GEOTHERMAL
QUALIFICATIONS

CONCORD
ENGINEERING

www.concord-engineering.com

Corporate Profile

Founded in 1989, Concord is a full-service engineering, energy consulting, construction management and commissioning firm. With 100 engineers, designers and energy consulting professional across four offices, Concord delivers end-to-end whole facility solutions specializing in services that enhance performance, increase efficiency and reduce downtime for both public and private sector clients. Backed by our technical expertise and wide range of services our commitment to client satisfaction has made us leaders in many regional and international markets.

Concord At-A-Glance

- **9 Million** SF Hospital Infrastructure Improvements
- **Over $1 Billion** MEP/FP Construction Projects as a result of our design
- **Over 750** Energy Audits with Local Government Energy Audit Program
- **16 Million SF** Lighting and HVAC Energy Performance Contracts
- **4 Million SF** Geothermal heating & cooling systems
- **1 Million SF** retro-commissioning services
- Electrical substation design (69kV-500kV)
- Large scale (65-600MW) power plant design and commissioning
- Over 150 MW onsite generation (CHP/DG) systems (15 MW "Class I" renewable projects including digester gas, landfill methane and solar photovoltaic projects
- Over $200 Million in US Federal Energy projects as part of FEMP ESPC Program
- Specialists in negotiation and valuation of long-term electric/gas and thermal contracts.
- Full supply side services to aggregate, bid, and manage third-party supplier contracts for electric and gas
- State of NJ BPU Energy Consultant

Our Services

Commercial Engineering
MEP / FP Engineering

Power Engineering
Energy Master Planning, Geothermal Engineering, CHP

Health Care / Lab
Science & Technology, Higher Education

Building & Infrastructure Commissioning
Commissioning / Retro-Commissioning

Concord Energy Services
Strategic Sourcing Solutions: Electricity, Natural Gas, Fuel Oil & Renewable Energy

Concord Management Services, LLC
Infrastructure & Energy Efficiency Construction

Concord Environmental
Solar, Wind & Landfill Gas

CONCORD ENGINEERING

Certified Geothermal Staff

Michael Fischette, PE, CGD
Chief Executive Officer

Professional Engineer licensed in Delaware, Ohio, Maryland, Massachusetts, New Jersey, New York, Nevada, Pennsylvania, Virginia, Washington, DC, Louisiana

BS, Mechanical Engineering
Rutgers University

Certified GeoXchange Designer (CGD)

John Marchiafava, PE, CGD, CEM
Chief Engineer

Professional Engineer licensed in Pennsylvania, New Jersey, Delaware, Maryland, Mississippi

BS, Mechanical Engineering
Drexel University

Certified GeoXchange Designer (CGD)

Certified Energy Manager (CEM)

Scott Ebling, PE, CGD
Senior Project Manager

Professional Engineer licensed in Pennsylvania,

BS, Mechanical Engineering
Drexel University

Certified GeoXchange Designer (CGD)

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Project Highlights

- Performed Life Cycle Cost Analysis (LCCA) on Varying System Alternatives
- LEED Silver
- Central Geothermal Utilities Plant/Ground Source Heat Pump System: CO2 Emissions Reduction of 642,311 lbs (291 Metric Tons) – Equivalent of Removing 53 Cars from the Road Each Year
- PJM Grid at Carbon Neutral: CO2 Emissions Reduction of 1,104,246 lbs (444 Metric Tons) – Equivalent of Removing 91 Cars from the Road Each Year

Construction Cost

$85 Million

Completion Date

2013

Rutgers University Business School

Piscataway, NJ

Geothermal Plant Engineering Design

Project Highlights

- In addition to geothermal heat pumps the application of water to water heat pumps to produce low temperature hot water for building reheat loads was investigated.
- The water to water heat pumps will extract heat from the chilled water return and utilize it to satisfy the building reheat loads.
- This study also estimated the impact the implementation of geothermal heat pumped and water to water heat pumps can have on the University's CO2 footprint.

Square Feet

10,530,000

Completion Date

2013-2014

Princeton University

Princeton, NJ

Campus-Wide Geothermal Master Plan

Marine Science Magnet High School

Groton, CT

Geothermal Engineering

Project Highlights

- Provided engineering, design & construction administration efforts for the geothermal heating and cooling system
- Utilizing a geothermal heat pump system allowed for CT Clean Energy Rebates with the additional energy savings of the GSHP system

Construction Cost

$16 Million

Completion Date

2011

New Egypt Middle School

New Egypt, NJ

Geothermal Systems for Energy Efficiency

Project Highlights

- Geothermal heating & cooling technology installed in new middle school, which resulted in 30% energy savings over conventional alternatives
- Energy efficiency design included:
  - Lighting and lighting controls
  - Steam to hot water conversion of elementary school heating system
  - Heat recovery
  - Unit ventilator replacement
  - Variable speed drives
  - Automated temperature controls

Construction Cost

$9.55 Million

Square Feet

86,500

Completion Date

1995

Project Highlights

- Design, construction, and commissioning services regarding energy conservation at 7 schools
- Project funded by performance contract with Johnson Controls, Inc. with a guaranteed savings for 10-year period
- Obtained $286,000 Smart Start Buildings Program incentive

Construction Cost

$16 Million

Completion Date

2017

Jackson Township Board of Education

Jackson, NJ

Engineer of Record

Rumson Fair Haven Regional High School

Rumson, NJ

Engineer of Record – System Upgrades

Project Highlights

- Added geothermal heating, air-conditioning, ventilation and air condition system
- Energy Star status achieved – making this one of the oldest renovation projects for educational facilities to attain this award
- Other renovations included electrical system upgrades, fire protection & suppression system improvements and installation of energy-efficient windows

Construction Cost

$14 Million

Square Feet

148,000

Completion Date

2008

Radnor Middle School

Wayne, PA

Engineer of Record

Project Highlights

- LEED Gold certification
- Geothermal heating and cooling via heat pumps; 144 total vertical bores
- Decoupled, dedicated ventilation systems with energy recovery and CO2 controls
- Full building direct digital control for HVAC, security and lighting
- Daylight harvesting and daylight controls

Construction Cost

$41 Million

Square Feet

195,000

Completion Date

2008

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Additional Projects

Letterkenny US Army Depot
Chambersburg, PA
Geothermal System Design

Concord provided the engineering design and was the designer of record for a Geothermal Heat Pump retrofit. Geothermal Heat Pumps and Vertical Closed Loop Geothermal heat exchangers were added to 9 buildings (~120,000 SF). Concord was responsible for detailed design of the ground heat exchanger bore field, internal duct and piping design of heat pumps into the facilities.

Ft. Monmouth US Army Base
Ocean Port, NJ
Base Decentralization & Geothermal Heat Pump Retrofit

Concord performed detailed engineering and design for a base-wide decentralization project, under an ESPC contract. Converted 12 buildings and 800,000 SF from central steam and air-cooled air conditioning to closed loop geothermal heat pumps. Concord was responsible for detailed design of the ground heat exchanger bore field, internal duct and piping design of heat pumps into the facilities.

US Navy/Coast Guard NW Annex Building 41
Chesapeake, VA
Design/Build Geothermal Retrofit

Concord was the design engineer of record for design/build retrofit of an existing 55,000 SF military office complex. The HVAC systems were geothermal heat umps with all new ductwork systems and mechanical piping systems for the condenser water and condensate systems. The condenser water was provided by means of the centralized bore field that was vertically drilled and had 41,850 LF of ground heat exchanger (GHX) capacity and a geothermal system capacity of 200 tons.

Waterford Board of Education
Waterford, CT
Geothermal Heating and Cooling

Concord designed the geothermal heating & cooling systems for three two-story 71,000 SF schools. Each system has 100 wells and provides 215 tons of cooling. At the Oswegatchie School, the bore field was split in two in order to facilitate keeping the existing school fully occupied while the new schools was under construction at the same site. One bore field was located under the parking lot and the second under the playground. Concord coordinated the site logistics to augment this unique design.

Upper Perkiomen High School
East Greenville, PA
Ground Source Heat Pump

Concord was Engineer of Record for the 160,000 SF electric to geothermal retrofit. The project was unique in that is it the first known application where a variable speed centrifugal chiller was directly coupled to a ground source heat exchanger. Additionally, the pool heating and space conditioning was performed by geothermal heat pumps.

Pleasantville School District
Pleasantville, NJ
Decatur Ave. Middle/High School

Concord provided MEPF engineering and design for a new 60,000 SF building. Concord was responsible for the MEPF design of a geothermal water source HVAC system, plumbing systems, electrical distribution systems, energy efficient lighting, fire alarm and sprinkler systems. Concord performed this project through Guenther & Hee Architects for the NJSCC.

Spotswood Board of Education
Spotswood, NJ
District Wide

Concord was the Engineer of Record for all MEPF systems requiring upgrades at all four schools. Concord prepared a Guaranteed Energy Savings Performance Contract package which included geothermal heating and lighting for the entire district. Construction was completed in September, 1996.

East Windsor Regional School District
Hightstown, NJ
East Windsor High School

Concord was the Engineer of Record for a 78,000 SF electric to geothermal retrofit. The project utilized heat recovery, variable speed drives and microprocessor based building controls remote monitored for energy conservation. The project was financed as part of a district wide energy performance contract which also included a conversion to geothermal heating and cooling for the modular classroom that were 6,000 square feet.

West Windsor-Plainsboro School District
West Windsor-Plainsboro, NJ
West Windsor Middle School

Concord was the Engineer of Record for the new 180,000 SF middle school. Concord was responsible for the design of energy conservation mechanical and electrical systems which included closed loop ground source heat pump systems, variable speed pumping, T-8 lamps with solid state ballasts and an energy management and control system.

CONCORD ENGINEERING

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