

Contributing to Princeton University's Sustainability Goals



CLIENT PROFILE

Princeton University, a private Ivy League research institution located in Princeton, NJ, is striving to achieve net-zero greenhouse gas emissions by 2046. To support this goal, the university is investing in forward-thinking energy solutions such as ground source heat pump (geo-exchange) systems, existing building energy-efficiency improvements, and on-campus photovoltaic arrays.

PROJECT OVERVIEW

Thermo Systems worked alongside Princeton University to support their campus-wide sustainability initiatives through the energy plant conversion and expansion efforts.

At the heart of these efforts is the TIGER (Thermally Integrated Geo-Exchange Resource) Plant, which features two heat pump chillers, two thermal energy storage tanks, and thousands of geo-exchange bores to deliver low-carbon heating and cooling to their main campus. The TIGER Plant is interconnected with the existing West Energy Plant, which introduced one heat pump chiller and a geo-exchange system. Additionally, the TIGER CUB Plant, which features two heat pump chillers, two thermal energy storage tanks, and hundreds of geo-exchange bores, was constructed to support the development of their Lake Campus.

Thermo Systems provided the Plant Control Systems (PCS) to provide the Balance of Plant (BOP) control and monitoring functionality. The PCS utilized Rockwell Automation hardware platforms and fully integrated with Princeton's existing AVEVA SCADA platform to enable seamless mode transitions and real-time data monitoring, which is key to tracking progress toward the university's net-zero targets and supporting long-term operational efficiency.

SCOPE OF SUPPLY

- Plant Control System at each Energy Plant that are fully integrated with the existing AVEVA SCADA platform
- Allen-Bradley ControlLogix PLCs
- Allen-Bradley Flex5000 IO Modules
- Turnkey Control System Installation
- Instrumentation and Control Valves

CHALLENGES & SOLUTIONS

The project required careful planning and technical precision to meet Princeton's expectations for scalability, cybersecurity, and performance. Thermo Systems developed the Plant Control Systems for the three interconnected energy plants to allow for seamless transitions between operating modes and coordinated plant performance. Collaboration with university stakeholders was essential throughout the project lifecycle, with strong communication helping to navigate complexity and align the project teams with Princeton's sustainability goals.

RESULTS

The fully integrated Plant Control Systems paired with the geo-exchange system significantly enhanced energy efficiency and reduced carbon emissions across campus. Real-time monitoring now supports sustainability tracking, while the robust automation platform enables long-term system performance and adaptability. Thermo Systems' role in this milestone project highlights its commitment to delivering innovative, future-ready energy solutions that support institutional climate goals.