

SAME PROBLEMS.
HIGHER STAKES.
BETTER SOLUTIONS.



NEHES

New England Healthcare Engineers' Society



**BETTER
THINKING**



**INNOVATIVE
PROGRESS**



**OPERATIONAL
RESILIENCE**



**PRACTICAL
SUSTAINABILITY**

PRACTICAL SUSTAINABILITY, POWERED BY INNOVATION

JOIN US OCTOBER 4-7, 2026 | FOXWOODS RESORT | NEHES FALL CONFERENCE



FROM STEAM TO GREEN

**A BUILDING-BY-
BUILDING APPROACH
TO SAVE MONEY AND
DECARBONIZE**

October 5, 2026

Introductions



Graham Smith
PE, CEM, CDP
CMTA



Katie Polum
EIT
CMTA



Chris
Longchamps
CEM
MGH

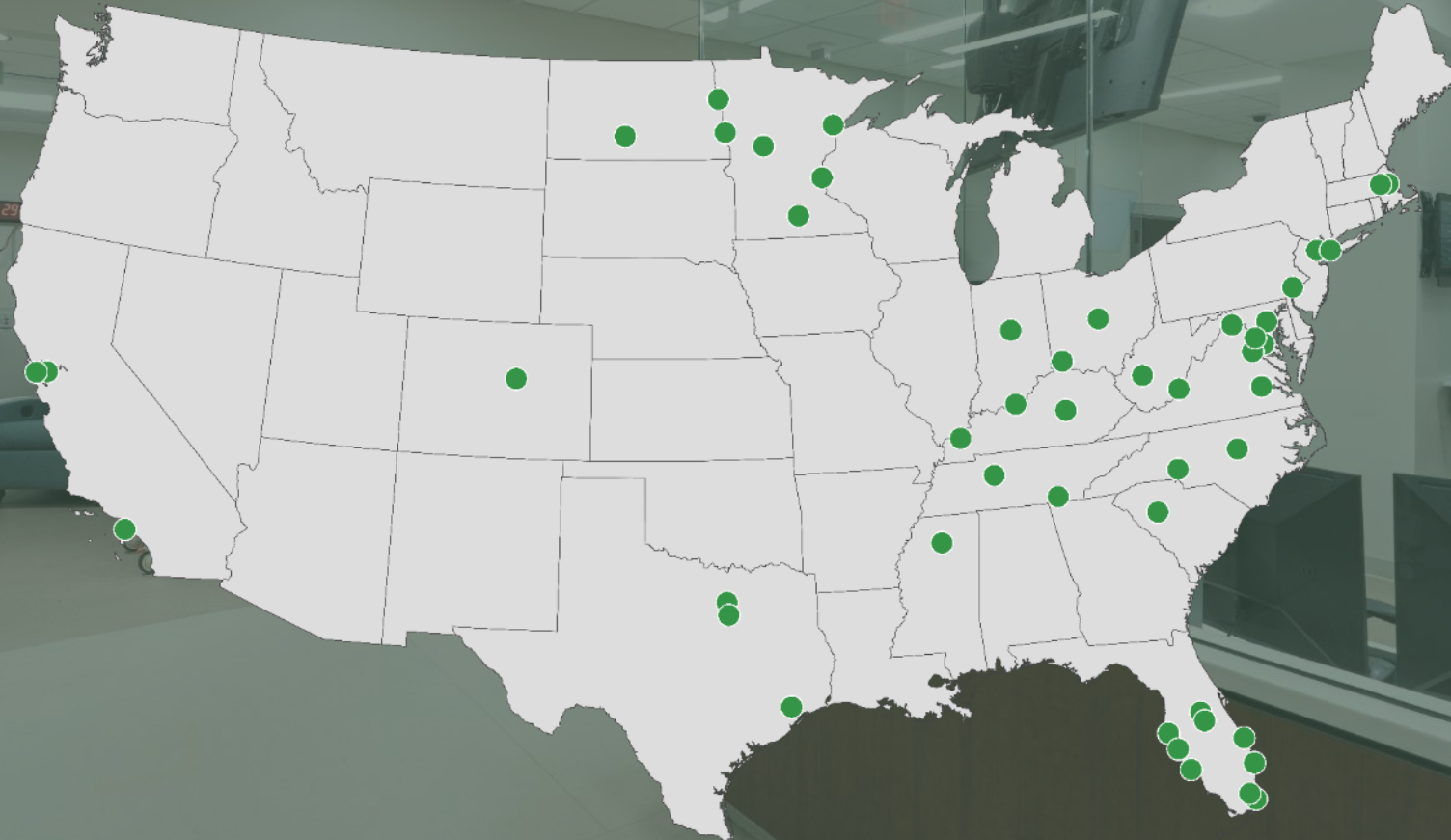


Brendan Giza-Sisson
PE
Eversource



CMTA
A LEGENCE Company

By the Numbers



1250+

Employees

50

Offices Nationwide

401

Professional Engineers

56

Years of Service

CMTA's Expertise

MEP Engineering

Zero Energy / Carbon Engineering

Renewable Energy & Sustainability

Energy Modeling

Commissioning

Technology / Security Infrastructure Design

Construction Administration

Performance Contracting

Energy as a Service (EaaS)



MGB/MGH

Mass General, is a founding member of Mass General Brigham, is a teaching hospital of Harvard Medical School. We provide advanced medical care based on innovative research and clinical trials. Roughly 4.1 million square foot main campus. Founded in 1811.



Eversource **at a Glance**



3

STATES

Largest energy company
in New England



4.6M

CUSTOMERS

Servicing electric and
natural gas



10K

EMPLOYEES

Across all three states



~\$725M

INVESTMENT

For energy efficiency
annually for 2025



#1

IN THE NATION

#1 Energy Efficiency
Provider in the Nation,
ACEEE and Ceres

**STEWARD
OF ENERGY
EFFICIENCY FUNDS**

Eversource works collaboratively with other electric and natural gas utilities and energy efficiency service providers under the umbrella of these statewide brands:



01

Impact

Yawkey HR Chiller Project Performance and Incentives

Project Summary

Simple Payback	Electrical Impact (projected)	Steam Reduction (projected)	CO ₂ Reduction (Metric Tons)
14.8 → 6.4 yrs	-34%	87%	2,000

57% faster payback with incentives

Capacity Constraints

Grid Level



Credit: ISONE <https://www.iso-ne.com/markets-operations/system-forecast-status/seasonal-system-outlook>

Circuit Level

- ✓ Conduct an Electrical Assessment
- ✓ In this case, the building's electric infrastructure could handle the increased electric load. LOOK FOR THOSE OPPORTUNITIES!

An aerial photograph of a city, likely New Haven, showing a dense urban area with a river. A large hospital complex, including several interconnected buildings and parking lots, is highlighted with a thick black outline and a light blue/white fill. The surrounding city features various other buildings, streets, and green spaces.

The Stakes

- **BERDO Compliance**
 - **zero carbon emissions by 2050**
- **Resiliency**
- **Minimize impacts on patient care and hospital operations**
- **Make “Financial Sense”**

Cambridge, MA

Museum of
Science

MGH
Main
Campus

TD Garden

State
Street

Boston, MA



Energy in Healthcare

- **~8.5% of U.S. carbon emissions** from healthcare
- **24/7 operations** drive high energy demand
- **Energy-intensive** systems include:
HVAC, medical equipment, sterilization, refrigeration, laboratories, and advanced technology



Energy Conservation and Decarbonization

➤ Building Emissions Reduction and Disclosure Ordinance (BERDO)

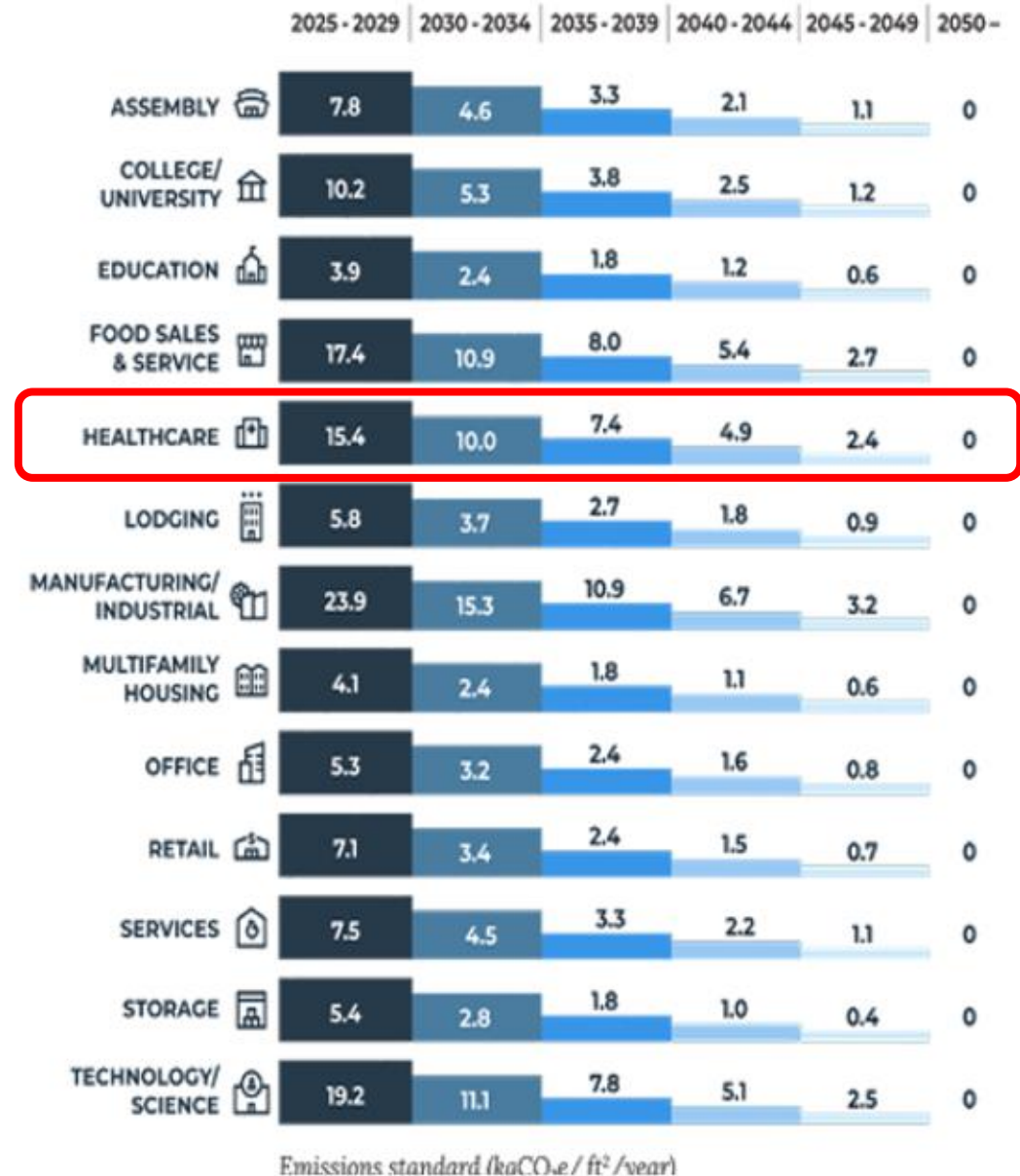
➤ Goal: **zero** emissions by **2050**.

➤ MGH Strategic Energy Master Plan

➤ Reduced consumption **25% in 5 years**

➤ Est. 2008

EMISSION STANDARDS BY YEAR

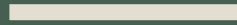


MGB/MGH Energy Sources

- Support **two new renewable energy facilities** partnered with Mass General Brigham, Harvard, MIT, Power Options, and Apex Clean Energy
- Procures **~1.3 million MWh** of renewable electricity annually
- District steam service provided by the Kendall Cogeneration Station (Cambridge)



Problem Statement

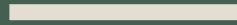


The Problem: How do I Reduce my Emissions
towards Zero and Conserve Energy?

Learning Goals from this Presentation

- Realize the benefits of working with incentive programs
- Identifying the steps for successful project completion
- Maximize your opportunity when you have it

Site Information



An aerial photograph of a city, likely Boston, showing a river (the Charles River) and a dense urban area. A large, semi-transparent circular area highlights a specific construction site in the city center. The site is outlined with a red dashed line and is currently a flat, light-colored area, indicating it is under construction. Surrounding the site are various city buildings, including some taller skyscrapers and many smaller, older structures. A green park area is visible to the left of the construction site, near the river. The overall scene is a mix of urban development and natural elements like the river and trees.

MGH needs a building opportunity for decarbonization project.

- Mechanical Room space
- Electrical Service Capacity
- Concurrent cooling and heating loads

*Construction of
New Ragon
Buildings*

MGB selects Yawkey Building as pilot for decarbonization project.

Yawkey:

- Outpatient
- Est. 2004
- ~750,000 SF

- ✓ Access to mechanical systems
- ✓ Available space for equipment
- ✓ Accessible electrical systems
- ✓ Available electrical capacity

Project Goals

- ☐ 80% steam reduction
- ☐ Reasonable Payback Period
- ☐ No major shutdown;
patients unaffected

Yawkey:

- Outpatient
- Est. 2004
- ~750,000 SF

Project Constraints

Project Constraints

1. Equipment Footprint
2. Electrical Service Capacity
3. 190 °F HW Supply Temp
4. Summer heating
5. Winter cooling
6. Misc. hospital loads

Yawkey:

- Outpatient
- Est. 2004
- ~750,000 SF

1 Equipment Footprint

The Dream:

vs. Reality:



- Equipment footprint
- Rigging path
- Exhaust
- Proximity to system loops
- Refrigerant detection
- Maintenance access
- Clearance requirements (NEC)

Feasibility Study

Concept Design

*Design
Development*

*Phase 1
Construction*

*Phase 2
Construction*

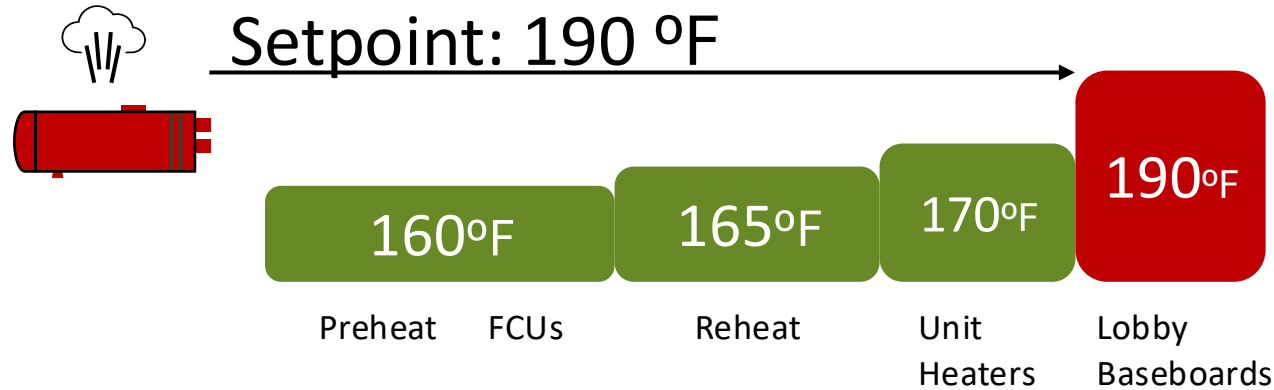
2 Electrical Service Capacity

- Over/Under panel rating?
 - ...We were under
- Required feeder upgrades?
 - ...We did not require a new feeder
- Emergency power
 - ...Not on EP



3. Required Supply Temperatures

Problem:

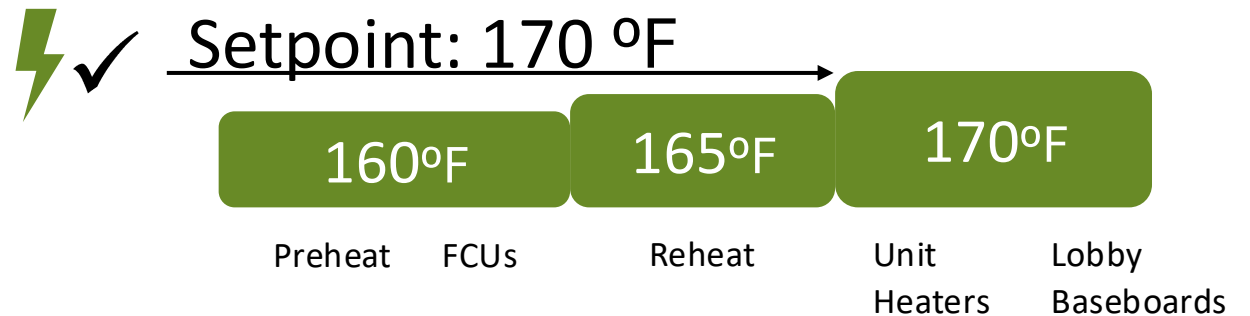


Solution:

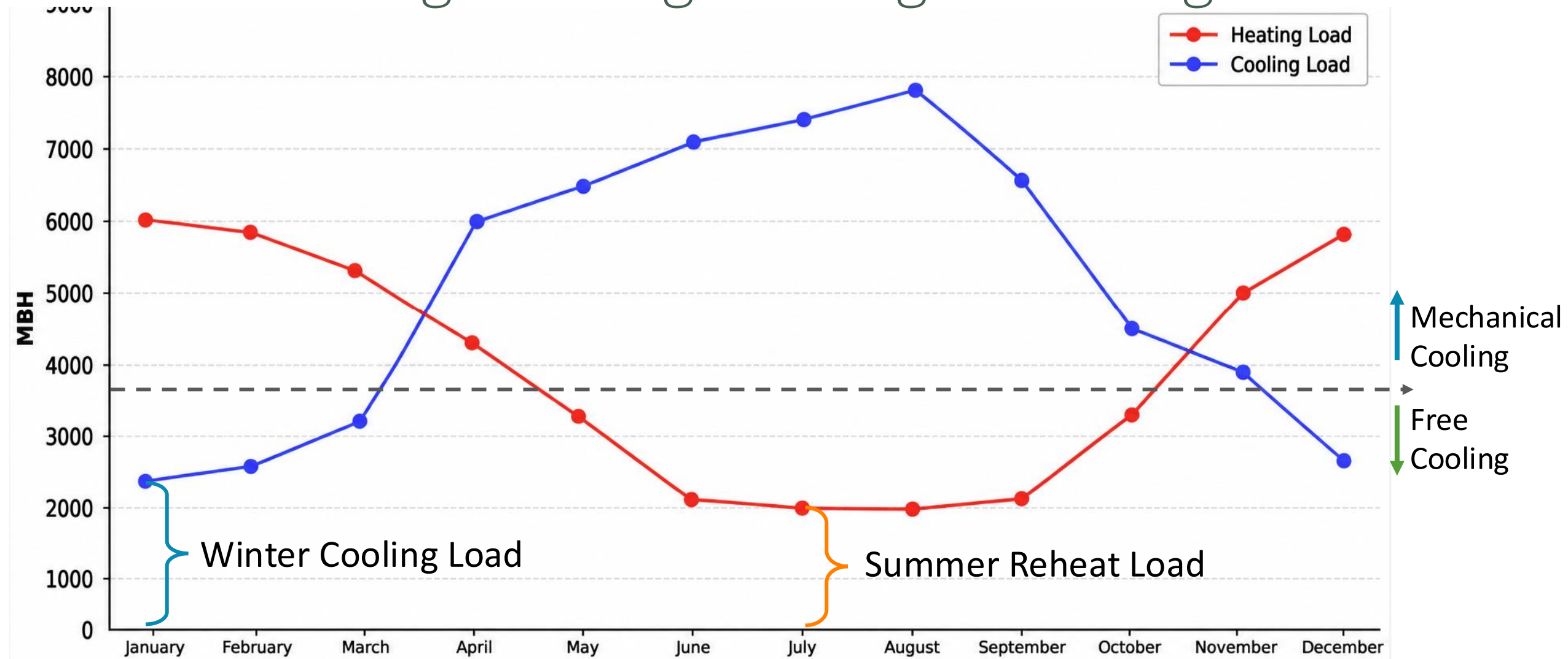
- ☐ Install fan assisted radiators in lobby that require 170 °F

Result:

- ☐ Lower System HWST
- ☐ Unlocks electric heating



4. Existing Building Heating & Cooling Loads



Feasibility Study *Concept Design* **Design Development** *Phase 1 Construction* *Phase 2 Construction*

05

Design

What technology options do you have?

- *Heat Shift, Heat Pump, Heat Recovery Chiller....*
- Different flavors, same concept
- The technology is out there
- Follow a Retro-fit design process:
 - Study the system constraints
 - Find the equipment that fits

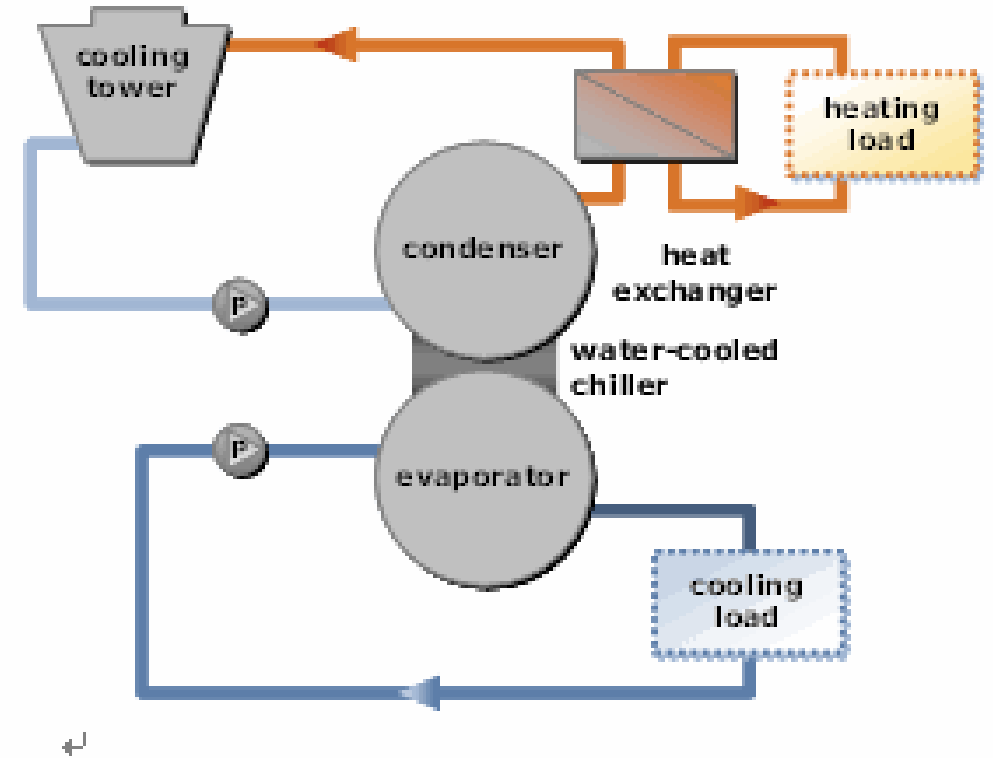


Fig.1 Heat recovery using a heat exchanger

The Equipment You Need is Out There

Options					
Overall Performance Per Unit	Heating Efficiency (COP) (kW/kW)	2.729	3.013	2.15	2.46
	NPLV/IP (kW/ton)	0.5921	0.509	N/A	N/A
	Cooling Tons	99.5	306.4	295.5	200
	Heating Capacity (MBh)	1,875	4,823	1,627	4,700
	Evaporator Flow Rate (GPM)	240	611	665	64
	Condenser Flow Rate (GPM)	218	506	706	112
	Turn Down Ratio	70%	25%	8%	35%
Heating Mode (Winter)	Efficiency COP (kW/kW)	2.729	3.013	2.15	2.46
	Evaporator Leaving Temp (F)	160	160	170	160
	Evaporator Entering Temp (F)	142	140	150	145
	Condensing Leaving Temp (F)	45	44	45	43
	Condensing Entering Temp (F)				
Swing Season (Fall and Spring)	Efficiency COP (kW/kW)				
	Evaporator Leaving Temp (F)				
	Evaporator Entering Temp (F)				
	Condensing Leaving Temp (F)				
	Condensing Entering Temp (F)				
Cooling Season (Summer)	Efficiency COP (kW/kW)				
	Evaporator Leaving Temp (F)				
	Evaporator Entering Temp (F)	122	491.2	120	140
	Condensing Leaving Temp (F)	75	50	75	70
System Total	Condensing Entering Temp (F)	85	85	85	62
	Total Capacity (MGH)	5626.35	9646	6508	9400
	FL Amps	831	2324	N/A	N/A
	Refrigeration	R134A	R515B	R513A	R515B (TRD)
	Compressor Technology	ScREW	ScREW	Reciprocating	S
Dimensions (Per Unit)	Number of Units	3	2	4	
	Length (in.)	136	167	66	
	Width (in.)	48	78	34	
	Height (in.)	77	98	77	

Cooling Tons

300



Heating equivalent Tons

140



Heating
Season
(winter)

C.O.P. (kW/kW)

2.15

Evaporator Leaving
Temp (F)

170



Length (in)

66

Width (in)

34



Height (in)

77

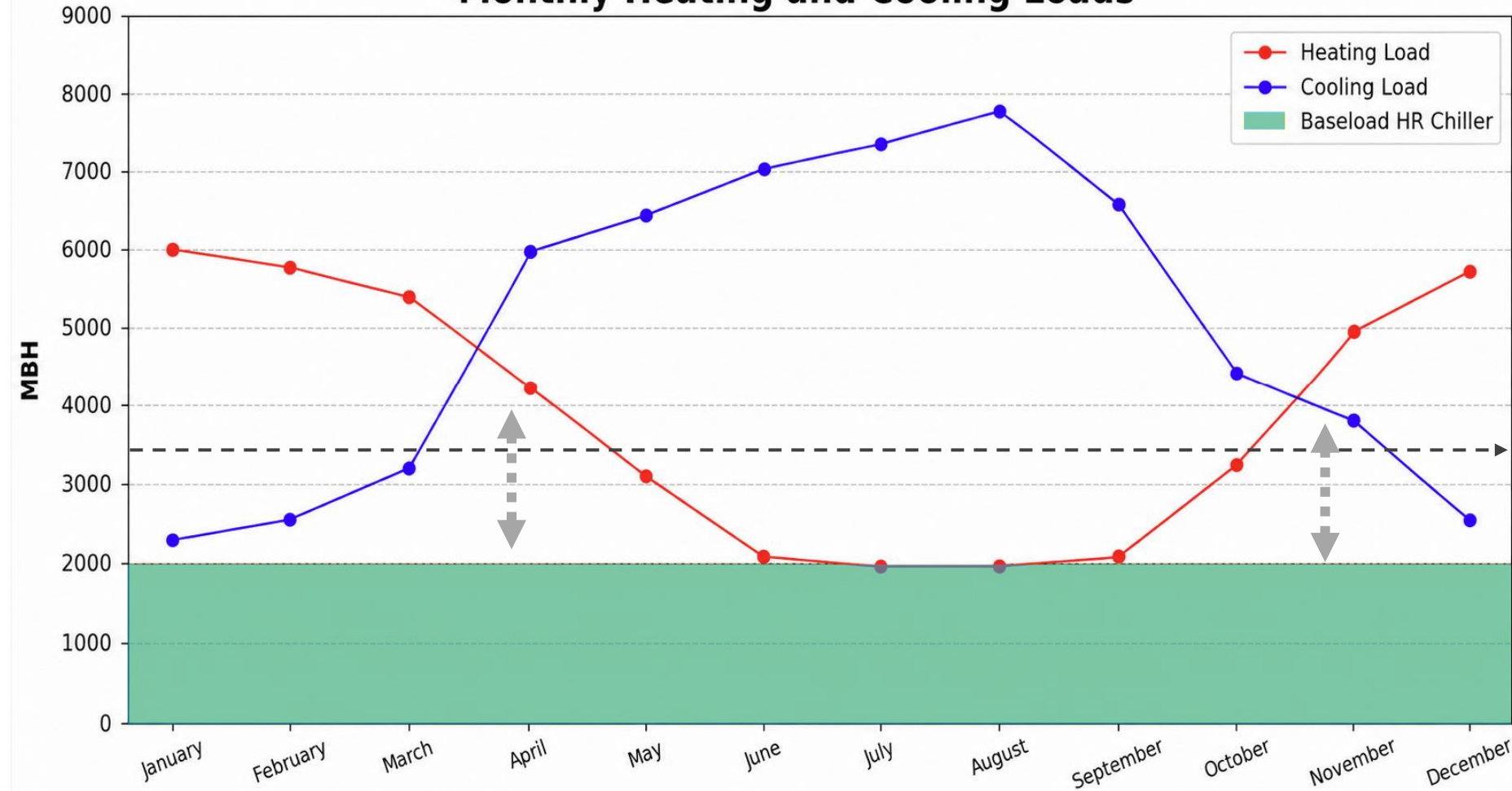
The Equipment You Need is Out There

- **Modular**
- **Fits in an Elevator**
- **Not a “typical” chiller**



Option 1: Equipment Sized for Base Load

Monthly Heating and Cooling Loads

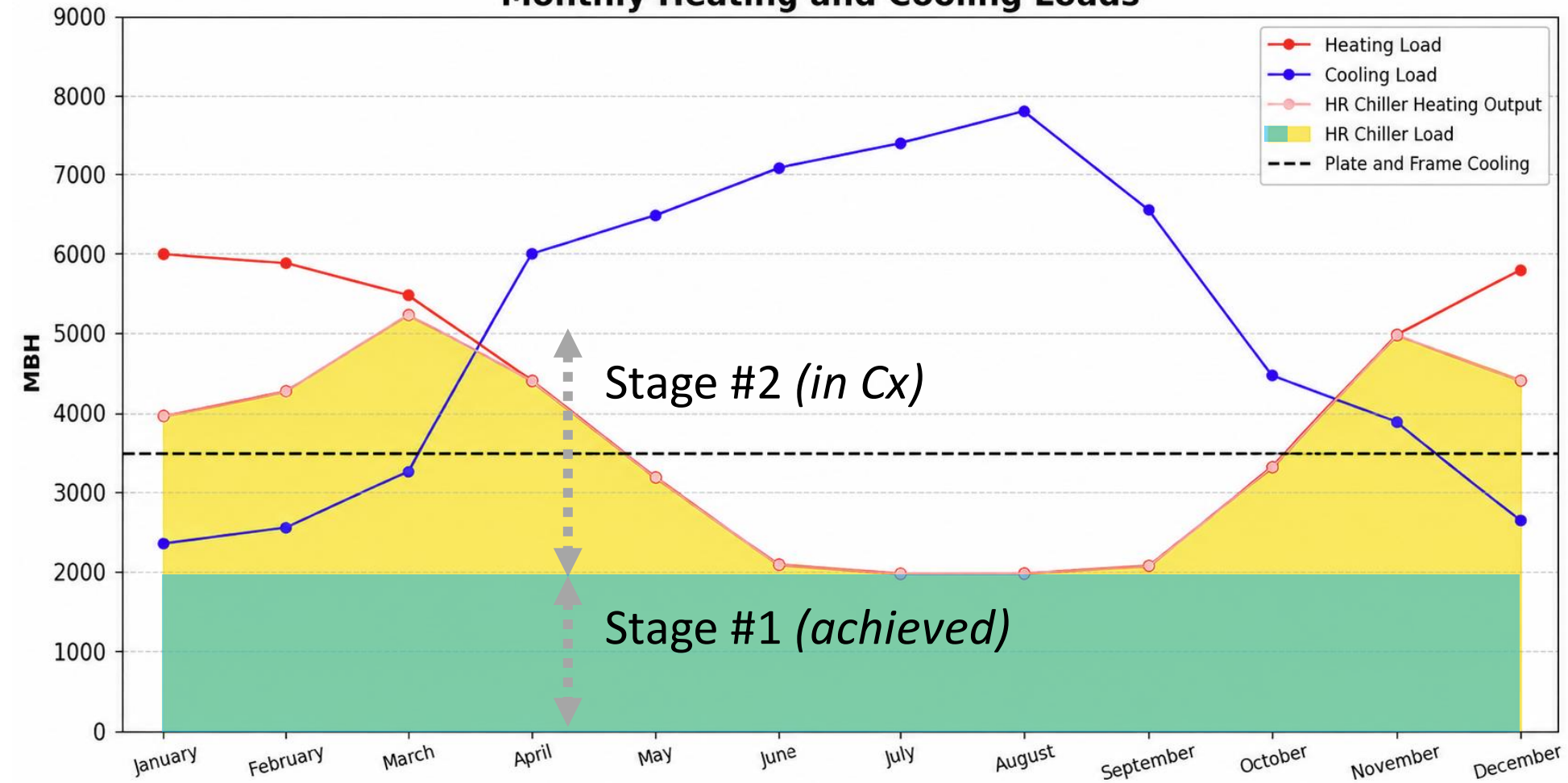


✓ Achieved with install of one module.

Feasibility Study Concept Design **Design Development** Phase 1 Construction Phase 2 Construction

Option 2: Equipment Sized for Peak Loads

Monthly Heating and Cooling Loads



Feasibility Study

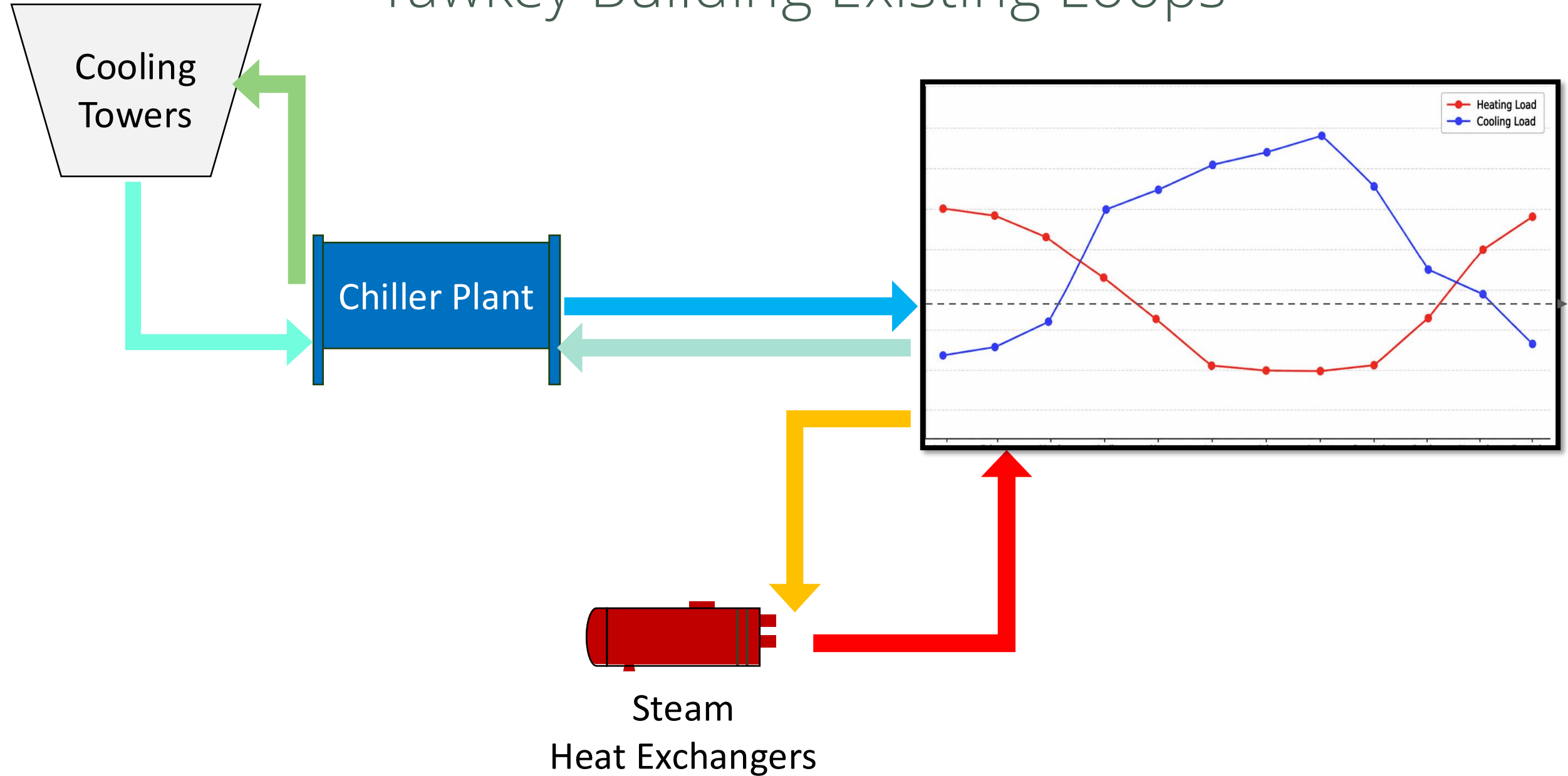
Concept Design

Design
Development

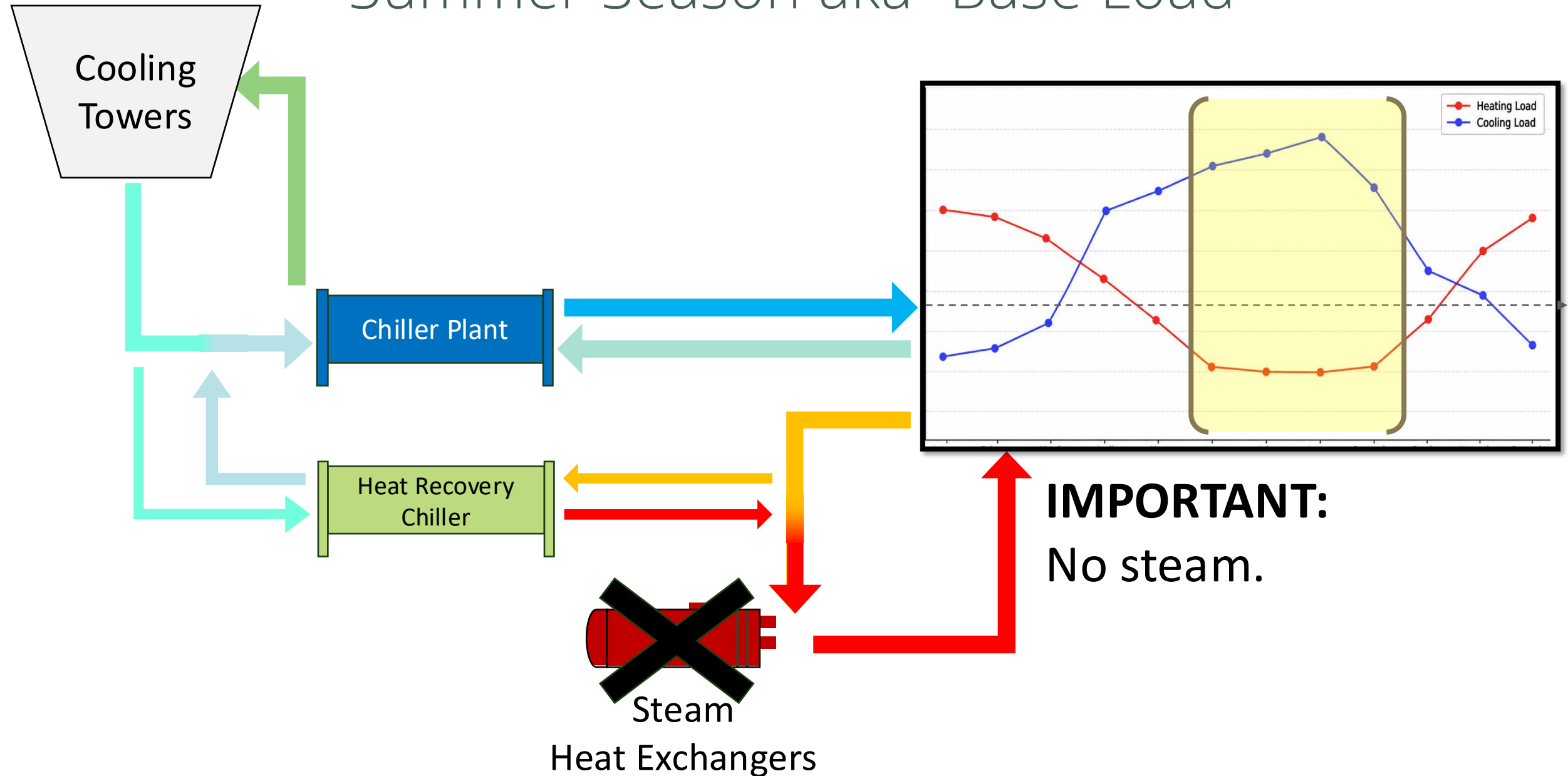
Phase 1
Construction

Phase 2
Construction

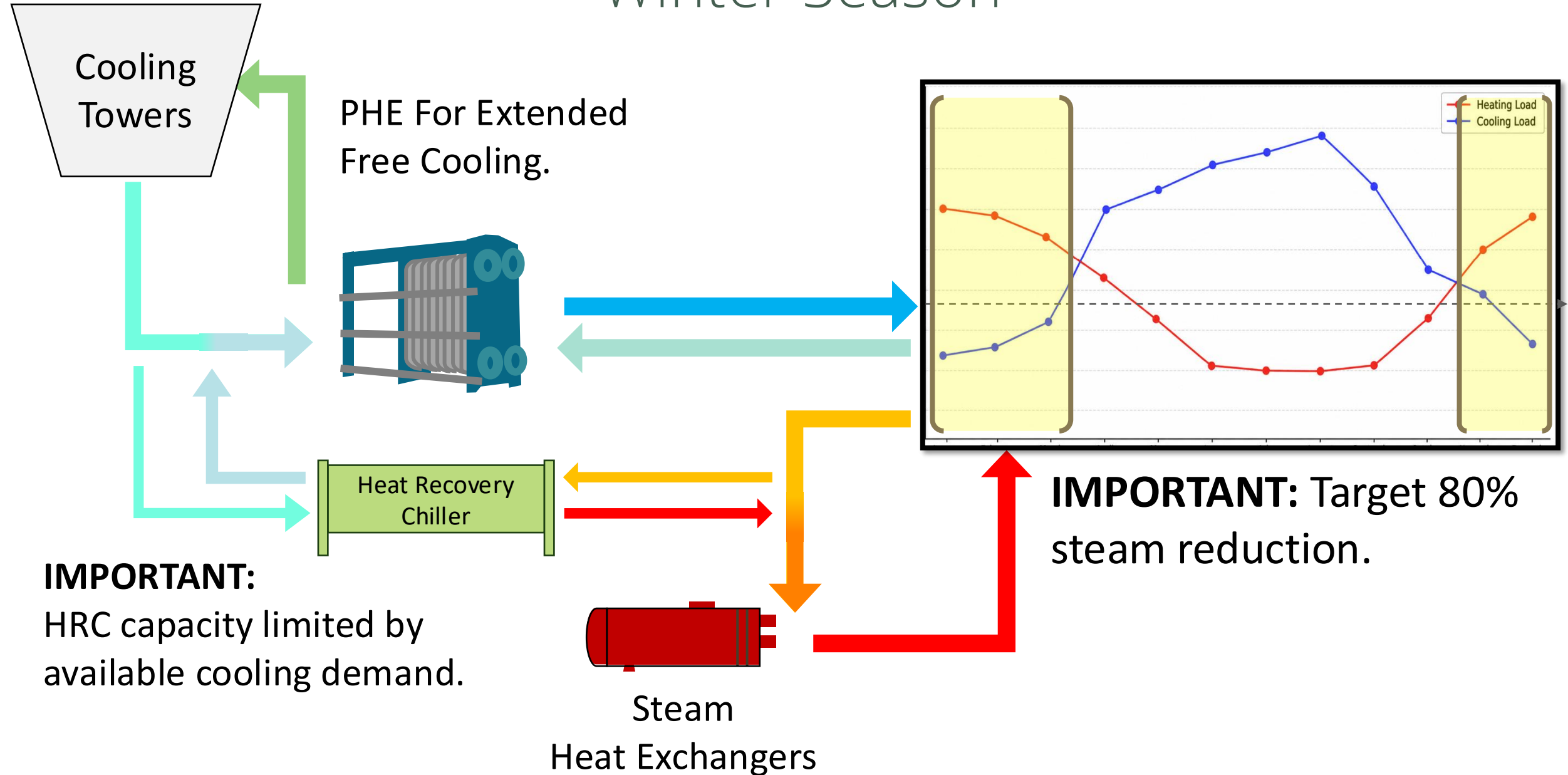
Yawkey Building Existing Loops



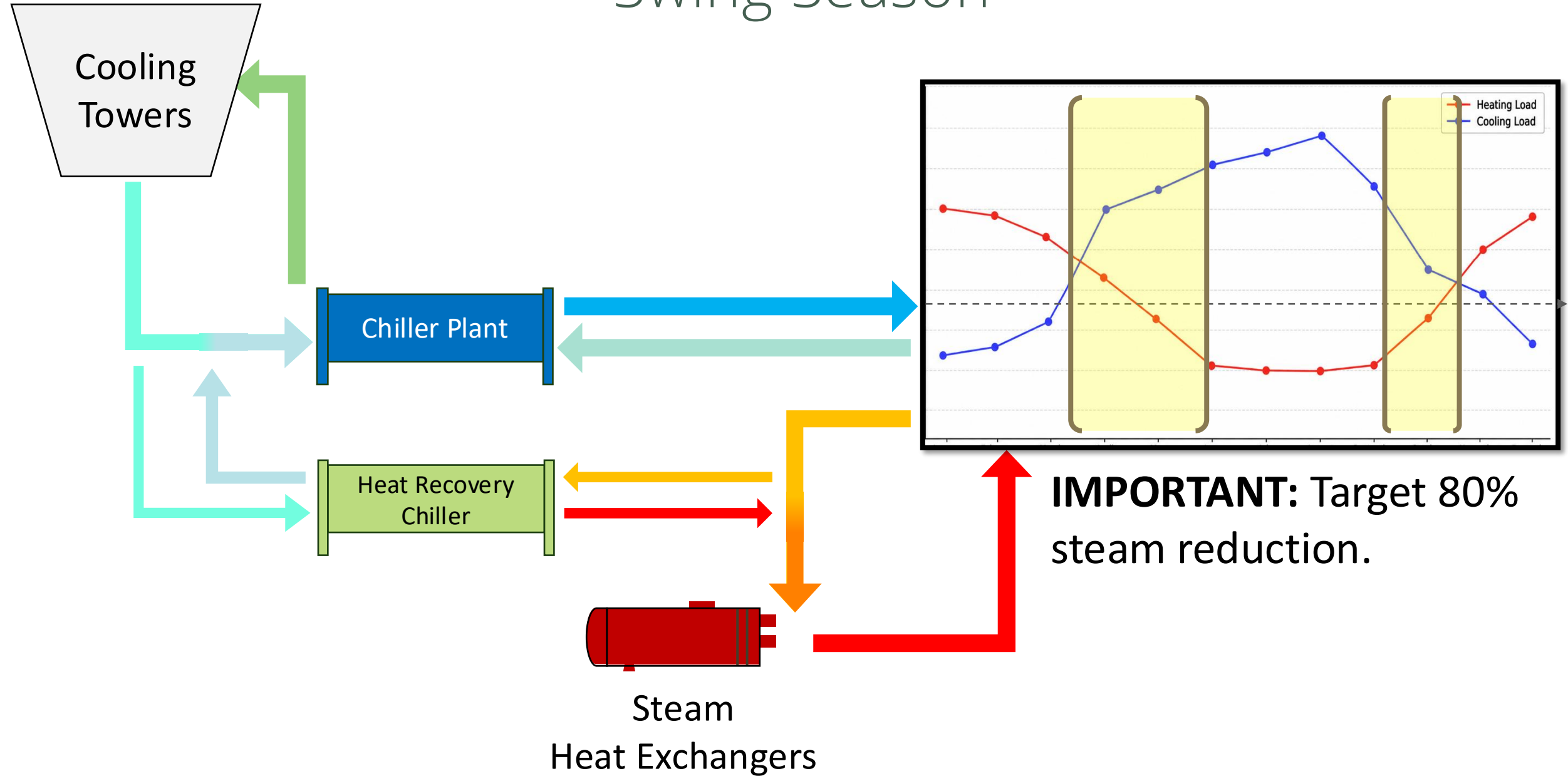
Summer Season aka "Base Load"



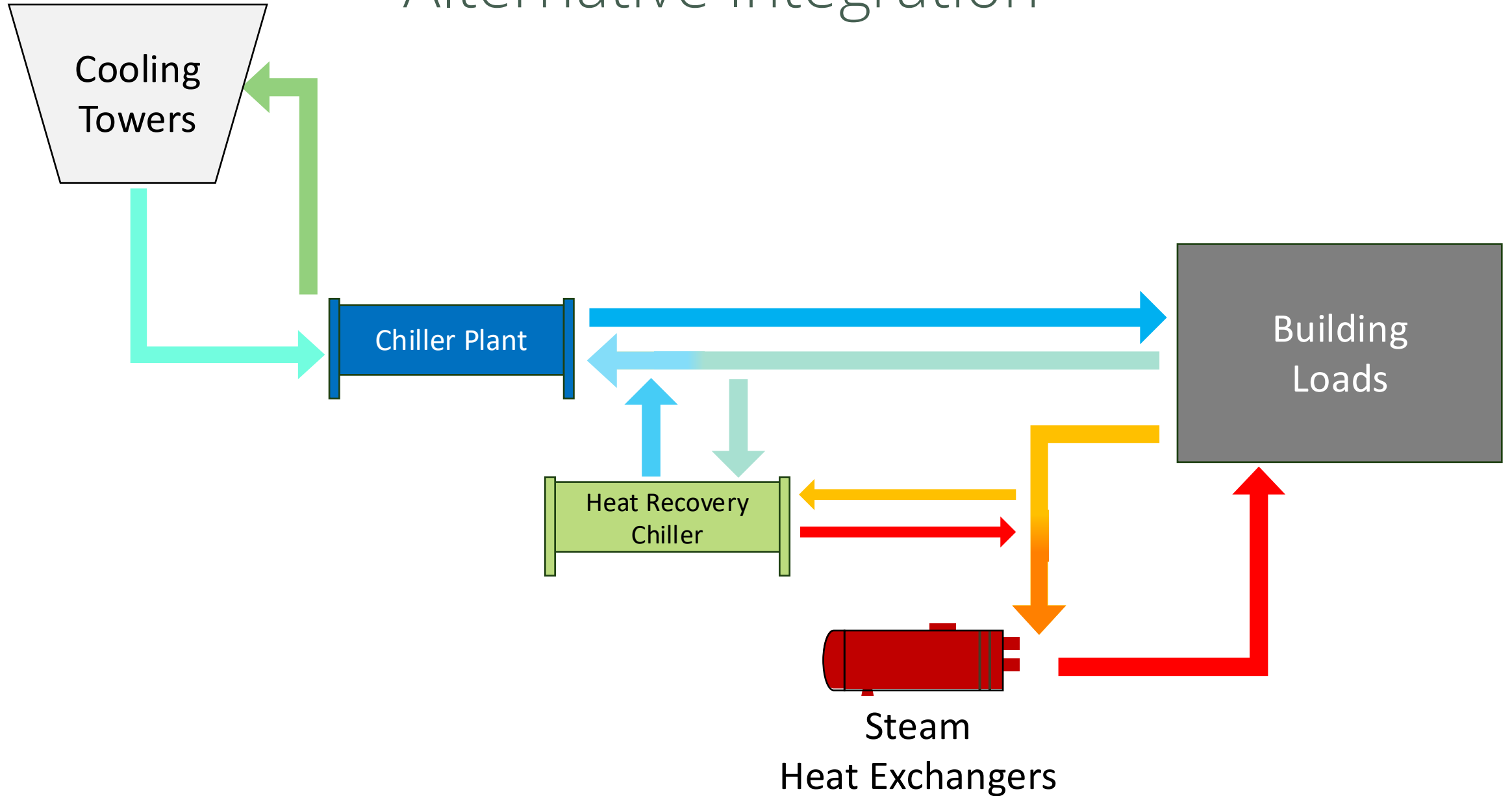
Winter Season



Swing Season



Alternative Integration



Why We Chose the Condenser Loop

Condenser EWT	Part Load Performances (KW/Ton)			
	Percent Load			
	100%	90%	80%	70%...
80.0	0.5256	0.5035	0.4905	0.4899
75.0	0.4716	0.4491	0.4327	0.4263
70.0	0.4201	0.3974	0.3794	0.3697
65.0	0.3289	0.3068	0.2859	0.2703

Increased House Plant Efficiency
Decreased Plant Run Hours

$\Delta 5 \dots +12\%$ in chiller efficiency

Why We Chose the Condenser Loop

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65.0	0.3289	0.3068	0.2859	0.2703

Increased Plant Efficiency
Decreased Plant Run Hours

$\Delta 5 \dots +12\%$ in chiller efficiency

$\Delta 10 \dots$ **+20%** in chiller efficiency

Feasibility Study

Concept Design

**Design
Development**

*Phase 1
Construction*

*Phase 2
Construction*

Why We Chose the Condenser Loop

Condenser EWT	Part Load Performances (KW/Ton)			
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Increased Plant Efficiency

Decreased Plant Run Hours

$\Delta 5$... +12% in chiller efficiency

$\Delta 10$... **+20%** in chiller efficiency

1,250 ton chillers...

240,000 kWh savings / year

Feasibility Study

Concept Design

**Design
Development**

*Phase 1
Construction*

*Phase 2
Construction*

06

Summary

Study

Optional step

Range of offerings from
Identification to detailed
analysis



Incentive Application and Approval

Prescriptive and custom
applications



Receive approval and
start work

M&V and Payment

Inspections & post
metering

Plan the next project



Contact Your Incentive Program Administrator

For Eversource MA Customers:

Barry McDonough

Account Executive

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Senior Energy Consultant

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For other MA Utility Customers:

[Mass Save Sponsor Directory for C&I Projects | Trade Partners | Mass Save](#)

For CT Customers: <https://www.energizect.com/contact-energize-ct>

For NH Customers: <https://nhsaves.com/contact-us/>

How We Moved the Needle



BUILDING ENERGY SAVINGS:

\$265,110 / YEAR

Campus Target: 20% reduction
64.1 to 41.6 emissions reduction

LIMIT FOR BERDO <u>2030</u>	PROJECT RESULTS	% ACHIEVED VIA HRC PROJECT
CO ₂ Reduction (Metric Tons)	CO ₂ Reduction (Metric Tons)	CO ₂ Reduction (Metric Tons)
22,500	2,000	9%

MGB achieved 2030 BERDO goal.

MGB on track for 2050 BERDO goal.

MGB identified inpatient building for next steam decarbonization project

Summary and Call to Action



Delivered a resilient system to decarbonize a steam system.

- ✓ 80% steam reduction
- ✓ Reasonable Payback Period
- ✓ No major shutdown;
patients unaffected

THANK
YOU

