

Barnard College
Category A Feasibility Study
NYSERDA PON 4614

New York County

Technical Lead: MEP
Geothermal Engineering

Anticipated completion of
study/availability of final
report: November 2021



V1 6/2021

The Site & Beneficiaries

Barnard College is an existing educational campus in the Upper West Side section of Manhattan with 16 buildings, some of which are historic structures. A subset cluster of three buildings, collectively 330,000 square feet, represents approximately 25% of the campus square footage. An existing natural gas-fired mini thermal district serves these three buildings and will be analyzed to explore district-style heat pumps in addition to integrating the other 13 buildings on the campus into the system. The campus has diverse occupancy patterns and thermal load profiles, consisting of classrooms, dormitories, and offices. The analysis will quantify the peak of the composited thermal load and compare it to the sum of the individual peaks in order to assess the load-flattening benefits of aggregating into a district.

Potential Thermal Resources

The primary opportunity anticipated will leverage heat pumps to move heat from one building to another, and supplemental thermal resources, if needed, could include ground-coupled boreholes, air-source heat pumps, and/or water as a thermal resource from sewage and/or dewatering pumping systems by the Metropolitan Transportation Authority at a subway station approximately five blocks away to depress the groundwater table and minimize groundwater infiltration into the subway tunnel.

Potential Configuration

Will explore a central heat pump system utilizing air and ground source for energy. The heat pumps will generate hot and chilled water will be distributed via conveyance pipes to the end-use buildings. Benefits of this configuration include: opportunity to integrate with existing thermal infrastructure and use the heat pumps as the first-call (reserving potential fossil fuel systems as supplement to meet extreme peaks or for systemwide redundancy for resilience); focusing the location where electric infrastructure upgrades are needed to meet the expanded electrification demand to occur at the Thermal Building (as opposed to at the end-use buildings) to minimize disruption to mission-focused activities during construction; and cost containment.