

Sustainable Infrastructure Program

Next Steps to Carbon Neutrality

Tuesday, March 23, 2021



Oberlin College's Call For Action

- **Antiquated Steam System**

The system is inefficient and past its useful life

Increasing emergency shutdown trend

- **Expanding Cooling Needs**

Changing school calendar

Summer Programming

- **Carbon Neutrality by 2025**

Steam system is the biggest contributor to carbon emissions

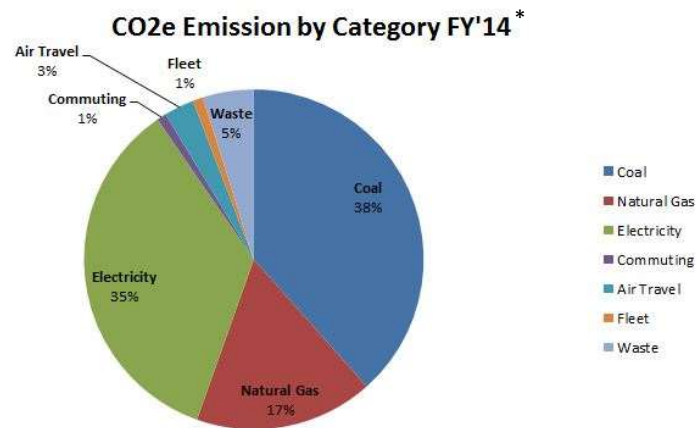
- **Broader Campus Utility Needs**

Fiber, Electrical Infrastructure, Fire Protection

- **Implementable and Financeable**

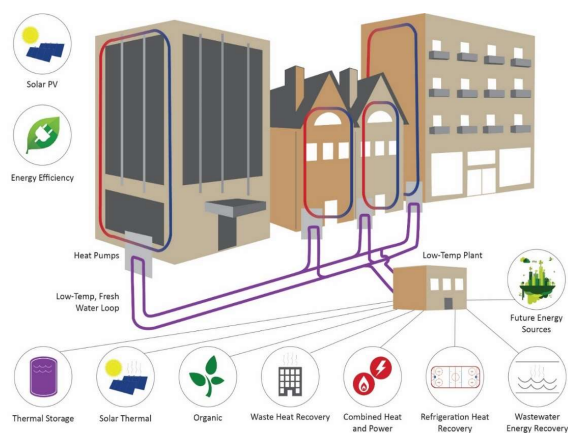
Business and organizational structure solution

Heating system is the biggest impact to our carbon profile!



* FY14 is the baseline year for when this recent resource planning work commenced

What is District Energy and How Does it serve Oberlin College?



Existing Steam System is Aged

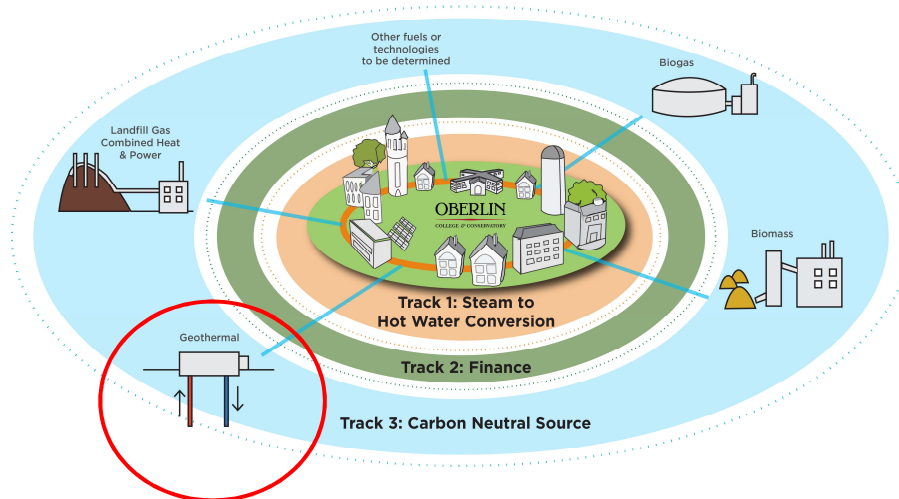


Oberlin's Sustainable Infrastructure Program Goals & Priorities

- Operational Cost Savings
- Carbon Reduction
- Resilient and Reliable Systems
- Educational Benefit
- Community Benefit
- Timescale
- Sustainably Financed

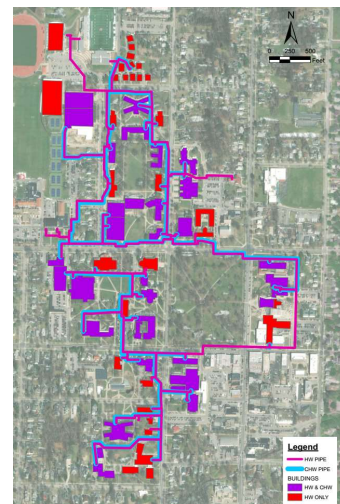


Three-Track Approach



Track 1: Steam-to-Hot Water Conversion & Chilled Water Growth

- Modernization of ~55 buildings
 - Hot water conversion
- Equipment replacement/upgrades
 - Expansion of cooling to 11 additional buildings
 - Conversion of the central plant to simultaneous delivery of steam and HW
 - Holistic Approach
- Modernize electrical infrastructure, IT Campus Fiber Network, & Fire Protection within the building



Track 2: Smart & Practical Financial Approach

- Significant and permanent operational cost savings.
- Addresses over \$18 M of deferred maintenance throughout our campus buildings.
- Better financial investment compared to “doing nothing.”
- Financial and Legal Advisory team analysis recommended the college owned, financed, and controlled model.



Track 3: Carbon-Free Source Analysis - Alternatives

- Aquifer Thermal Energy Storage
- Biofuel
- Biogas
- Biomass
- Geothermal
- Variable Refrigerant Flow (VRF)
- Waste heat capture from a local power plant
- Solar PV with electric resistance heat and thermal storage
- Wind with electric resistance heat and thermal storage



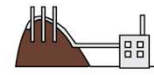
BIOGAS



GEOTHERMAL



BIOMASS



LANDFILL GAS COMBINED
HEAT & POWER

Achieving Carbon Neutrality at Oberlin College

Moves Oberlin College
within 11%
of the **Carbon Neutral** by
2025 goal

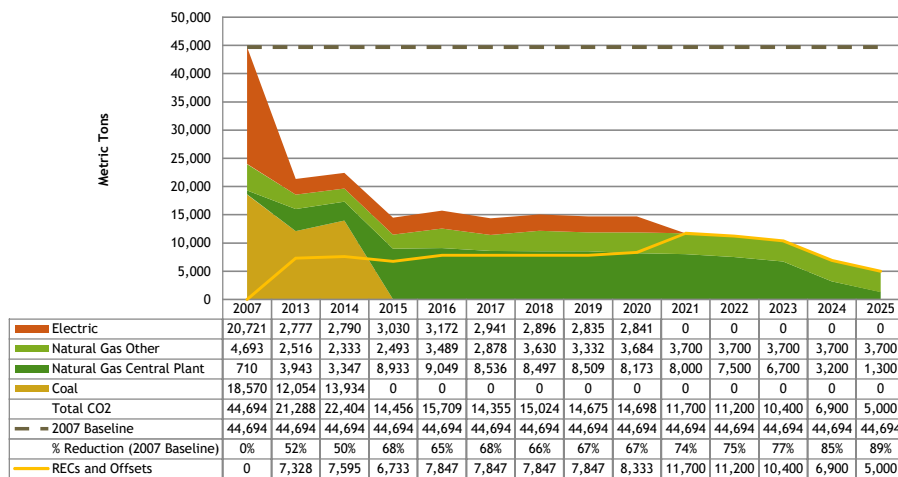
Reducing annual
Water use by over
5 million gallons/year

Reducing annual
Sewer discharge by
over **4 million**
gallons/year

Improve
campus energy efficiency
by **30%**

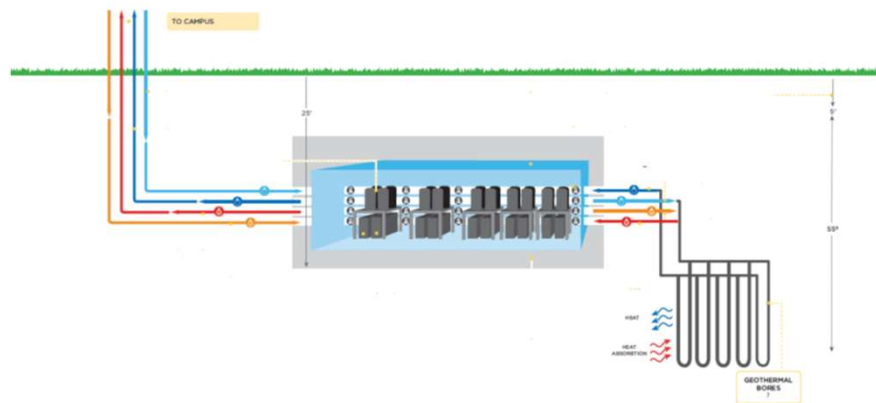
Providing **carbon neutral**
district energy option to
local businesses, nonprofits,
& community

Carbon Dioxide Emissions (As Metric Tons CO₂)



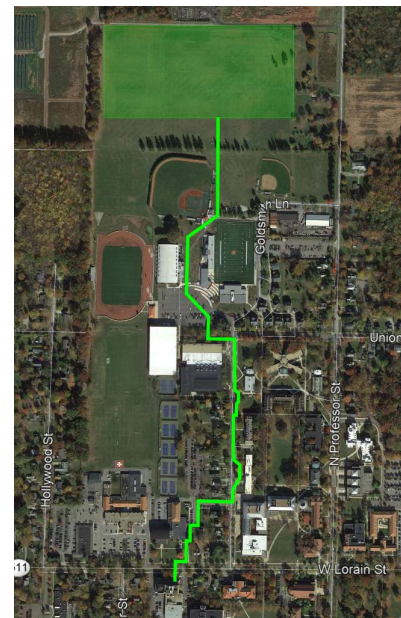
Note:
2021-2025 Emissions and RECs/Offsets are projected.
Geothermal plant operational in 2024 and 2025.
OMLPS to 100% renewables in 2021.

Introduction to Geothermal Energy

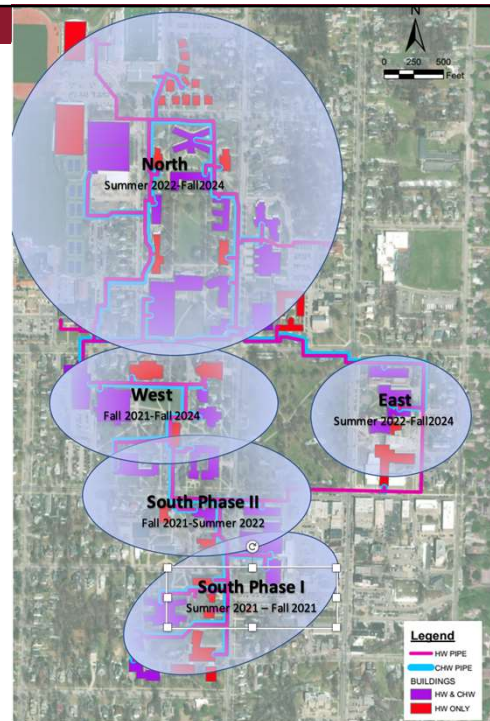


Geothermal Well Field

- Practice field disruption during construction
- Well field potentially trending cold
- Electrical infrastructure enhancement required
- Campus-wide geothermal vs. building-based geothermal



4-Year Construction Plan Phased Approach



Sustainable Infrastructure Timeline and Phases

- Let's start with South Phase 1

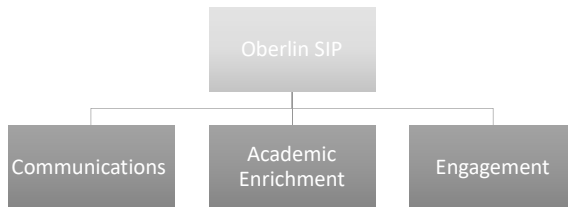
Biggest issues with steam system are there!

- 4 Year Construction Window

Using these years to our advantage

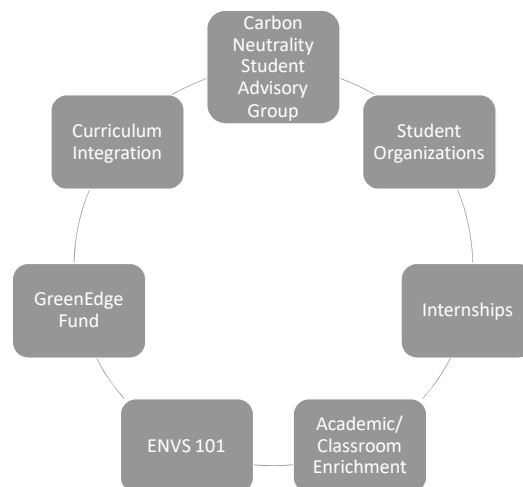
- Data input for the Source Design (Demand-Side Management Approach)

Communications and Outreach



- Program Website is active & informative: www.carbonneutraloc.com
- Program branding is underway
- Outreach internships to be posted by the end of March

Opportunities for Student Engagement



Questions?

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