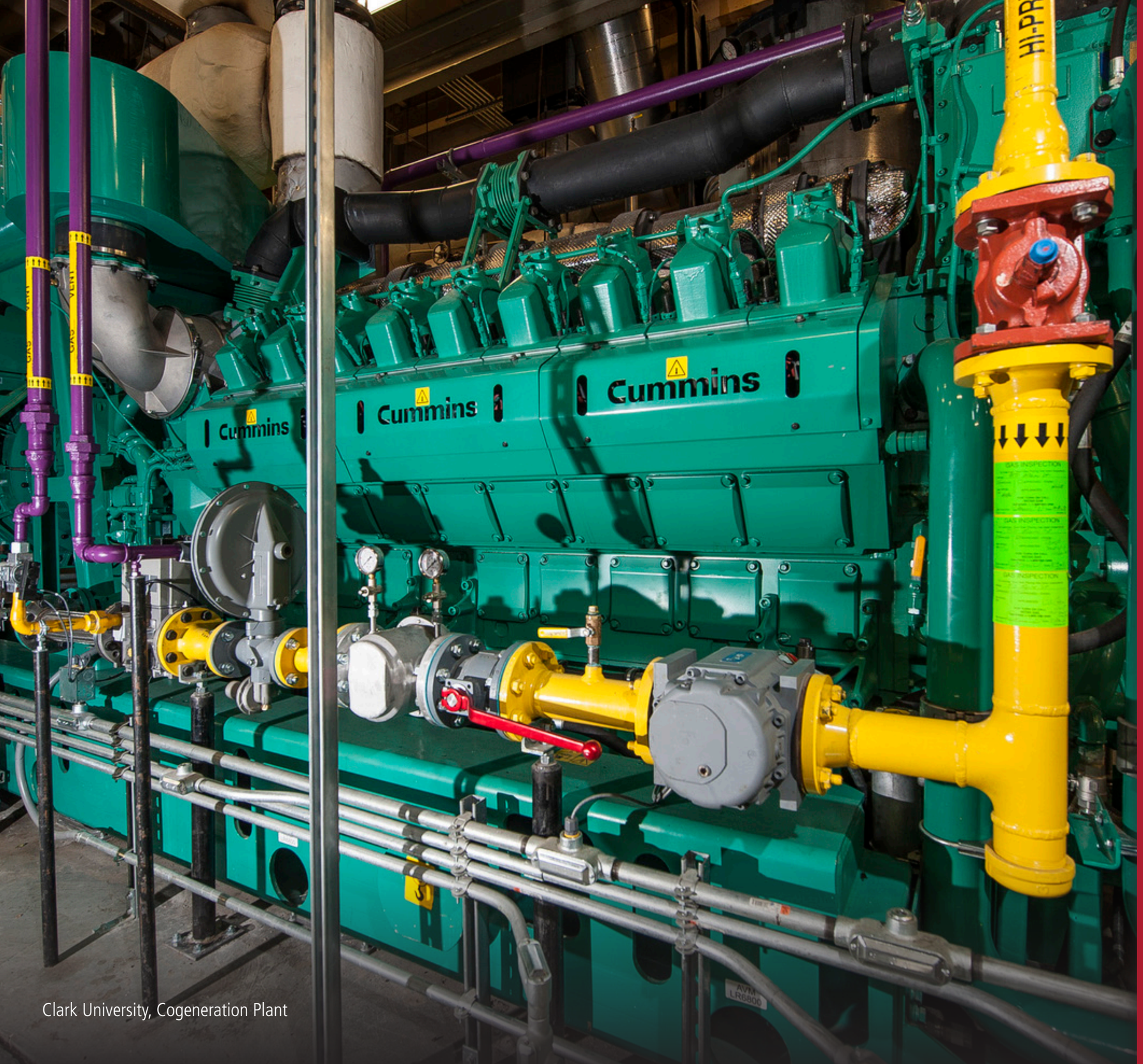
100+
Years of Discovering Innovative & Integrated Solutions

Analyze various infrastructure options to reduce operating costs & carbon emissions for improved building health



In-house self-perform team dedicated to the design, install & service of building automation systems, access controls & networked lighting controls

Case Studies



Clark University, Cogeneration Plant

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Building Intelligence

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Finished Exterior

Auditorium

13%

Reduction in Energy Use After 1st Year in Operation

BROOKS SCHOOL

CENTER FOR THE ARTS

PROJECT OVERVIEW

Located in the heart of campus, Brooks School's Center for the Arts consists of three interconnected structures: one each for performance, music and visual arts. To achieve Brooks School's performance and operational standards, Consigli managed the project focused on energy optimization.

With the new building elevation interfering with the existing steam line, campus steam and electric utilities had to be relocated. To support the steam and chilled water enabling, Consigli installed a new chilled water plant and new 12 inch steam and condensate underground piping systems, flowing from the boiler plant through the basement of the new building and back to the rest of the campus. A variable refrigerant flow (VRF) with a heat recovery system now supports areas needing year-round cooling.

A Distech Controls™ Building Energy Management System (EMS) featuring a wireless lighting control system was installed for the new facility. Wireless occupancy sensors now collect occupancy data to support demand control ventilation through CO_2 sensors in every classroom, providing building occupants with the proper amount of ventilation, cooling and heating. After one year of operation, site energy proved 13% better than the modeled Energy Use Intensity of 40 British thermal units (BTU) per sq. ft.

Design-assist services bring our team into the process early, helping to meet & beat your energy goals for your new building.

BY THE NUMBERS

$25M
PROJECT VALUE

37 KBTU / SQ. FT.
ENERGY USE INTENSITY

13%
REDUCTION IN ENERGY USE AFTER FIRST YEAR IN OPERATION

12 IN.
STEAM & CONDENSATE UNDERGROUND PIPING SYSTEMS

2.5%
TOTAL PROJECT SAVINGS

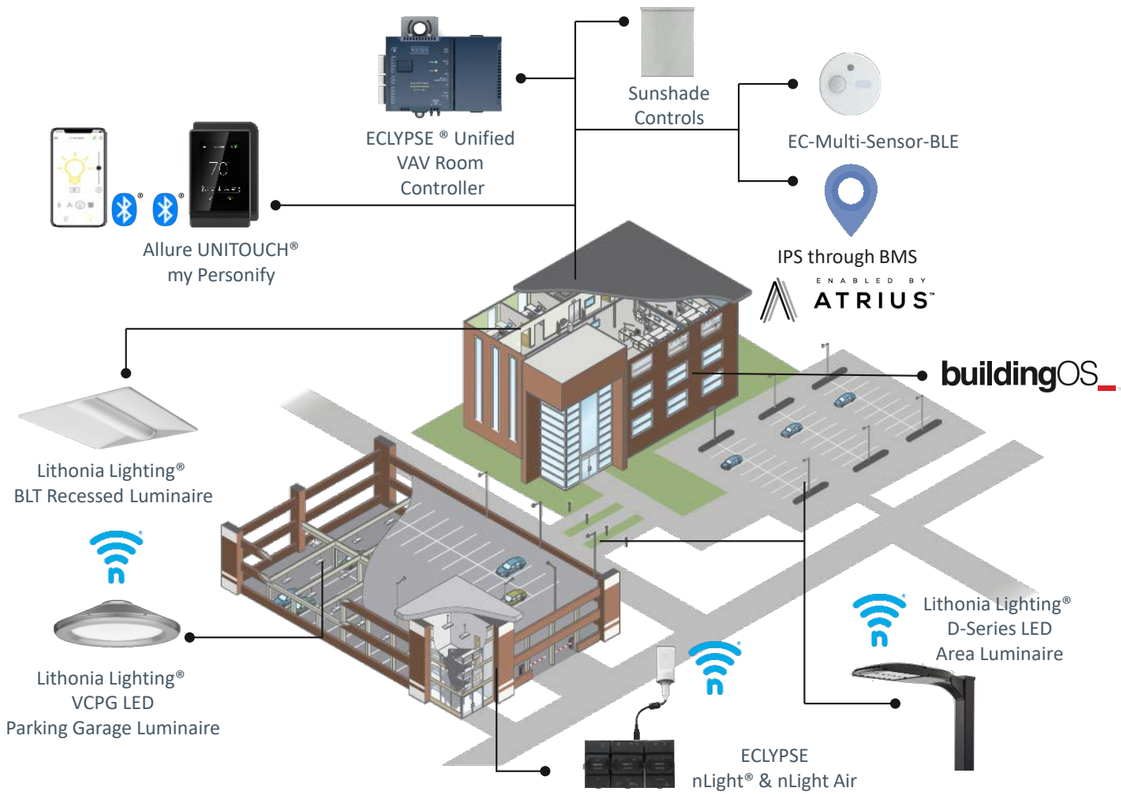
$269,000
MECHANICAL TRADE COST SAVINGS (APPROX. 9%)

- HVAC RE-DESIGN +$179K
- BUILDING CONTROLS RE-DESIGN +$28K
- SELF-PERFORM WORK +$62K

$299,150
ELECTRICAL TRADE COST SAVINGS (APPROX. 14%)

- LIGHTING RE-DESIGN +$260,300
- ELEC. SERVICE RE-DESIGN +$38,850

A Complete Solution for Connected Buildings



Smart technology increases occupant comfort & facilitates smooth operations through effective communication to facilities personnel & stakeholders.

BUILDING INTELLIGENCE EXPERIENCE

Confidential Client, Building Automation Systems

Replacement of existing building automation system (BAS) for a historic museum site to control new mechanical systems. Implementation of the new BAS will service three separate facilities on the campus. Project scope includes integration with the variable refrigerant flow (VRF) and boiler plant, baseboard heating and graphics. Crucial to the project's success proper logistical planning in critical and challenging spaces.

MSPCA, Angell Critical Care Unit, Building Automation Systems, Boston, MA

Building automation systems (BAS) work to support the renovation and addition at MSPCA's Angell Critical Care Unit. Project scope includes proper demolition and cut over of existing controls related to the unit, as well as integration of four new rooftop units. New controls for the hot water plant will be installed and integrated with CO_2 control to 30 new VAV boxes. The Arch Energy team developed value engineering ideas for the client and is managing the project with careful coordination so as to not interrupt existing controls and facility operations.

Boston College, Building Automation Systems T & M, Boston, MA

Service work related to energy optimization of certain buildings. Project scope includes troubleshooting energy meters, adding new energy meters to campus dashboard and fixing and calibrating sensors and devices related to chillers on site.

Worcester Polytechnic Institute, Building Automation Systems, Worcester, MA

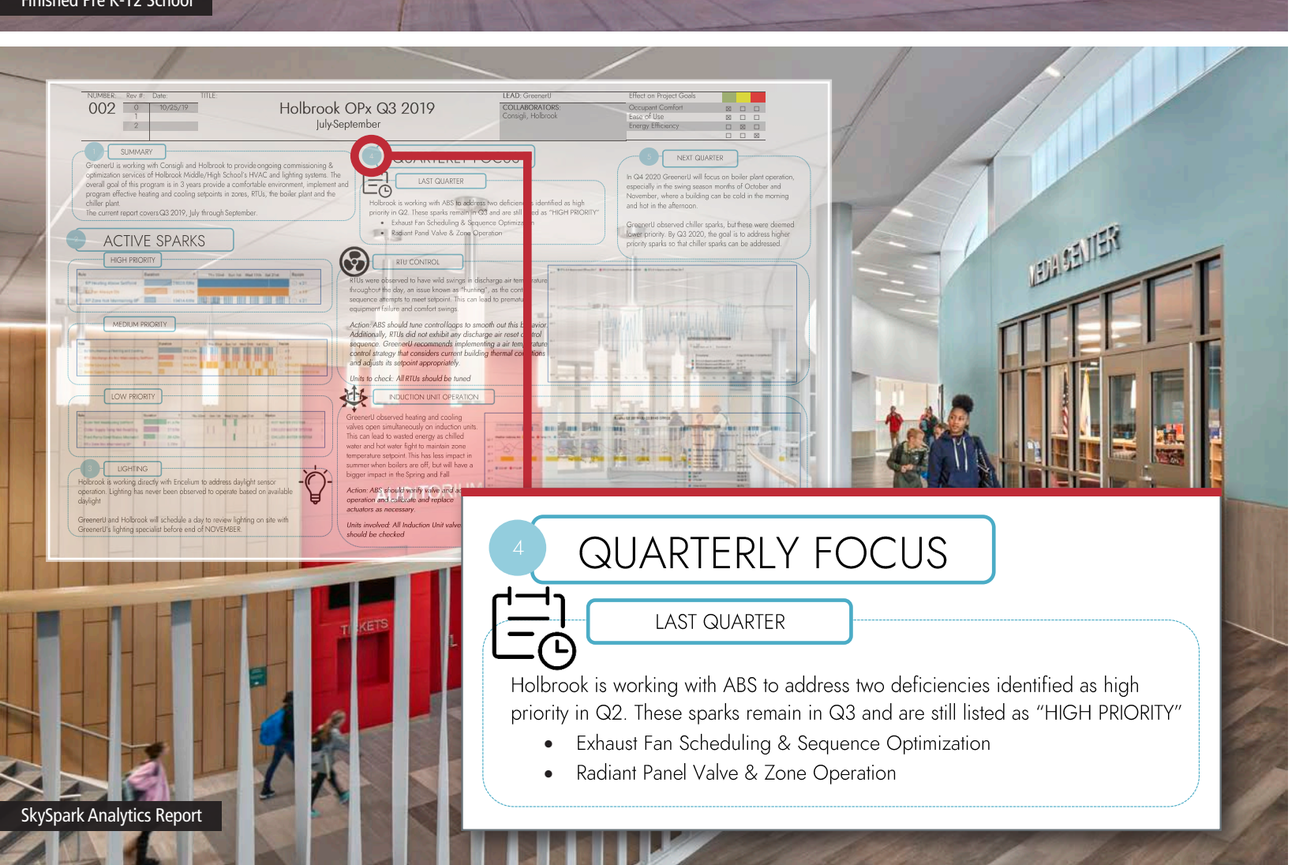
Supporting the Institute to perform routine tasks and assist the WPI Controls Manager to maintain and optimize the control system on campus utilizing an Arch Energy Lead Controls Specialist. Project scope also includes calibration of sensors, addition of sensors and devices as needed, retrocommissioning of equipment on a rolling basis and ensurance of ventilation dampers operation.

Web Industries, Equipment Supply & Building Automation System Controls, Dayville, CT

Equipment supply for a dryroom and laboratory manufacturing facility, including a 750KW diesel standby generator and HVAC equipment start-up, commissioning and testing. Arch Energy is self-performing the design and installation of the upgraded automatic temperature controls (ATC).

Energy Optimization

Finished Pre K-12 School



SkySpark Analytics Report

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TOWN OF HOLBROOK PUBLIC SCHOOLS

HOLBROOK PRE K-12 SCHOOL

PROJECT OVERVIEW

In order to update and improve their existing schools, the Town of Holbrook embarked upon the construction of a new 217,353 sq. ft. Pre K-12 school. The new school consolidated three aging buildings into one, with separate wings for grades Pre K-5 and 6-12. After the first year of the new building's operation, Consigli offered Holbrook a three-year Building Analytics Solution to proactively identify and methodically address potential issues as the school's facilities staff adjusted to the updated building management systems. With the support of the SkySpark platform's ongoing data collection, Holbrook's building operators were able to analyze data from smart devices, meters and equipment systems to identify potential issues, reduced downtime and operational saving opportunities.

Using SkyFoundry and its SkySpark platform, Holbrook now has the ability to monitor equipment health, comfort and energy, as well as identify equipment that may not be operating as commissioned. Although the building was performing below the modeled baseline after one year of operation with an Energy Star score of 76, the team has a goal of increasing this score to 85 through the ongoing commissioning process.

Fault detection & diagnostics help to keep building energy usage down on an annual basis. In addition to energy usage, it reduces the amount of complaints & maintains comfort by detecting potential issues before they progress.

BY THE NUMBERS

$80M
PROJECT VALUE

3-YEAR
BUILDING ANALYTICS SOLUTION PARTNERSHIP

85
ENERGY STAR SCORE GOAL

7%
DECREASE IN GAS CONSUMPTION

Deep Energy Retrofit

Cambridge Housing Authority, Revitalization of Millers River Apartments

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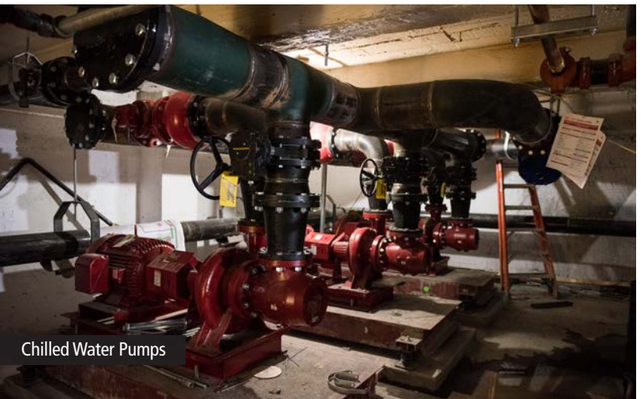
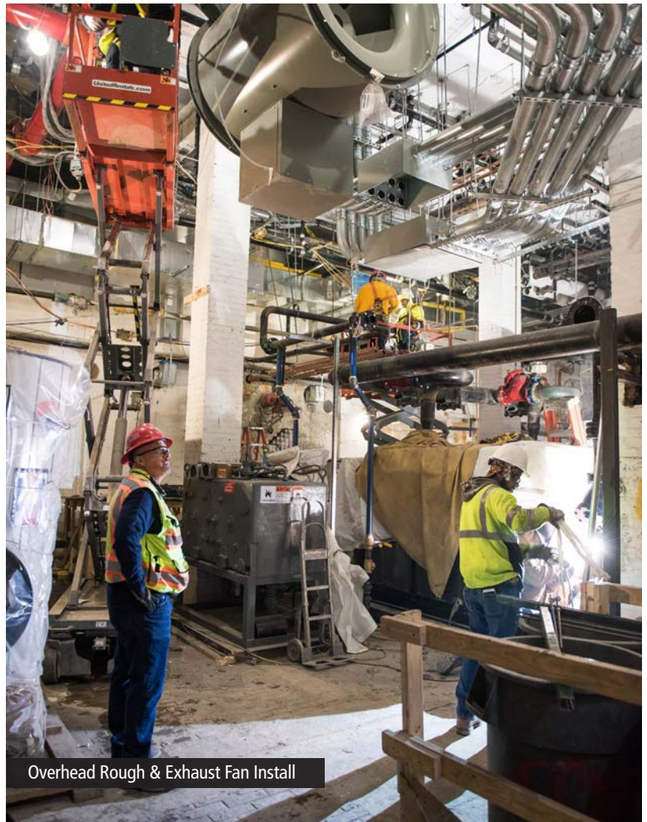
Fully Scaffolded Exterior of Hastings Hall


Chilled Water Piping


Chilled Water Pumps


Overhead Rough & Exhaust Fan Install

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UNION THEOLOGICAL SEMINARY

HASTINGS HALL RENOVATION & UTILITY PLANT REPLACEMENT

PROJECT OVERVIEW

Union Theological Seminary (UTS) is a graduate school of theology marked by 100+ year old neo-gothic buildings at its campus in the Morningside Heights section of Manhattan. In order to preserve the buildings for the 21st century and maintain their infrastructure, UTS has embarked on a multi-phased, multi-year renovation, starting with the 90,000 sq. ft. renovation of Hastings Hall Dormitory and Utility Plant Replacement.

Hastings Hall, one of UTS' on-campus residence halls, will undergo a fast-track renovation featuring unit reconfiguration to increase capacity while introducing new residential spaces. Concurrent project scope included replacing the central heating and cooling plants in the basement and the sub-basement. The existing steam boilers were replaced with new hot water boilers and two 400 ton water cooled chillers, and new cooling towers were installed on the roof. New electrical infrastructure was also installed, as well as a new 750 kilowatt (kW) emergency generator to support the building's resiliency.

A building's age, location & type should not deter deep energy retrofit projects. Extending equipment beyond its useable life is not safe & will result in more costs than upgrading with energy efficiency equipment.

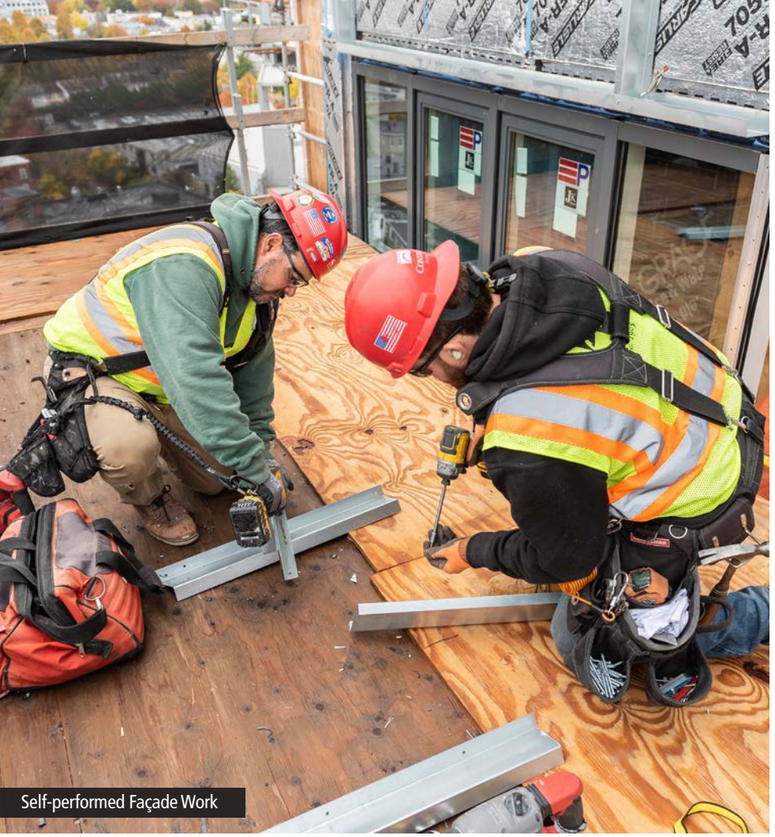
BY THE NUMBERS

$45M
PROJECT VALUE

(2) 400-TON
WATER COOLED CHILLERS

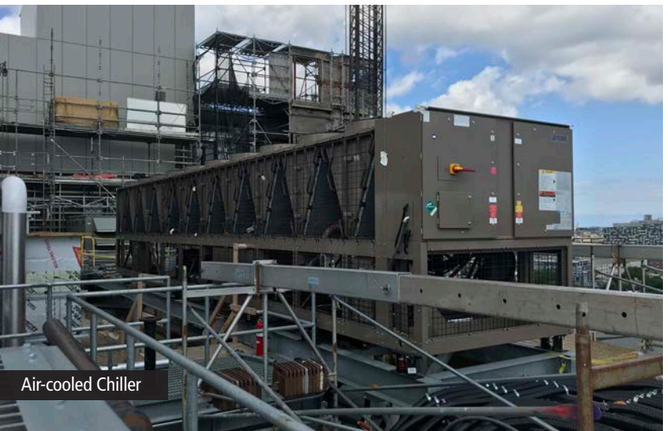
750 KW
EMERGENCY GENERATOR TO SUPPORT THE BUILDING'S RESILIENCY

100+
YEAR-OLD BUILDING


Self-performed Façade Work


New Exterior Insulation & Siding

Trigen Inverter


Air-cooled Chiller

Cooling Tower

CAMBRIDGE HOUSING AUTHORITY

REVITALIZATION OF MILLERS RIVER APARTMENTS

PROJECT OVERVIEW

Millers River Apartments is a 19-story apartment building featuring 297 low-income, senior and respite housing units. The high-rise has gone largely untouched since its original 1970's construction, calling for a deep energy retrofit and renovation of the dated building infrastructure, with a significant goal being to improve the building's systems and thermal efficiency. Individual units and common areas are being revitalized, and the exterior is receiving a full roof replacement and total reskinning of the façade, which requires the removal of existing balconies to increase unit square footage.

Because of the apartment complex's thermal load needs, a 125 kilowatt (kW) trigeneration system is being installed. Hot water from the engine supplements the building's heating needs, while the installation of a 600 MBH hot water absorption chiller supports cooling needs. The new heating plant features hot water boilers and indirect water heaters for domestic water, and the cooling plant features a high-efficiency 325 ton air-cooled chiller. To increase resident comfort, the building envelope is also being refitted to provide more insulation, and each apartment now features a four-pipe fan coil system. LED lighting is being installed throughout the building in lieu of the existing halogens and fluorescent lights.

Upgrading your building envelope along with trigeneration or combine heat & power will reduce energy usage by over 60% & drop carbon emissions significantly.

BY THE NUMBERS

$104.6M
PROJECT VALUE

125 KW
TRIGENERATION SYSTEM

600 MBH
HOT WATER ABSORPTION CHILLER

325 TON
AIR-COOLED CHILLER

19 STORIES
TOTAL FAÇADE RESKINNING

Infrastructure

The MathWorks, Inc., Lakeside Campus Master Plan

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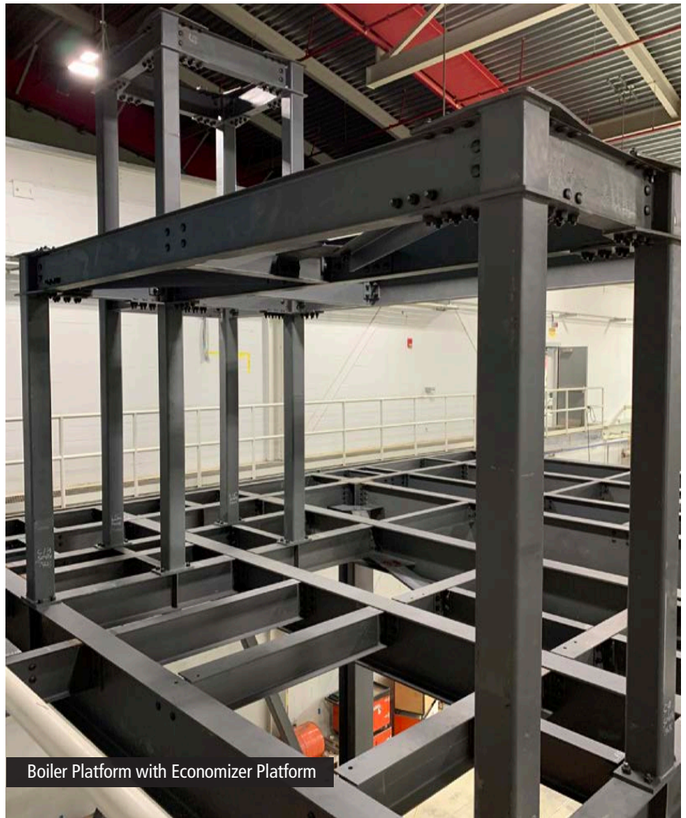
Setting New Deionized Water Tank

Deaerator Tank

New Boiler Platform



Boiler Platform with Economizer Platform

UNIVERSITY OF MASSACHUSETTS AMHERST

CENTRAL HEATING PLANT EXPANSION

PROJECT OVERVIEW

As the largest and flagship campus in the University of Massachusetts (UMass) system, UMass Amherst hosts a campus community of approximately 30,000 people. Understanding that their existing Central Heating Plant (CHP) could no longer meet the peak steam demand estimated at 345,000 pounds of steam per hour (pph), the University called for a solution.

To increase the CHP's steam generating capacity and meet an N+1 redundancy criteria, the CHP expansion includes the installation of the first of three 40,000 pph firetube boilers, as well as an expansion of the basic plant mechanical, electrical and controls infrastructure to support the new equipment. Supporting utility installation includes breeching work for the boiler up the existing stack and connection of the upgraded systems to the three-story facility's existing steam network.

The boiler is designed to burn renewable fuel oil (RFO). The project will include storage tanks, forwarding pumps and a heat exchanger to store and deliver the fuel to boiler. Additional new machinery includes an attemperator system for the existing steam turbines, deionized water tank, deaerator tank and associated water pumps feeding into the existing boilers. The continuous emission monitoring systems (CEMS) room was expanded for future growth. Foundation and demolition work was managed while keeping the existing plant in operation, thus ensuring that the construction area was properly contained and filtered with no sign of dirt or dust migration over to the existing central utility plant.

By installing low carbon alternative fuels, you can continue to meet your sustainability goals.

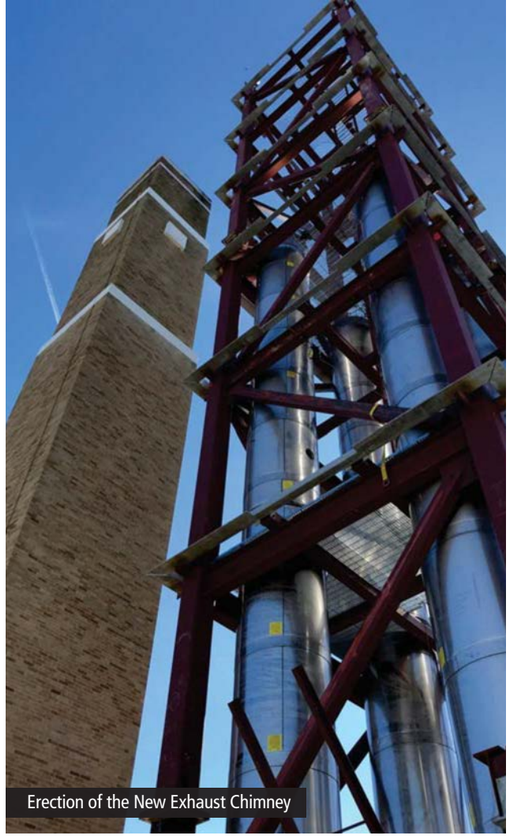
BY THE NUMBERS

$13M
PROJECT VALUE

40,000 PPH
STEAM BOILER INSTALLATION CONNECTED TO EXISTING STEAM NETWORK

RFO CAPABILTIES
CENTRAL HEATING PLANT DESIGNED TO BE ABLE TO RUN ON RENEWABLE FUEL OIL (RFO)


Foundations of the Addition – Fuel Tank Storage Room


Erection of the New Exhaust Chimney


New Boiler Rigging


Fuel Tank Footings


New Fuel Tank

BOSTON COLLEGE

CENTRAL HEATING PLANT UPGRADE & EXPANSION

PROJECT OVERVIEW

Boston College's existing five-story Central Heating Plant operates and maintains three high-pressure steam boilers providing service for up to 22 campus buildings. The expansion project included the construction of a new addition connected to the existing live plant to house two new boilers. Additionally, the existing boiler exhaust chimney was dismantled and two of the existing boilers were migrated to exhaust out of a newly constructed exhaust stack erected atop the new structure. Other equipment installed included a new 13.8 kilowatt (kW) switchgear, emergency generator, AHU, VRF system and a fuel storage system.

Construction of the steel-framed addition required deep excavation work and support of excavation (SOE) with both water and sewer lines being routed around the footprint. Enabling work included the relocation of an emergency backup generator, transfer gear, fuel storage tank and a storage building removal. Safety hazard mitigation was a key focus in pre-construction and throughout the project, as the addition was being completed while the heating plant was fully occupied by the plant facility staff. Additionally, the project site was located in the heart of the occupied academic campus with over 14,000 students being routed around the site daily, requiring vehicular and pedestrian re-routing plans and communication.

Upgrades to existing infrastructure can be done with minimal impact to your existing operations while keeping your stakeholders comfortable & focused on what they do best.

BY THE NUMBERS

$24.8M
PROJECT VALUE

72 HOURS
OF TOTAL SHUTDOWN TIME ALLOWED ON THE 16-MONTH PROJECT OVER MEMORIAL DAY WEEKEND

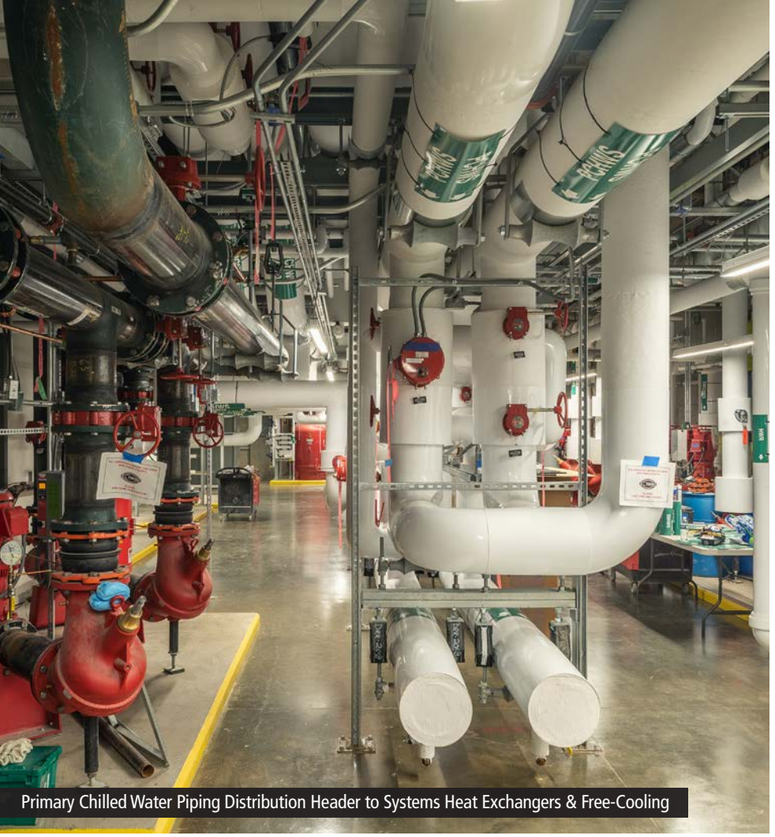
14,000+
STUDENTS & PEDESTRIANS WORKED AROUND DAILY

145 FT.
HEIGHT OF THE NEW EXHAUST CHIMNEY

(2) 40,000 PPH
BOILERS INSTALLED & CONNECTED TO EXISTING STEAM DISTRIBUTION

32,000 GALLON
ABOVE-GROUND, FUEL OIL STORAGE TANK INSTALLED IN THE NEW ADDITION

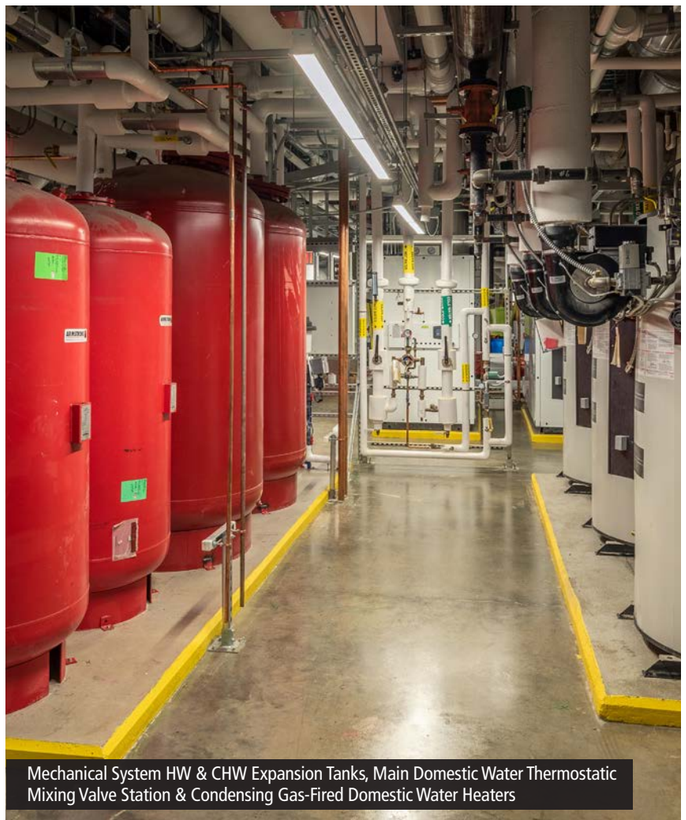
ENR REGIONAL BEST PROJECT
2020 | ENERGY / INDUSTRIAL



Primary Chilled Water Piping Distribution Header to Systems Heat Exchangers & Free-Cooling

Chilled Water Glycol Loop Heat Exchanger for AHUs

370-ton Centrifugal Chillers



Mechanical System HW & CHW Expansion Tanks, Main Domestic Water Thermostatic Mixing Valve Station & Condensing Gas-Fired Domestic Water Heaters

THE MATHWORKS, INC.

LAKESIDE CAMPUS MASTER PLAN

PROJECT OVERVIEW

MathWorks embarked on the creation of a new multi-building campus to support their growing employee population. Following the construction of a new, 569-space parking garage, MathWorks selected Consigli to continue our presence on site and act as the construction manager for the new 525,000 sq. ft. campus. The Lakeside Campus features collaborative office and meeting spaces; a fitness center; wellness and recreation space; a full-service kitchen and cafeteria; outdoor social spaces; a green roof; and a 10,000 sq. ft. level-4 data center. The buildings boast high-end finishes and technology to support this innovative organization. Sustainable elements include a greywater harvesting system and photovoltaic panels.

During the design process, our pre-construction team worked with the engineers and architects to design an area to simplify future chiller removal and replacement. Rather than having separate direct expansion (DX) cooling equipment, data center equipment featured rear-door heat exchangers—or active chilled doors—reducing cost and increasing reliability. The project also included two feeds, a substation with a 13.8 kilowatt (kW) feed and a back-up 2 megawatt (MW) diesel generator for resiliency and redundancy. The project also consisted of extensive utility upgrades and demolition of two of the three existing buildings, while the MathWorks' data center and employees occupied the remaining building—LS1.

Whether it is new construction or retrofits, thinking long term on maintenance, collaborating with engineers & vendors & providing input during the early design process can be very effective.

BY THE NUMBERS

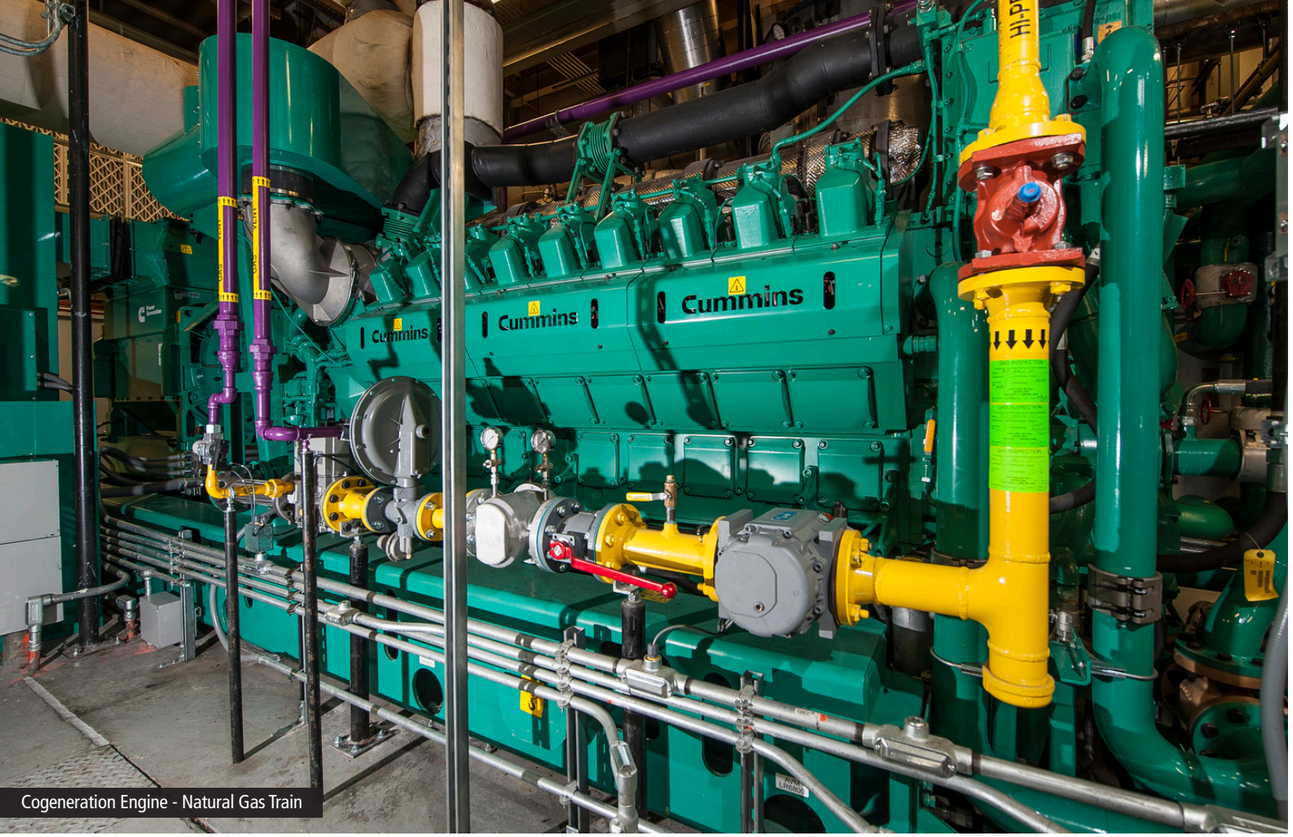
CONFIDENTIAL
PROJECT VALUE

1,850 TONS
OF COOLING

10,000 SQ. FT.
LEVEL-4 DATA CENTER

2 MW
BACKUP GENERATOR

2N+1
REDUNDANCY FOR MISSION-CRITICAL AREAS



Cogeneration Engine - Natural Gas Train

Genset - Alternator

Genset - Controls & Breeching

ARCH ENERGY

CLARK UNIVERSITY

COGENERATION PLANT

PROJECT OVERVIEW

Clark University's on-campus cogeneration plant serves as a demonstration model for both students and policy-makers alike for its sustainable and cost-effective benefits. Installed in 1982 as the first power-grid-connected cogeneration plant in the nation, over 90% of Clark's campus buildings receive their electricity, heating and cooling as a result of this system, saving the school over $8,000,000 over its 24-year life at Clark. The 60,000 pound, 1.8 megawatt (MW) generator showed signs of age and needed to be replaced with a more efficient system. Located in the basement of Jonas Clark Hall, the removal and replacement involved demolishing an entire wall of an occupied building, installation of a new 46,000 pound, 2 MW generator and the replacement of the wall with additional structural modifications.

The project also involved the replacement of three heat exchange systems and the existing generator room exhaust system, as well as the installation of a new selective catalytic reduction system to meet emission standards, new engine controls and a new transformer. Protecting the campus quad and underground utilities while rigging the engine and heat recovery steam generator proved to be a challenge that was managed through great coordination. The project was delivered under a design-build method, enabling completion to be on budget and on schedule, specifically with National Grid interconnection. Consigli assisted the University in selling the existing engine for reuse.

Complex energy & infrastructure projects are best implemented through a design-build process. This saves time, reduces cost & risk & increases performance while enhancing the operational capabilities of your equipment.

BY THE NUMBERS

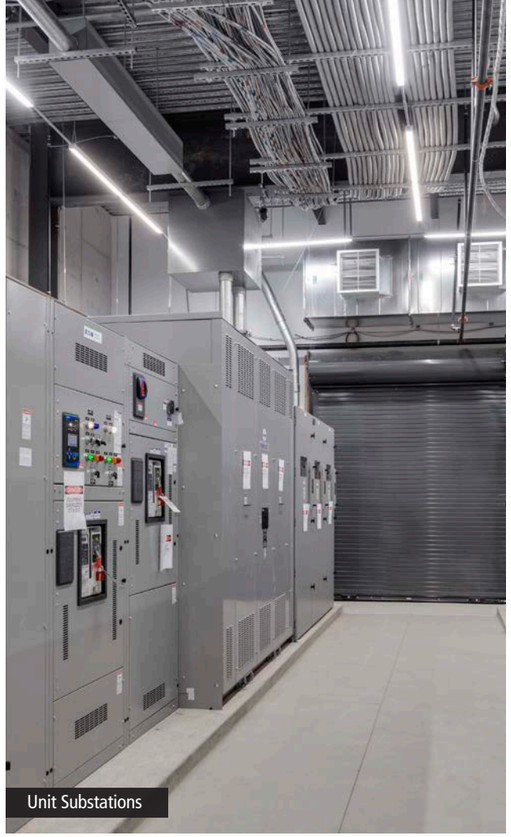
$4M
PROJECT VALUE

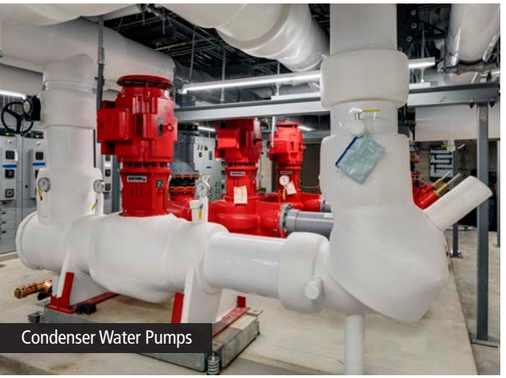
2 MW
GAS FIRED RECIPROCATING ENGINE

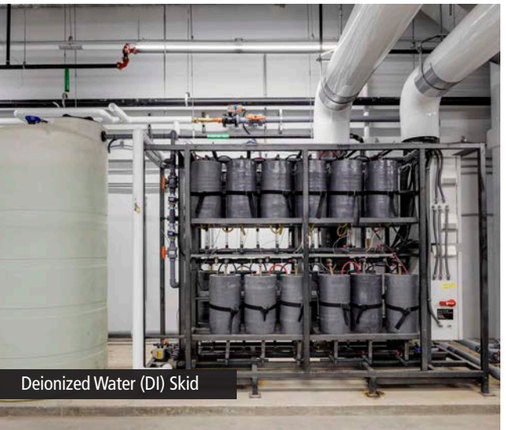
150 PSIG
STEAM

40 YEAR-OLD
EXISTING ENGINE REPLACED

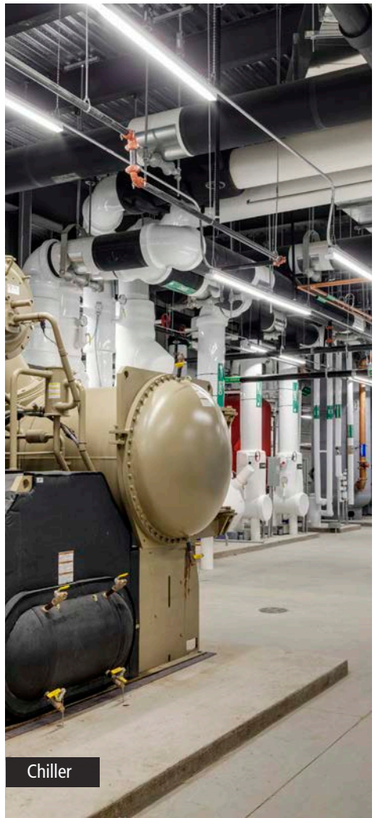

Cooling Tower


Unit Substations


Condenser Water Pumps


Deionized Water (DI) Skid


Compress Air System Air Dryers


Chiller

INSULET CORPORATION

MANUFACTURING AND CORPORATE OFFICES FACILITY

PROJECT OVERVIEW

Insulet Corporation, the leader in tubeless insulin pump technology (Omnipods), acquired a property in Acton, MA to serve as its sole U.S.-based manufacturing location. The new facility provides capacity for Insulet to manufacture up to 70% more Omnipods on a single line with up to 90% fewer personnel than its four locations based in China. The existing 201,690 sq. ft., three-story building was converted to a high-end corporate and manufacturing campus featuring space for research and development, post-market research and quality control operations, a call center, an employee fitness center with locker rooms, a cafeteria and commercial kitchen as well as open offices, conference rooms and executive suites. The 155,252 sq. ft. addition, provides clean room manufacturing and warehouse space, quarantine inspection and receiving areas, a gowning and wash unit, packaging rooms and a shipping/receiving area.

As part of the addition, Consigli installed three 1,000 ton water-cooled centrifugal high-efficiency chillers, as well as the associated pumps and cooling towers. This scope required a phased demolition and installation of the new cooling and heating equipment. As part of the building's addition, Consigli also managed the installation of five new substations—four to serve the new clean room and one to serve the existing building.

Whether it is electrical or mechanical infrastructure, upfront planning, coordination & care goes a long way.

BY THE NUMBERS

$137M
PROJECT VALUE

3,000 TONS
OF COOLING

(4) 13.8 KV
SUBSTATIONS FOR THE NEW CLEAN ROOM

(1) 13.8 KV
SUBSTATION FOR THE EXISTING BUILDING

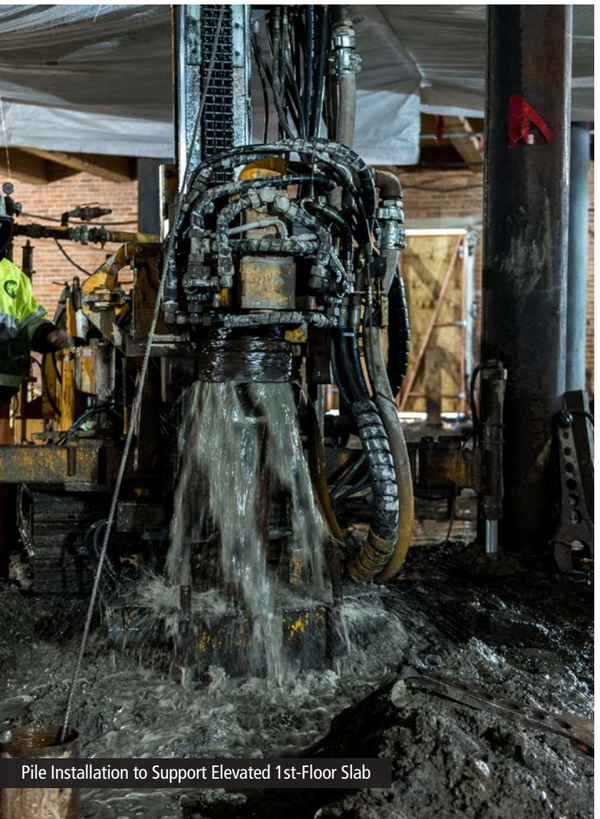
Resiliency

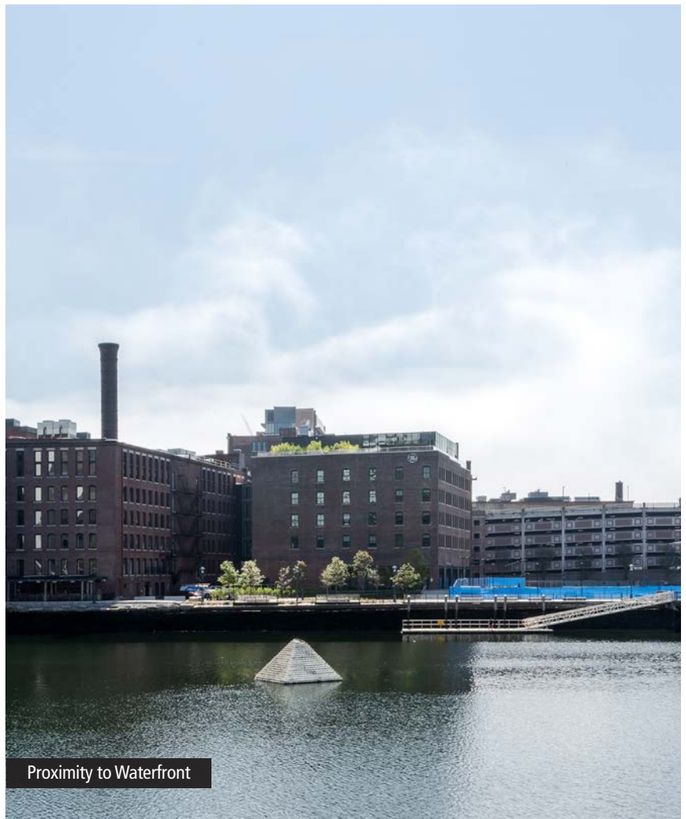
General Electric, North Point

ARCH ENERGY


Completed Project


Raising 1st-Floor Grade Above Flood Plain


Pile Installation to Support Elevated 1st-Floor Slab


Proximity to Waterfront

ARCH ENERGY

GENERAL ELECTRIC

NORTH POINT

PROJECT OVERVIEW

General Electric (GE) has developed a new campus along the Fort Point Channel in Boston's Seaport comprised of two historic brick-and-beam buildings at 5 and 6 Necco Court that once housed the New England Confectionery Company (NECCO). Originally built in 1907, these buildings were completely restored to productive use after being largely vacant and unkempt for decades. The upper levels of North Point hosts offices for up to 280 people as well as internal GE makerspace, with the ground floor hosting Brilliant Labs classrooms, public makerspace and a waterfront bistro.

Perhaps most important to North Point's design is resiliency. The design located all critical mechanical, electrical and plumbing equipment in the building's mezzanine and roof spaces, and in anticipation of rising sea levels, the ground floor was raised 19.5 inches—roughly two feet above Boston's 500-year flood line and FM Global's required flood line. Pitched crawlspace slab-on-grade and strip drains throughout the footprint improve drainage of anticipated flooding, and at the West of the building, Solite Lightweight Aggregate filters stormwater runoff and drains surrounding soil. Resiliency measures also include the incorporation of green roofs, a stormwater retention tank, water reuse systems, below-grade foundation waterproofing and leak detection systems.

The campus was built in adherence with LEED V4 as well as GE's internal wellness program, HealthAhead and the principles of the WELL Building Standard.

Resiliency benefits every project—especially when dealing with high water levels—providing continuous power & ensuring proper building system operations.

BY THE NUMBERS

$75M
PROJECT VALUE

$1.5M
INVESTED IN RESILIENCY

5-YEAR
NPV

19 IN.
RAISE IN GROUND LEVEL

$545K
ANTICIPATED RETURN IN AVOIDED LOSSES

ENR REGIONAL BEST PROJECT
2020 | RENOVATION / RESTORATION

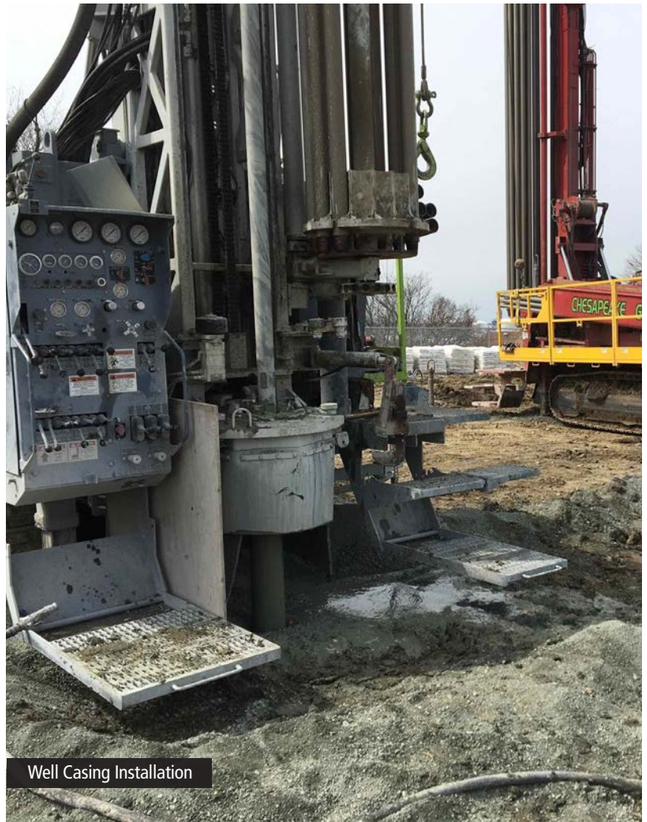
Net Zero / WELL

Williams College, Kellogg House

ARCH ENERGY

Well Drilling

144 Geothermal Wells Dug



Well Casing Installation

MASSACHUSETTS DIVISION OF CAPITAL ASSET MANAGEMENT

CHELSEA SOLDIERS' HOME COMMUNITY LIVING CENTER

PROJECT OVERVIEW

To achieve Chelsea Soldiers' Home's modern vision for veteran care and services, a new 247,000 sq. ft., 154-bed Community Living Center is being constructed adjacent to the Quigley Building—a fully operational hospital originally constructed in 1949—and built in accordance with the U.S. Veterans' Administration's Small House Model Design Guide.

The new site posed a number of challenges which were addressed in an enabling phase, including the relocation of an existing generator and oxygen farm; installation of geothermal wells; and demolition of an existing water tower. Once complete, the construction of the Community Living Center began; the six-story concrete structure will feature two housing clusters of 14 residents per floor, situated in single-occupancy rooms surrounding a shared common area, dining space and kitchen. It will target a LEED Silver Net-zero Ready standard and feature sustainable elements including geothermal wells, photovoltaic panels, high-efficiency systems and a high-performance envelope. Due to the Community Living Center's close proximity to the sensitive and operational Quigley Building, extensive coordination and mitigation measures are being managed to keep patients, staff and visitors safe and undisturbed during all phases of construction.

Net Zero projects with geothermal wells can be implemented at costs equal to or slightly higher than a traditional building.

BY THE NUMBERS

$175M
PROJECT VALUE

73%
REDUCTION IN ENERGY USE

100%
OF HEATING LOAD IS PROVIDED VIA THE GEOTHERMAL WELL SYSTEM

90%
OF THE BUILDING IS DAYLIT

35%
PREDICTED REDUCTION IN INDOOR WATER USE

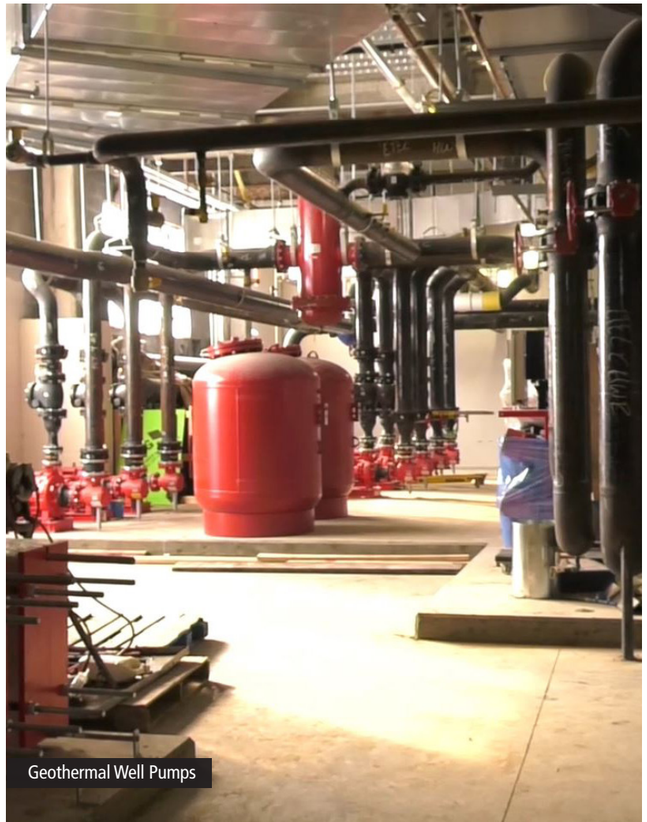
10%
RENEWABLE ENERGY PRODUCED ON-SITE

0
FOSSIL FUEL USAGE (NET ZERO)

0.7 MW
ROOFTOP SOLAR ARRAY

12-acre ETEC Project Site

190 Geothermal Wells Dug Every 25'



Geothermal Well Pumps

UNIVERSITY AT ALBANY

EMERGING TECHNOLOGY AND ENTREPRENEURSHIP COMPLEX (ETEC)

PROJECT OVERVIEW

The new Emerging Technology and Entrepreneurship Complex (ETEC) will combine the University at Albany's research strengths with some of its fastest-growing new programs and innovative entrepreneurial resources into a state-of-the-art facility fostering teaching, research and business collaborations. The new complex will feature a geothermal well field, which will reduce its fossil fuel consumption and reliance, as well as water-to-water heat pumps. With 190 geothermal wells drilled 495 feet deep every 25 feet on site, ETEC heating and cooling systems will be powered completely by geothermal strength. In addition to geothermal installation, Consigli managed 40 miles of high-density polyethylene (HDPE) piping to enhance the building's sustainable infrastructure.

The complex will house the first-in-the-nation College of Emergency Preparedness, Homeland Security and Cybersecurity, as well as include space for the University's existing Departments of Atmospheric and Environmental Sciences and the Atmospheric Sciences Research Center. Upon completion, the ETEC will house over 200 full-time faculty, 100 research and industry partners and provide educational space for 800 students.

Laboratories can achieve Net Zero despite the frequent assumption that they are unable to.

BY THE NUMBERS

$122M
PROJECT VALUE

190
GEOTHERMAL WELLS ON THE 12-ACRE SITE, DRILLED EVERY 25 FEET

495 FEET
DEPTH OF GEOTHERMAL WELLS

100%
GEOTHERMAL HEATING & COOLING IN THIS 250,000 SF BUILDING

$200,000
ENERGY COST REDUCTION (APPROXIMATELY 70%)

40 MILES
HIGH-DENSITY POLYETHYLENE (HDPE) PIPING

NET ZERO & LEED PLATINUM
TARGETS FOR SUSTAINABILITY

ARCH
ENERGY