OCTOBER 24, 2024

COALITION
ENERGY SUSTAINABILITY PROGRAM

Sustainable Solutions: Addressing Deferred Maintenance on Your Campus

SOLAR FINANCING SOLUTIONS

ecosystem

FIRST AMERICAN™
AN RBC/CITY NATIONAL COMPANY

AGENDA

- Setting the Stage
- Sustainable Deferred Maintenance Approach
- Case Study: Brown University
- Opportunities for Your Campus & ESP Support

Polling Question #1

What is the biggest challenge your institution faces regarding deferred maintenance?

Setting the Stage

Common Challenges

- ✓ Funding Constraints
- ✓ Aging Infrastructure
- ✓ Resource Allocation
- ✓ Complexity of Upgrades
- ✓ Backlog of Maintenance

Polling Question #2

When does your institution typically address deferred maintenance issues?

Deferred maintenance & asset renewal is not just a cost, it’s also an opportunity.

Deferred Maintenance Need

Added Value

- OPEX savings
- GHG reduction
- Resiliency
- Comfort
- Ease of O&M

Adopt the Right Process

1. Start with a deferred maintenance need/project
2. Take a holistic look at other outcomes / energy systems around
    a. Resiliency, OPEX, GHG emissions, comfort, disruption.
3. Identify 1-2 alternatives that add value
4. Compare using the right tools:
    a. Life-Cycle Cost analysis
    b. Choosing By Advantages decision making matrix

Choosing by Advantages Decision Matrix

Factors	Weight	Base Project	Alternative
Project Description		Scope #1	Scope #2
Life-Cycle Cost	X%	Focus on **comparative advantage** provided by each project. Give score (out of 5) for each factor.	
GHG Emissions	X%		
Comfort gains	X%		
Ease of O&M	X%		
Disruption	X%		
Resiliency	X%		
	100%	**Weighted average**	**Weighted average**

Brown University

Case Study

BROWN UNIVERSITY

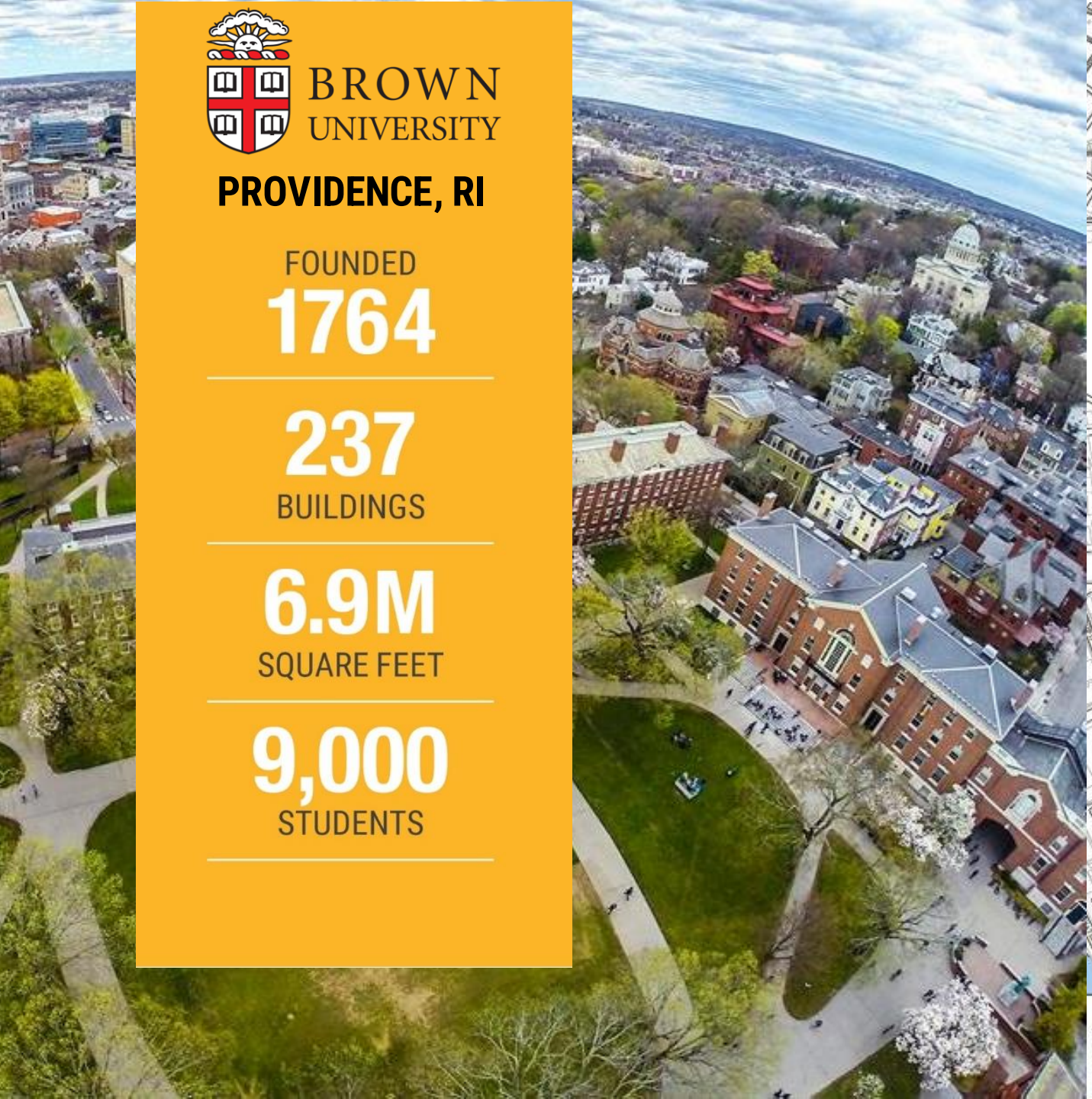
PROVIDENCE, RI

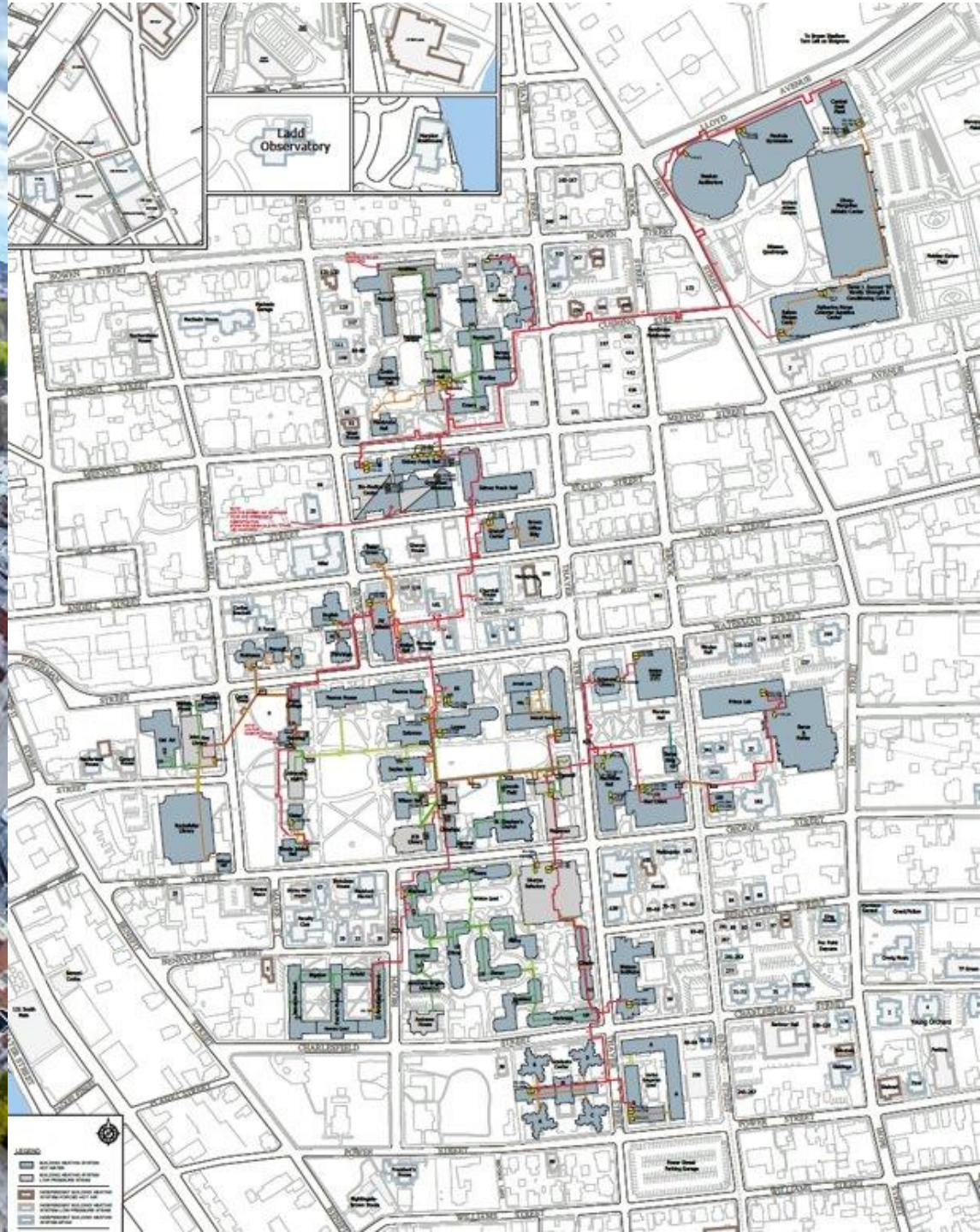
FOUNDED
1764

237
BUILDINGS

6.9M
SQUARE FEET

9,000
STUDENTS

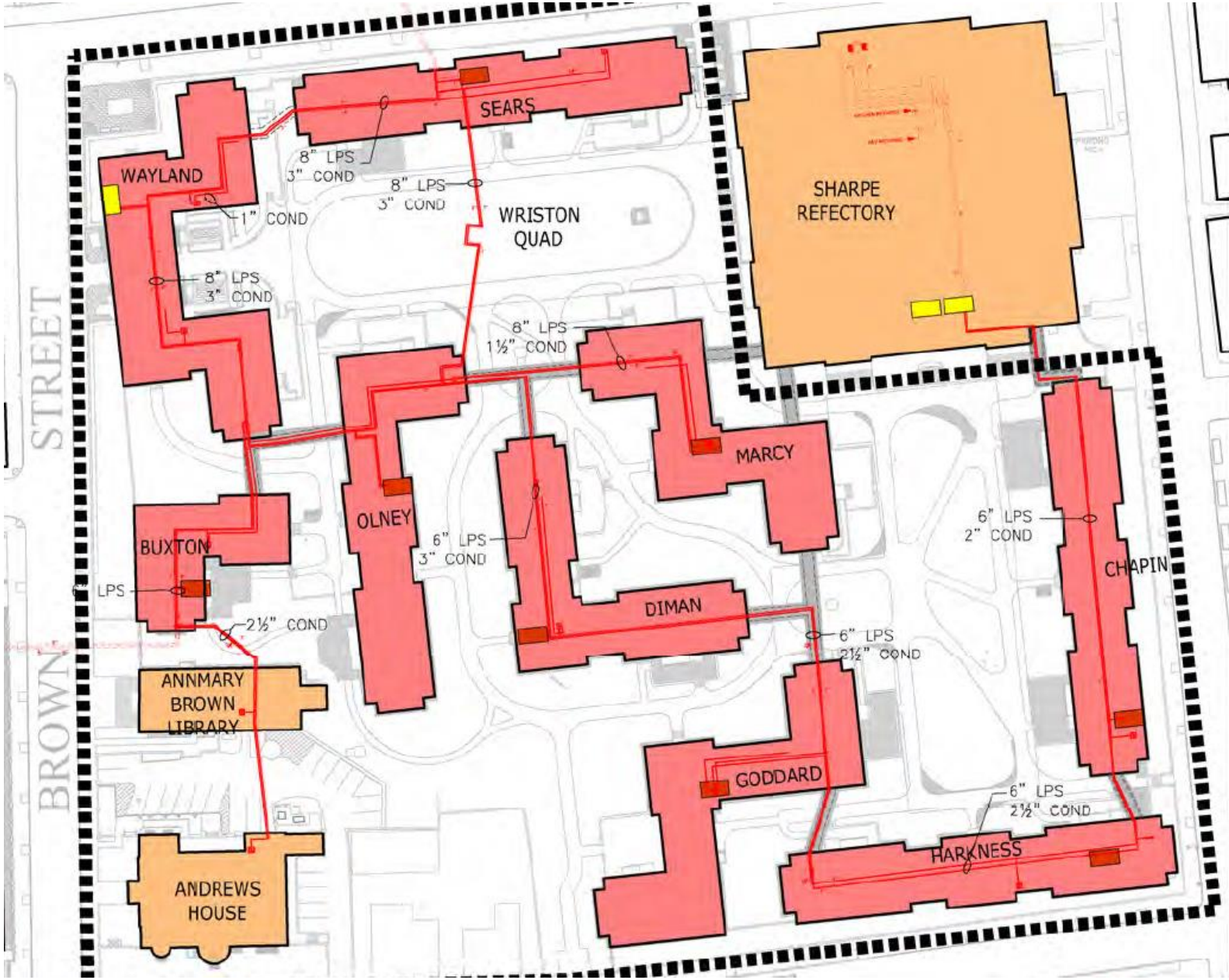


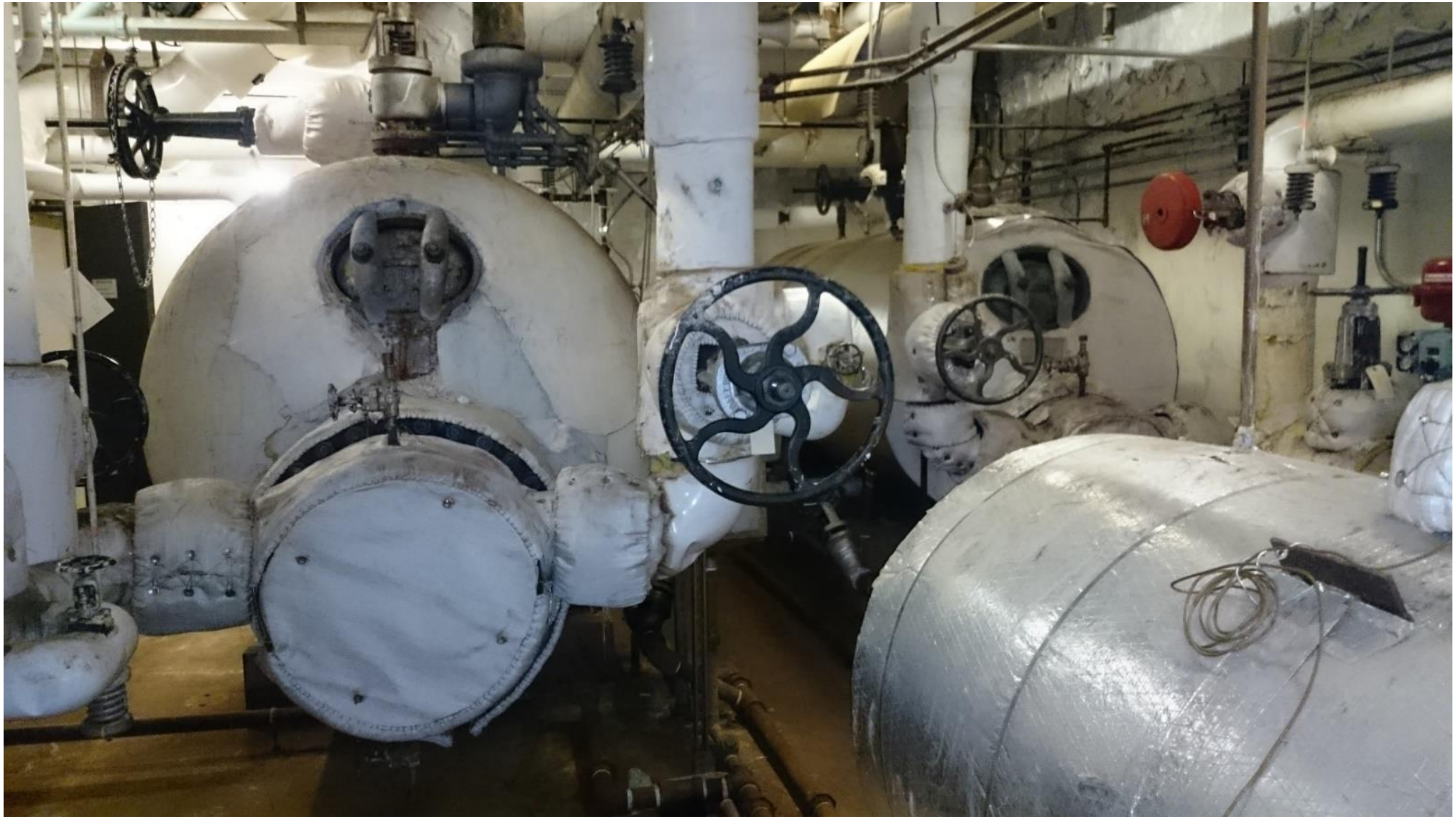


Dormitory Quad

Initial Conditions

- ✓ 2 low pressure secondary steam loops
- ✓ Buildings already on hot water
- ✓ Heat exchangers end of useful life
- ✓ Similar needs on other secondary loops throughout campus

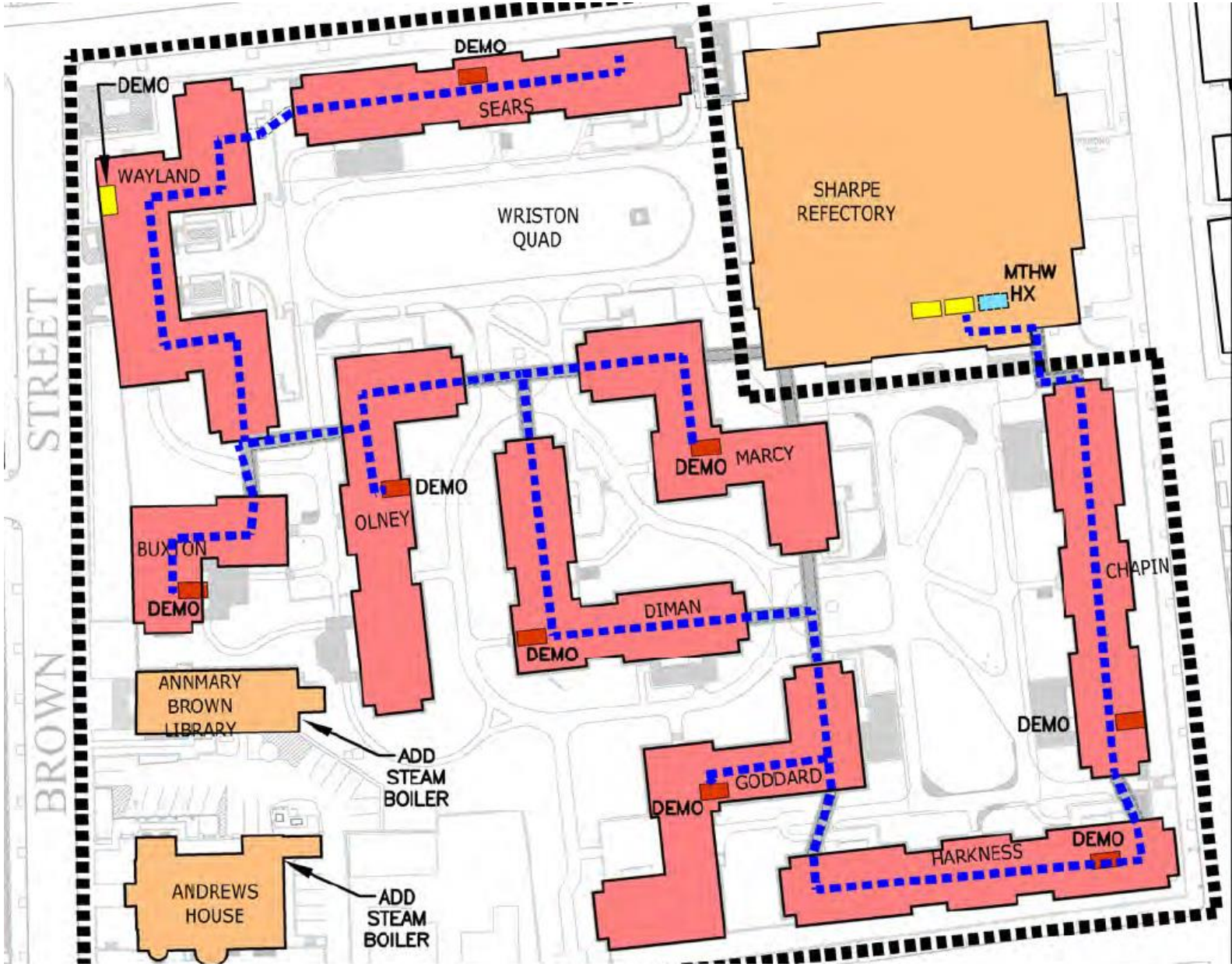




Dormitory Quad

Base Project

- ✓ New hot water secondary distribution
- ✓ $4M budget



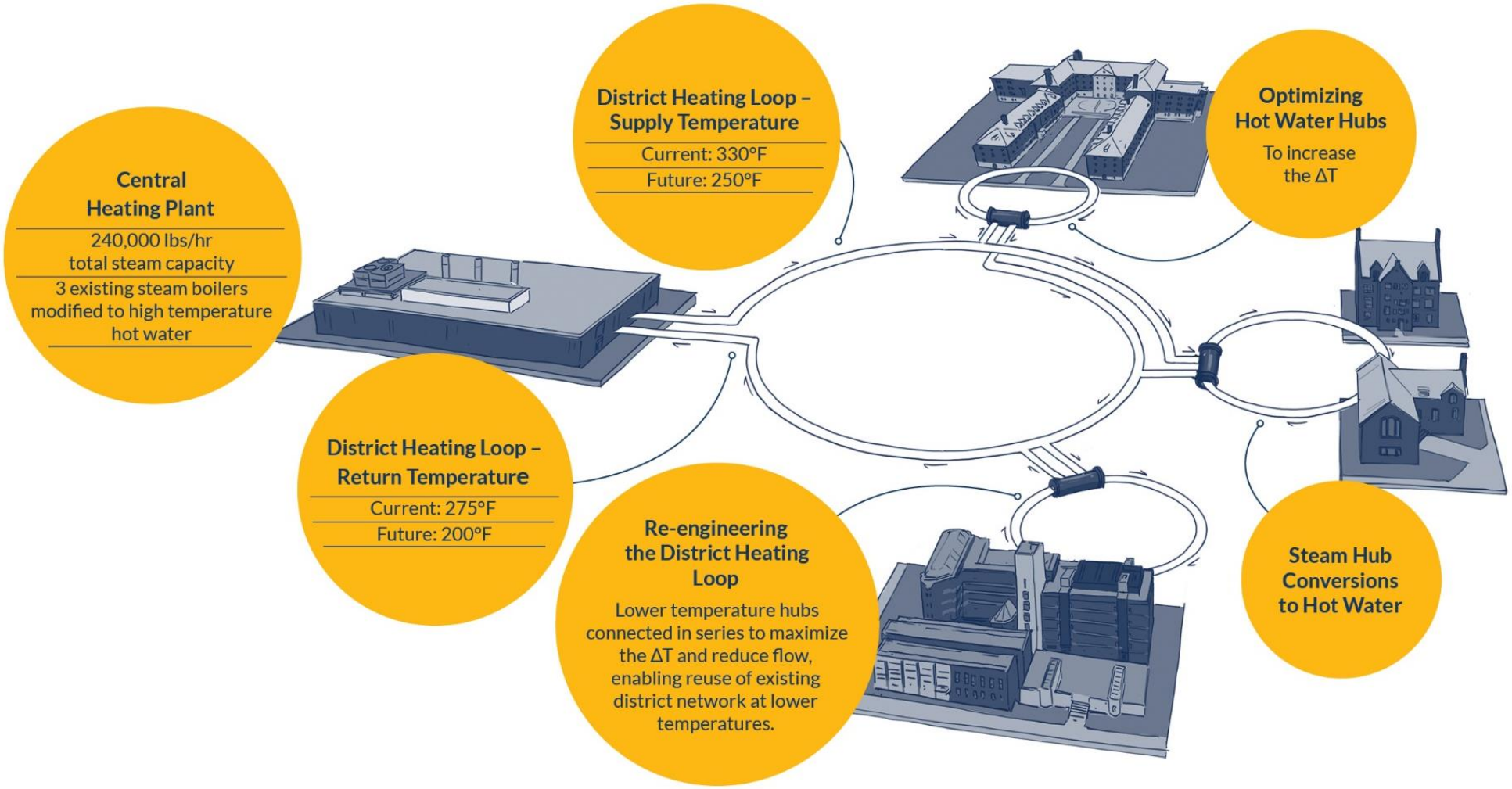
Holistic look at other adjacent energy systems

- ✓ Central heating plant: lots of inefficiencies
- ✓ Campus-wide district heating loop: lots of inefficiencies
- ✓ Total deferred maintenance budget: $17M (funded) with even more DM needs (unfunded)

Holistic look at other needs / desired outcomes

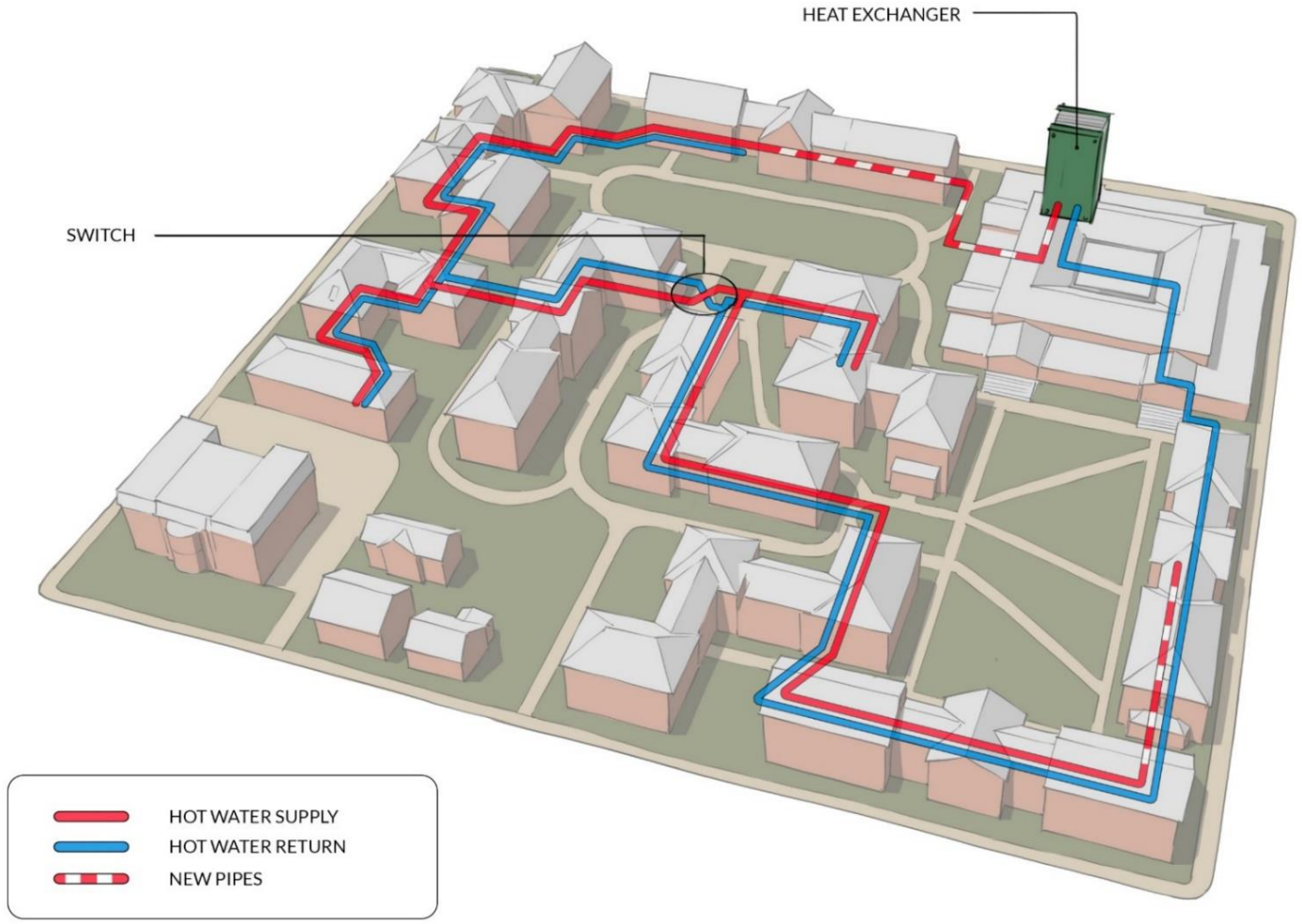
Stakeholders	Need / Desired Outcome	Foregone benefits
Plant manager	Improve ease of O&M at central heating plant	
VP Facilities	Reduce energy costs	Potential savings estimated at $1M/yr
Dir Sustainability	Reduce GHG emissions: 42% reduction target (about half way there)	

Deferred Maintenance Need → Opportunity



Key Innovations to Reduce Costs

- ✓ Validated condition of existing piping
- ✓ Mix of installing new and reusing existing piping
- ✓ This residential quad only: reduced cost from $4M to $2.5M



CBA Example: Brown University (RI)

Factors	Weight	Base Project	Alternative
Project Description		Piping / heat exchangers replacement	Holistic upgrade of district heating system
CAPEX		$17M	$25M
Energy Savings		-	$1M/yr savings
Subsidies		$0	$1M
Life-Cycle Cost / ROI	60%	4	5
Disruption	10%	3	4
Ease of O&M	10%	3	4
GHG Reduction	20%	2	5
Total	**100%**	**3.4**	**4.8**

CBA Example: Vassar College (NY)

Factors	Weight	Base Project	Alternative
Project Description		One-for-one chiller replacements	Heat Recovery Chiller
CAPEX	20%	4	3
OPEX Savings	30%	3	5
Ease of Building O&M	10%	5	3
Ease of Plant O&M	15%	3	5
GHG Reduction	25%	2	5
Total	**100%**	**3.2**	**4.4**

CBA Example: Adelphi University (NY)

Factors	Weight	Base Project	Alternative
Project Description		Replace: lab fume hoods valves + exhaust air strobic fans	Convert system to VAV + heat recovery between exhaust and fresh air intake
CAPEX	40%	4	3
OPEX Reduction	30%	3	5
GHG Reduction	10%	2	5
Comfort & Lab Safety	20%	4	5
Total	**100%**	**3.5**	**4.2**

CBA Example: DePauw University (IN)

Factors	Weight	Base Project	Alternative
Project Description		Repair steam system (heat exchangers, steam traps, piping, boilers)	Steam to hot water conversion
CAPEX	40%	4	3
OPEX	20%	3	5
Disruption	10%	3	3
Ease of O&M	10%	3	4
Enable future decarb.	10%	1	5
Comfort & Safety	10%	3	5
Total	**100%**	**3.2**	**3.9**

Other recent examples in universities/colleges

Factors	Base Project	Alternative
Project Description	Replace chillers like for like	Install new chillers + thermal storage
CAPEX		
Inflation Reduction Act subsidy		Because of thermal storage
OPEX Savings		
GHG Reduction		

Other recent examples in universities/colleges

Factors	Base Project	Alternative
Project Description	Replace window AC units + Replace peripheral heating	Reuse existing hydronic network, install new heat pumps in each room for simultaneous heating/cooling
CAPEX		
Subsidies		Help pay for increased CAPEX
OPEX Savings		More efficient heating/cooling
Ease of O&M	Two systems	One system
GHG Reduction		Offsets boilers gas consumption

Energy Sustainability Program

Support & Funding Options

ESP Support

How our team can help

- ✓ **Support your team with:**
  - ✓ *Strategic review of your deferred maintenance / capital renewal needs*
  - ✓ *Adoption of the right processes and tools*
  - ✓ *Obtaining alignment with stakeholders*
  - ✓ *Implementation and financing of added value DM projects*

Polling Question #3

How do you plan to fund your deferred maintenance projects over the next 5 years?

Funding Options

First American Education Finance

First American is committed to helping our clients progress toward a carbon neutral/low-carbon campus.

Common Projects

- Deferred Maintenance
- Energy Efficiency
- Renewable Energy
- Clean Transportation

Customized Structures*

- Enhanced Terms
- Leases and Loans
- PPAs and ESAs

Independent Capital

- Attractive Alternative to ESCO Financing
- Vendor & Tech Agnostic
- Support Sustainability Plan

**All transactions are subject to credit approval. Eligibility for a particular service is subject to final determination by First American Equipment Finance. Some restrictions may apply.*

Program Resources

For Further Questions on Next Steps

Program Web Page:

https://www.thecoalition.us/energy-sustainability-program

Program Contact Information:

Financing-related questions:

Chad Wiedenhofer

First American Education Finance

Chad.Wiedenhofer@FAEF.com

Project-related questions:

JP Drouin

Ecosystem

jpdrouinbouffard@ecosystem.ca

Scan this QR code for the ESP web page


THANK YOU
Questions?

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