Energy is Repurposed with the Heat Pump + Geothermal Wells

By connecting the heating and cooling systems, the heat pump can pull heat from the chilled water and transfer it into the hot water system or store it in the bore fields for later use.

120°F
THE NUMBER THAT MAKES EVERYTHING POSSIBLE

Transitioning from steam to a low-temperature (120°F) hot water distribution system is key to future system diversity, flexibility, modernization, and carbon reductions. The lower temperature threshold allows Carleton to engage at a district-energy scale such technologies as ground source heating and cooling, condensing boilers, solar thermal systems, and future heating system innovations.

New System has Positive Returns

When compared to the cost of maintaining and operating the existing steam system, the cost of the new hot water system—including capital, operating, and utility costs—will break even in 19-20 years with continued savings into the future.

Electrification Incorporates Renewable Energy Sources

The heat pump lowers central plant natural gas consumption by 75% and shifts more of that load to electricity, which opens many more options for on-site renewables like wind and solar photovoltaics. It also takes advantage of the rapidly greening public electric grid, and creates a more diverse and resilient energy system with reduced carbon emissions.

Energy Consumption and Carbon Emissions Reduced

The geothermal hot water system is projected to reduce central plant carbon emissions by 15 percent by 2021. The Utility Master Plan keeps Carleton on its desired trajectory toward being carbon-neutral by 2050 through actual changes to the campus infrastructure in lieu of purchased carbon credits.

KEY OBJECTIVES
1. Replace the aging and outdated central plant facilities, campus steam distribution network, and controls
2. Provide for future loads as envisioned in the Facilities Master Plan
3. Reduce our operating costs and carbon emissions significantly and permanently
4. Integrate into academics and create a living lab on campus

A HISTORY OF SUSTAINABILITY

Carleton has a long-standing commitment to environmental stewardship beginning with the founding of Cowling Arboretum in the 1920s. A series of innovative projects and a conscientious planning process led to establishing Carleton as a leader in 21st energy technologies.

For more information: go.carleton.edu/sustainability

Contacts:
Fred Rogers
Vice President and Treasurer
fredrogers@carleton.edu
Martha M. Larson
Manager of Campus Energy and Sustainability
mlarson@carleton.edu