Implementing A2Zero

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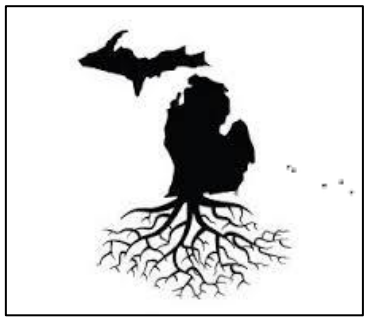
Introduction



Foundational Presidential Initiatives

VISION 2034
ANN ARBOR | DEARBORN | FLINT

Vision 2034 Framework

VISION 2034

Look to Michigan

By 2034, we will be the defining public university, boldly exemplified by our innovation and service to the common good. We will leverage our interdisciplinarity and excellence at scale to educate learners, advance society, and make groundbreaking discoveries to impact the greatest challenges facing humanity.

Our Excellence At Scale: **Impact Areas**

Over the next 10 years, we will harness our unparalleled excellence and vast intellectual resources to make dramatic, focused, and demonstrable advancements in service to humanity.

- Life-Changing Education
- Human Health and Well-Being
- Democracy, Civic and Global Engagement
- Climate Action, Sustainability, and Environmental Justice

Investing In Our Vision: **Commitments**

To fully realize our vision as the defining public university, we will make strategic investments in core commitments designed to advance our mission and boldly affirm the critical role of higher education in society for generations to come.

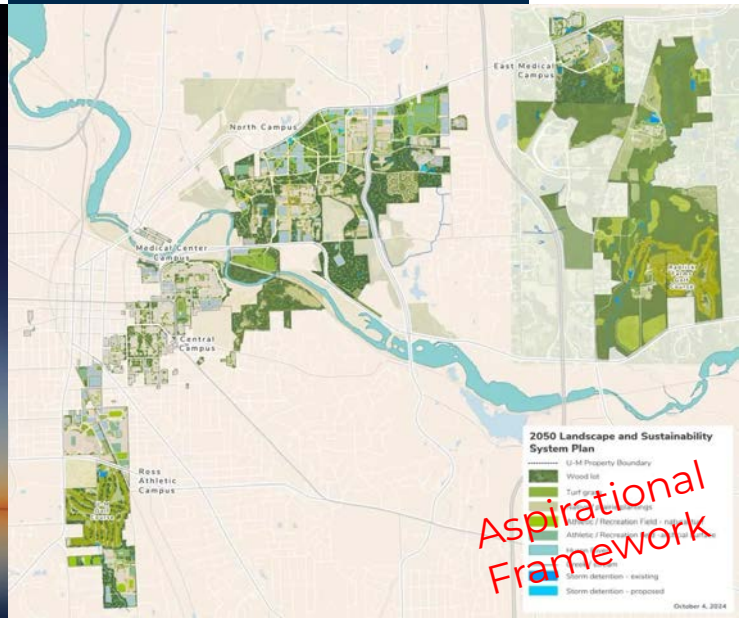
- Purpose-Driven Education and Student Experience
- Research, Scholarship, Discovery, and Artificial Intelligence
- Community Health Support, Prevention, and Performance
- Arts and Creative Expression
- Diversity, Equity, and Inclusion
- Faculty and Staff Engagement and Experience
- Innovation, Partnerships, and Economic Development

Foundation: **Foundational Supports**

We will implement cross-campus strategies and plans designed to build momentum, unlock resources, and provide critical infrastructure to enable our vision.

- Campus Plan 2050
- Operational and Financial Strategy
- Development Campaign
- Communications Strategy
- Technological Infrastructure Plan

CAMPUS PLAN 2050
UNIVERSITY OF MICHIGAN



Executive Sustainability Leadership

Shalanda Baker

Vice Provost for Sustainability & Climate Action

Shana Weber

Associate Vice President for Campus Sustainability

Tony Denton

Senior Vice President, Chief Environmental, Social, and Governance Officer, U-M Health

Activation at All Scales

Current Goals: Sustainability & Climate Action

On-campus Solar Panels | North Campus

Carbon Neutrality

- **2040:** eliminate direct, on-campus greenhouse gas emissions (Scope 1).
- **2025:** net zero emissions from purchased power (Scope 2).
- **2025:** establish goals for indirect emission sources (Scope 3).
- **2050:** achieve a net-zero endowment (Scope 3).

Ann Arbor Campus Sustainability

Current goals to be updated in 2025:

- Waste reduction
- Sustainable food
- Resilient Grounds

Defining Greenhouse Gas Emissions

Scope 1

Emissions from sources the university owns and operates directly.

Scope 2

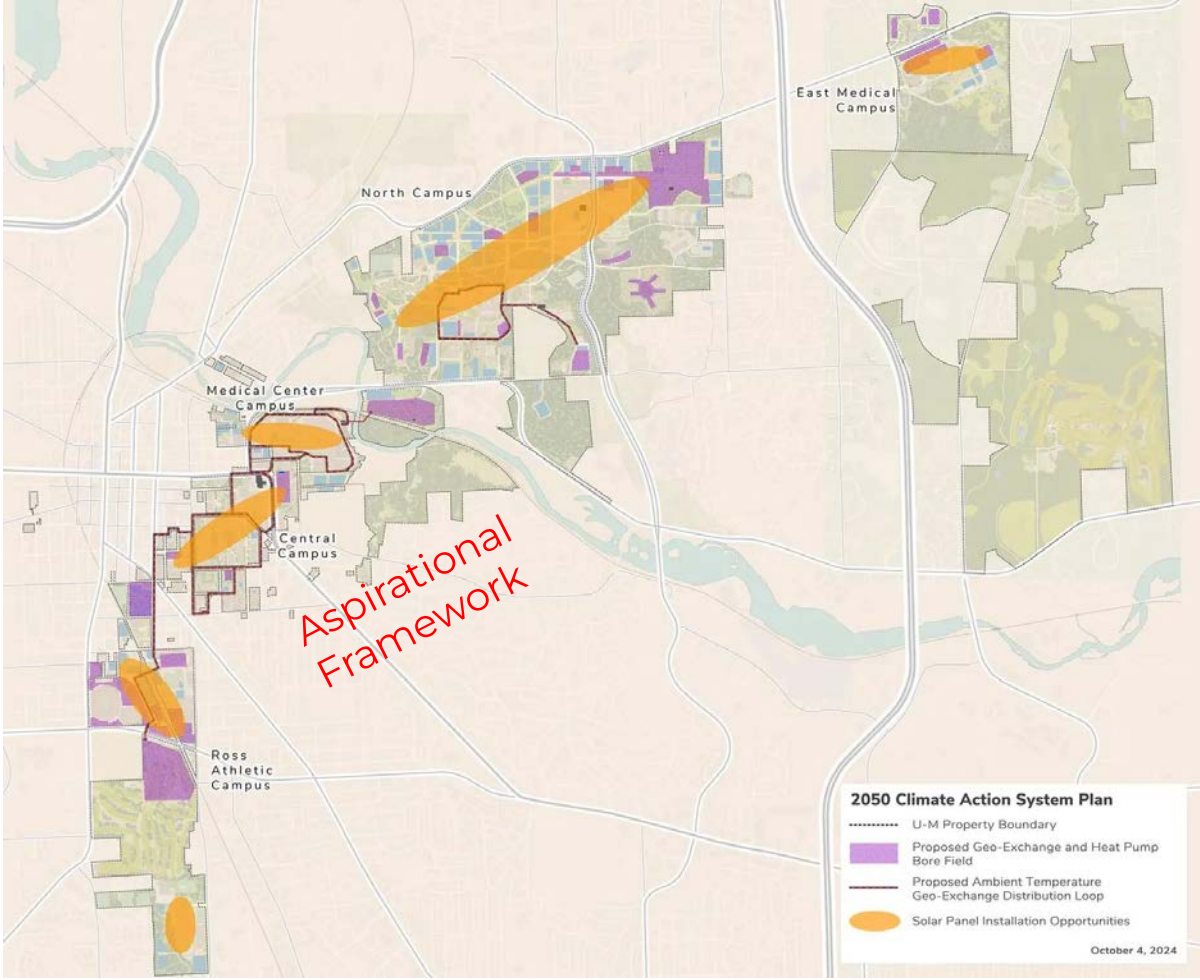
Emissions from purchased electricity.

Scope 3

Indirect emissions from U-M activities, but from sources not owned or controlled by the university.

CAMPUS PLAN 2050
UNIVERSITY OF MICHIGAN

Bringing **Bold** Ideas to *Life*



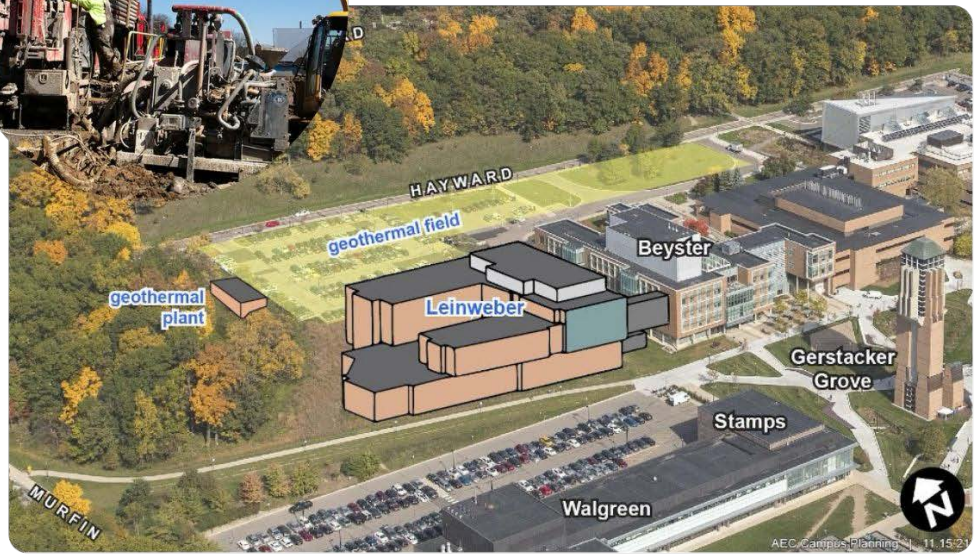
Campus-as-lab

Top Left: U-M campus Farm
Top Right: Matthaei Botanical Gardens
Middle and Bottom Right: Energy Transition Projects
Geo-exchange Installation on U-M's North Campus
Solar PV Tour on U-M's North Campus

Showcase Facilities

Princeton Example

Hayward Geo Project - Site Plan



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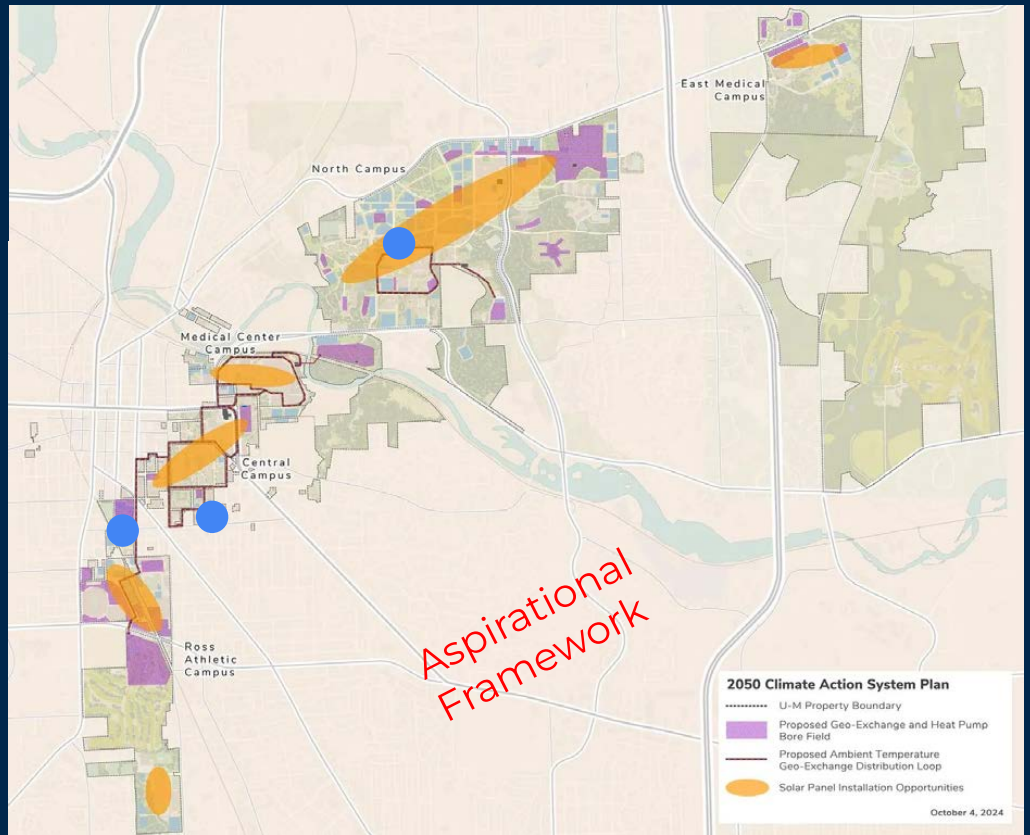
Campus Geo-Exchange Projects

- Leinweber Building/Hayward Geo Facility
- Central Campus Residential Development
- Ginsberg Building

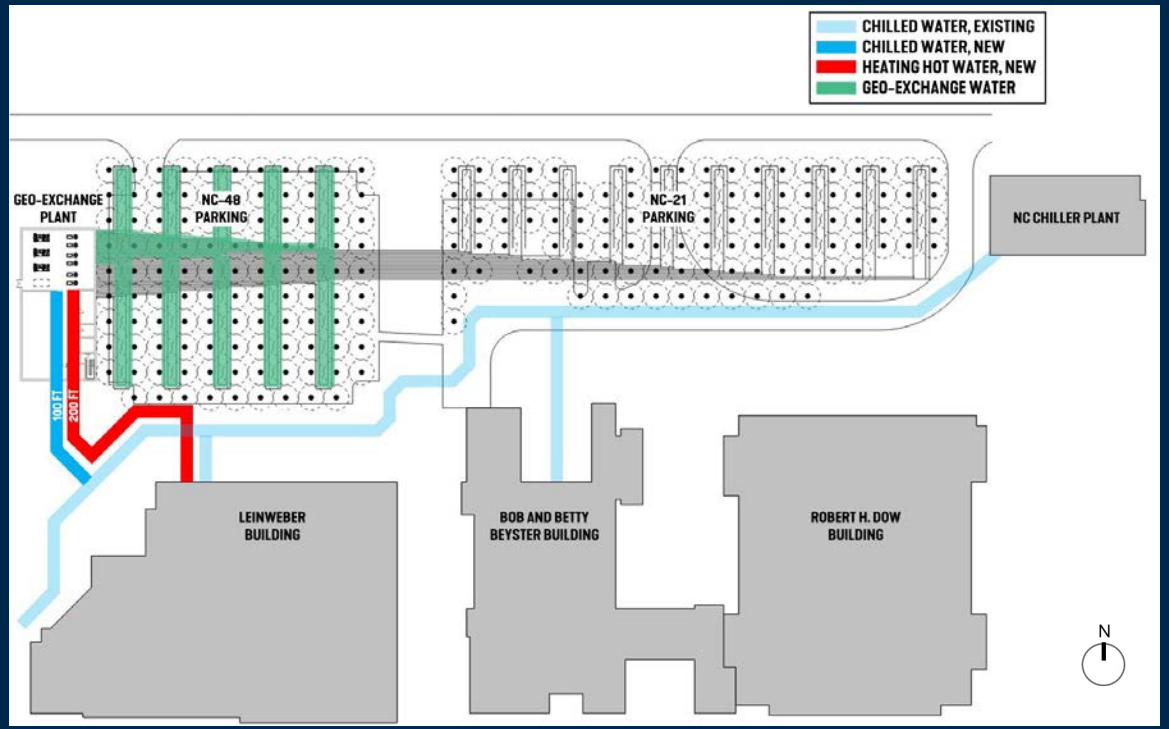


Leinweber Building/Hayward Geo Facility

- 2200 Hayward St.
- 163,000 GSF
- LEED Gold

Leinweber Building/Hayward Geo Facility

Configuration	Vertical Closed Loop
Borehole Quantity	99
Borehole Pipe Size	1-1/2 Inch
Borehole Active Depth	700 Feet (Typical for 8)
Borehole Total Depth	705 Feet (Typical for 8)
Borehole Separation	20 Feet on Center
Number of Circuits	2
Soil Thermal Conductivity	1.2 BTU/(H*Ft*°F)
Peak Heating	1,920 MBh
Peak Cooling	3,900 MBh
Heating EFLH	1,200 Hours
Cooling EFLH	1,300 Hours

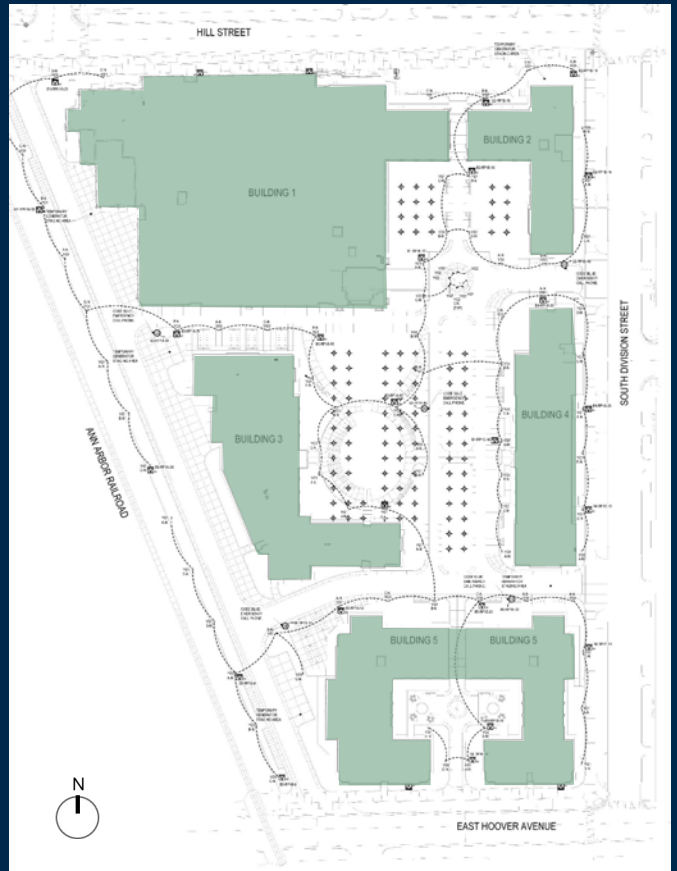


Central Campus Residential Development

- S. Division & Hoover
- 680,000 GSF
- LEED Platinum

Central Campus Residential Development

Configuration	Vertical Closed Loop
Borehole Quantity	110
Borehole Pipe Size	6 Inch
Borehole Active Depth	800 Feet
Borehole Total Depth	808 Feet
Borehole Separation	20 Feet on Center
Number of Circuits	11
Soil Thermal Conductivity	1.6 BTU/(H*Ft*°F)
Peak Heating	2,191 MBh
Peak Cooling	3,685 MBh
Heating EFLH	2,979 Hours
Cooling EFLH	1,178 Hours



Edward and Rosalie Ginsberg Building

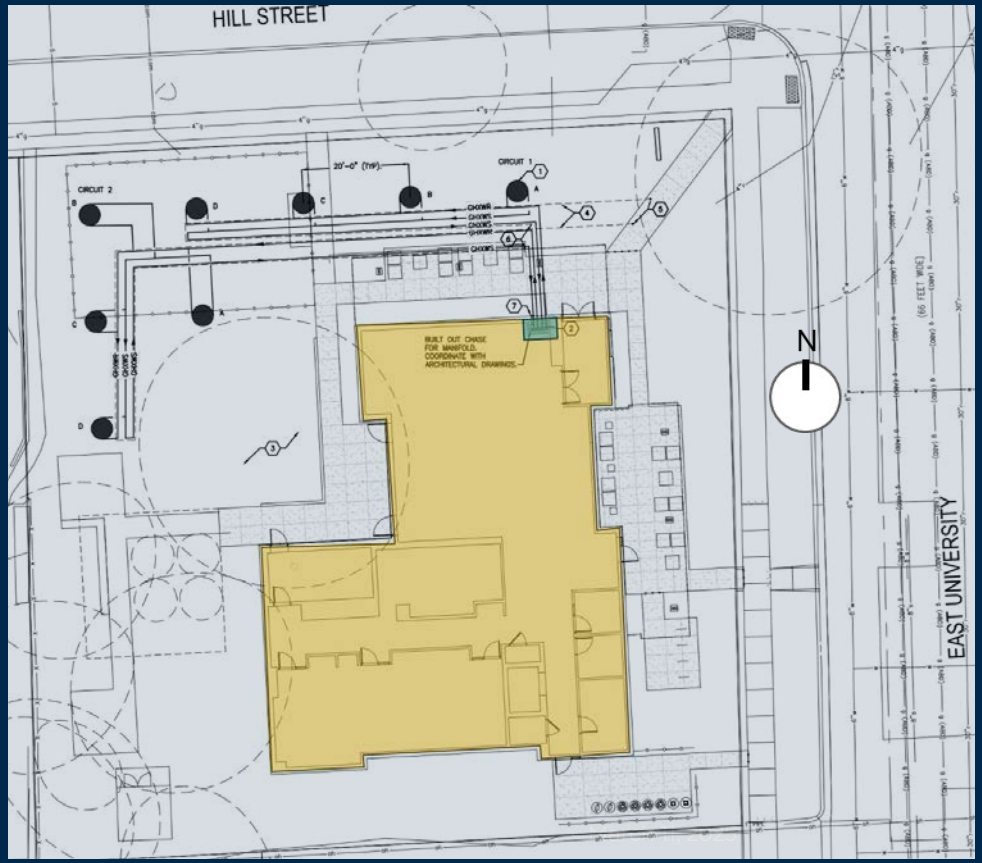
1024 Hill St.

11,000 GSF

LEED Gold

Edward and Rosalie Ginsberg Building

Configuration	Vertical Closed Loop
Borehole Quantity	8
Borehole Pipe Size	1-1/4 Inch
Borehole Active Depth	535 Feet (Typical for 8)
Borehole Total Depth	540 Feet (Typical for 8)
Borehole Separation	20 Feet on Center
Number of Circuits	2
Soil Thermal Conductivity	1.4 BTU/(H*Ft*°F)
Peak Heating	127 MBh
Peak Cooling	287 MBh
Heating EFLH	776 Hours
Cooling EFLH	640 Hours

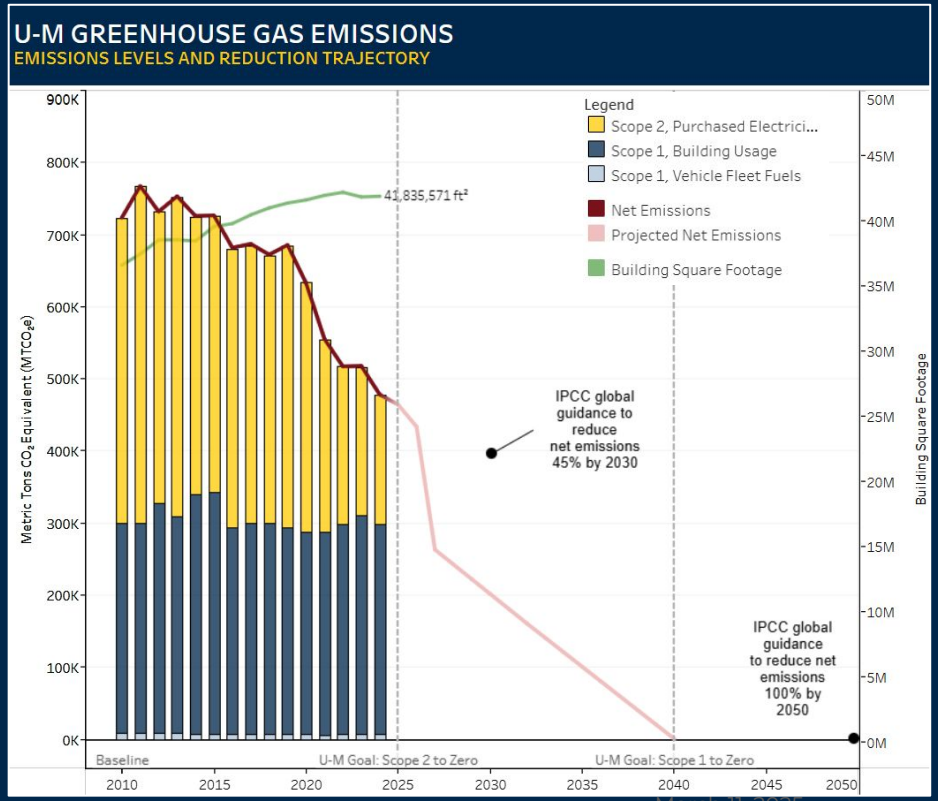


Construction Standards

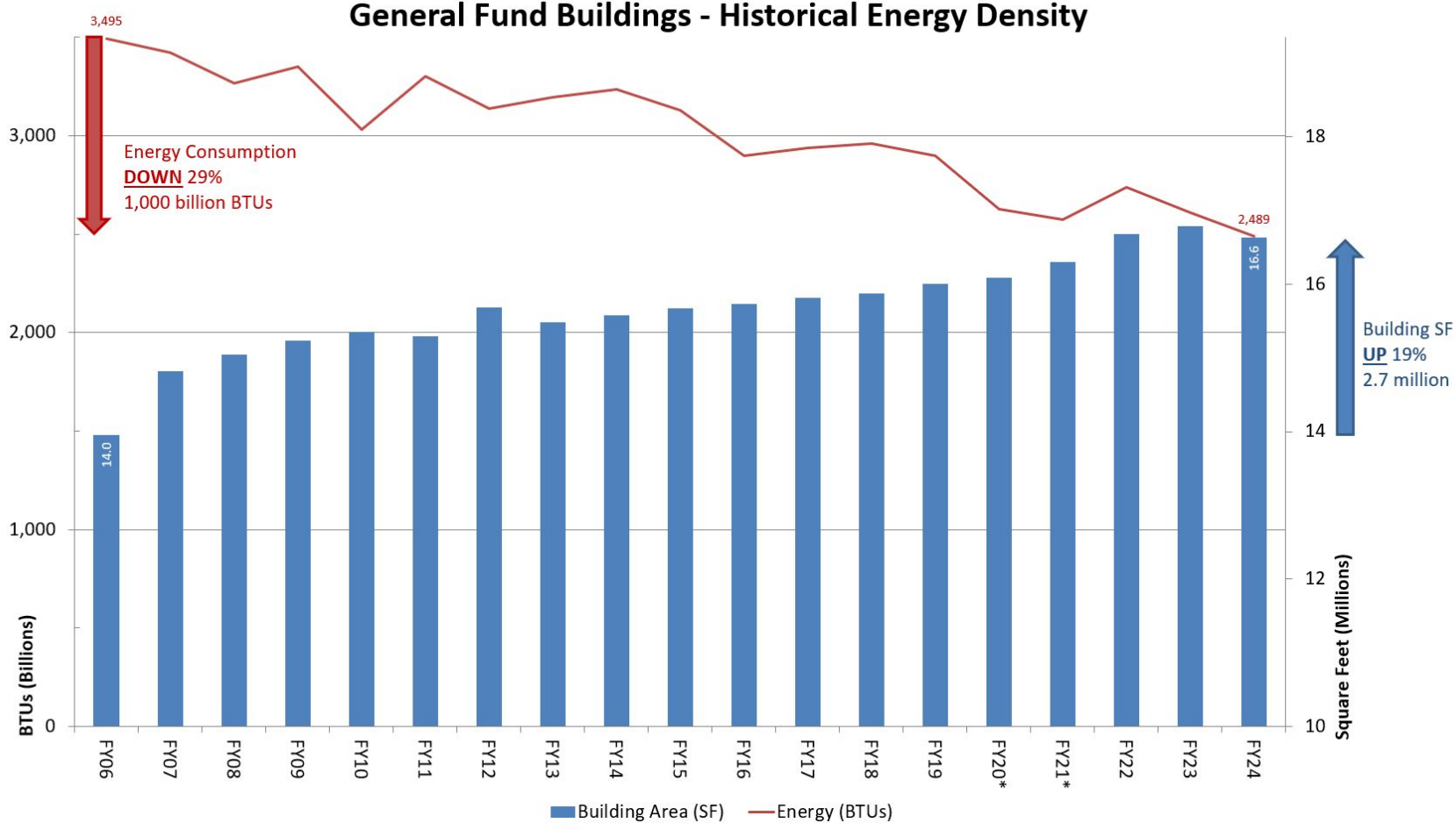
- **LEED Silver Certification** (Minimum)
- **Exceed ASHRAE 90.1** baseline requirements by **20%** for New Construction projects; **15%** Renovations
- Use **20% less water** than EPA 1992 baseline
- Comply with project-specific **Building Maximum Emissions Target** (est. by U-M)
- Employ **Mandatory Energy Conservation Measures (ECMs)** (est. by U-M); includes maximum window-to-wall ratios, VAV direct digital control, and new building envelope thermal scanning during construction.
    - ECMs evaluated on set payback periods

Energy Management

Why focus on existing buildings?



General Fund Buildings - Historical Energy Density



Energy Management

- **Goal: reduce energy consumption and greenhouse gas emissions in buildings**
- Energy Conservation Measures (ECMs)
- Existing Building Commissioning
  - Operational improvements
  - Building tune-ups
  - Room-side re-commissioning

Energy Management

- Collaborations with many departments to support energy work:
  - Architecture, Engineering & Construction
  - Maintenance Services
  - Utilities
  - Schools & colleges

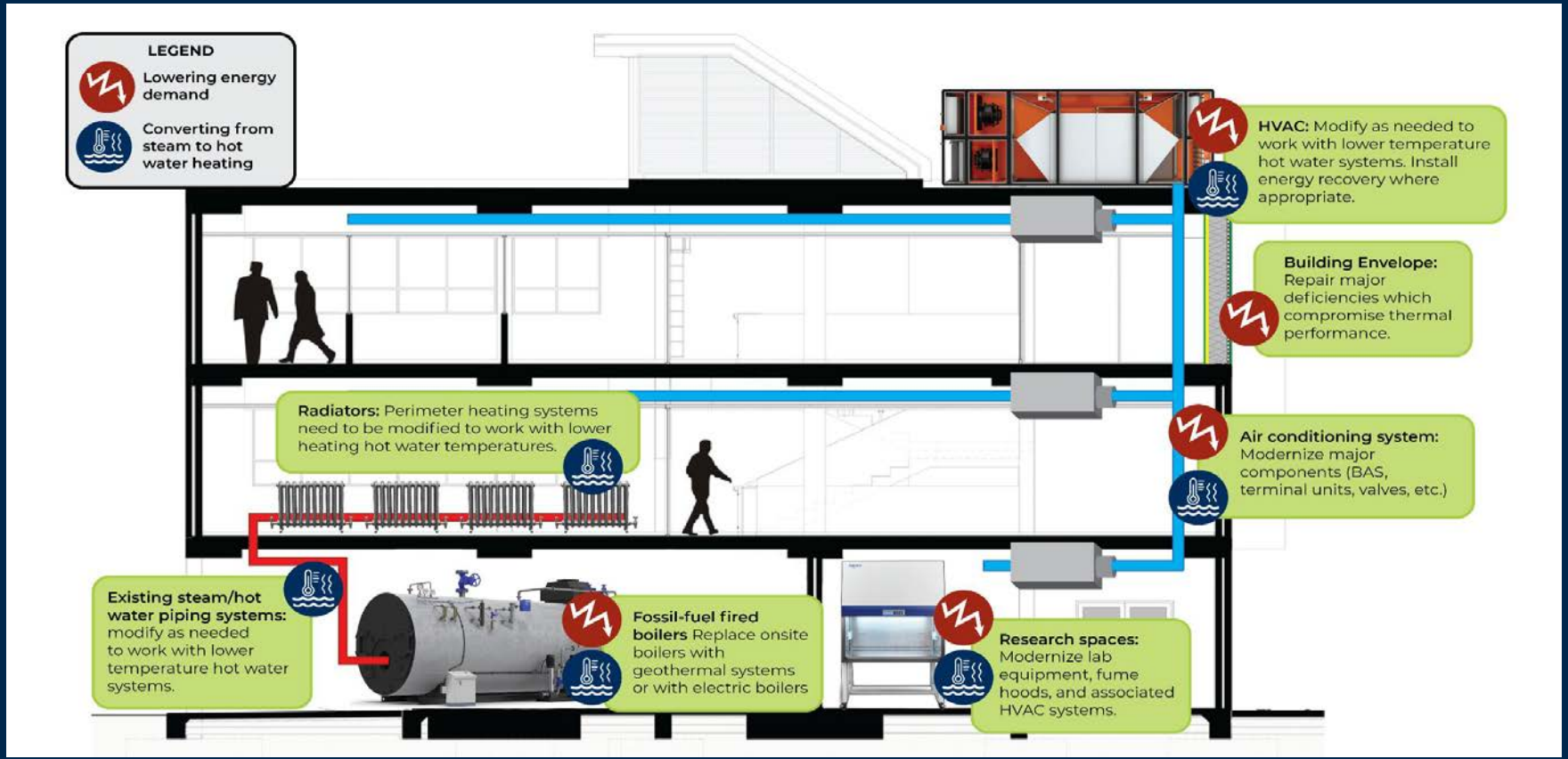
- Work began in early 1990s with first energy engineer positions

- Historical focus on General Fund buildings, now expanding throughout campus

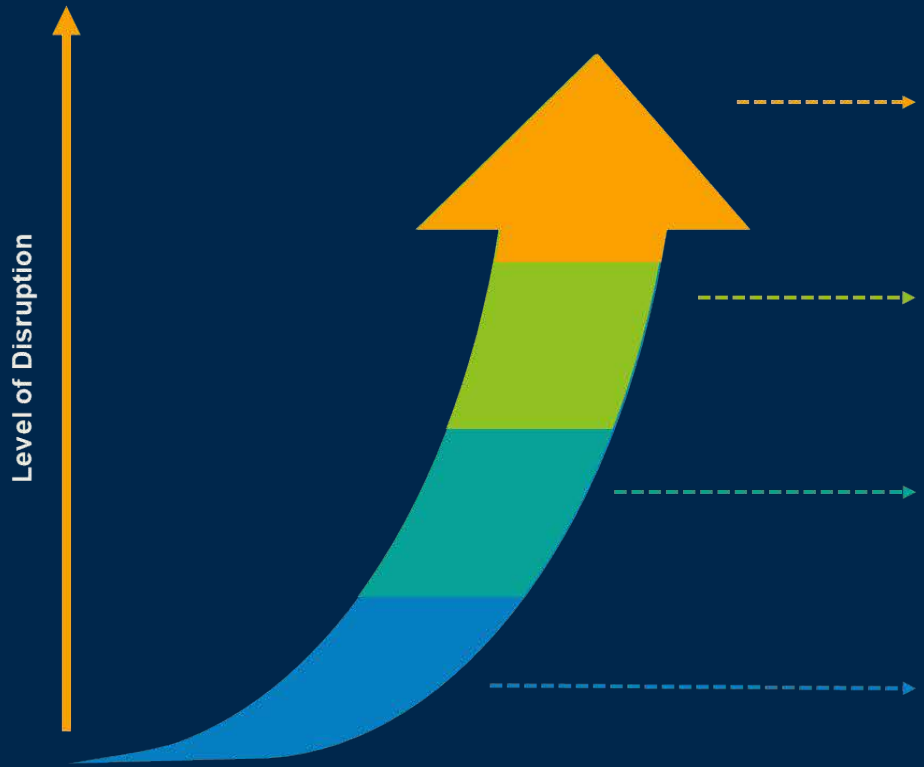
Energy Management

https://ocs.umich.edu/resources/sustainability-data/individual-building/

Energy Management



Energy Management



Building Emptying

A full building needs to be empty for work to proceed. Examples include major envelope overhauls and new HVAC system installations.

Major Disruptions

Multiple areas of the building need to be vacated for weeks to a few months. Examples include perimeter heating retrofits.

Noticeable Disruptions

Projects may cause minor disruptions that last more than a day, or they are noisy enough to be noticeable throughout the building. Examples include bigger envelope upgrades and hot water coil replacements.

Small Disruptions

Projects can either work around the academic calendar, or disruptions are minimal to roughly a single day in each room. Examples are BAS upgrades and some small envelope repairs

Questions?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Thank you!