CSHE 2024 Annual Institute

Sutter Health RCx Program: A Decade of Energy Management Program Learning

May 9, 2024

Agenda

- Introduction
- RCx Program Purpose and Overview
- Development & Project Examples
- Big Picture and Takeaways

Introduction

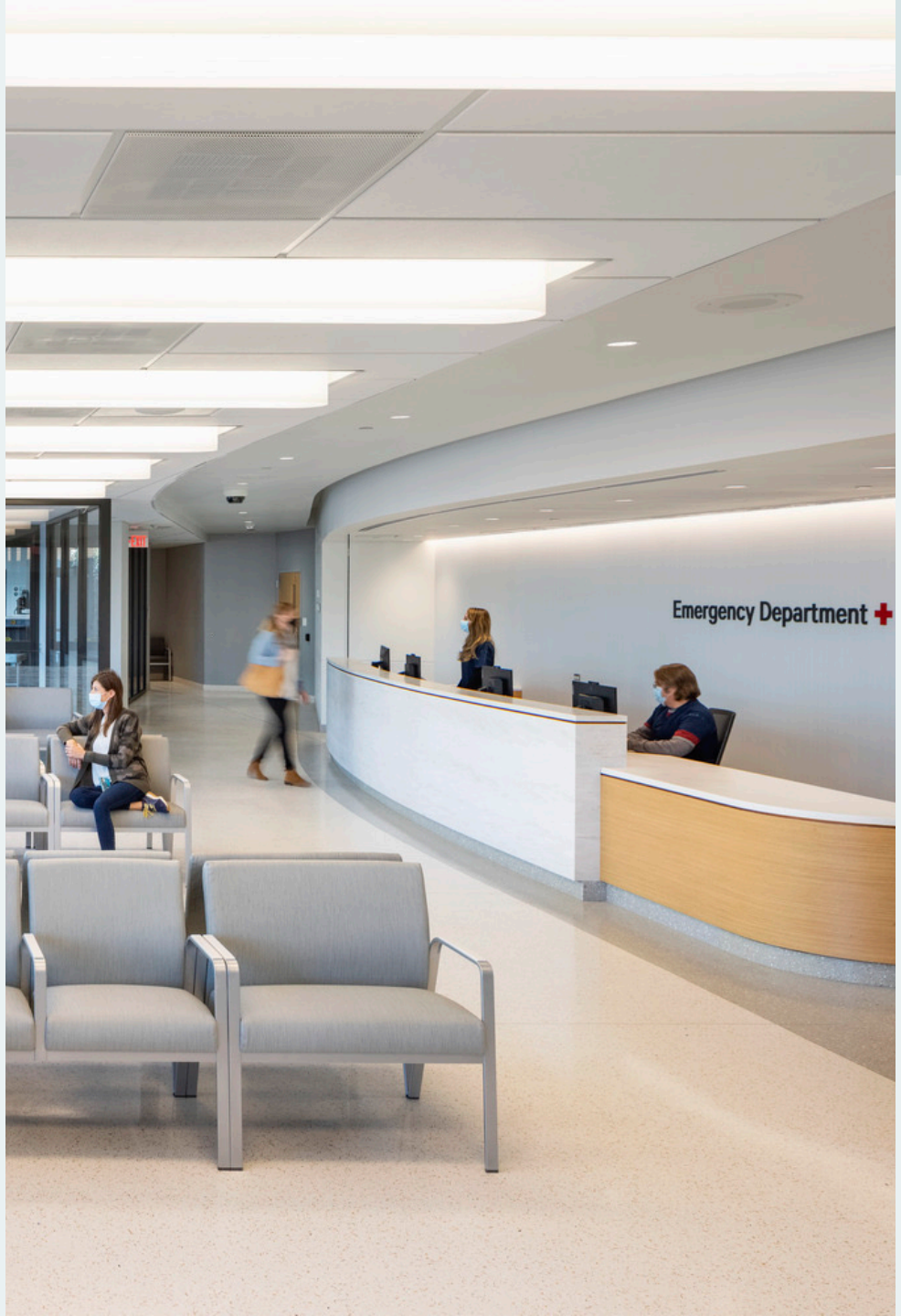
Wayne Bader – Sutter Health
Energy Manager

Eric Nyenhuis, PE – Southland
Industries Engineering / Development

Brent Patera – Southland Industries
Business Development

RCx Program Purpose and Overview

Wayne Bader, PE



Sutter Health

Facts at a Glance

$7.6 Billion

Invested over 10 years to further expand lifesaving technology and new facilities.

$899 Million

Invested in the community in 2022 — including traditional charity, the unreimbursed costs of providing care to Medi-Cal patients and investments in community health programs.

433 Partnerships

Collaborations with community partners to expand access to care.

People

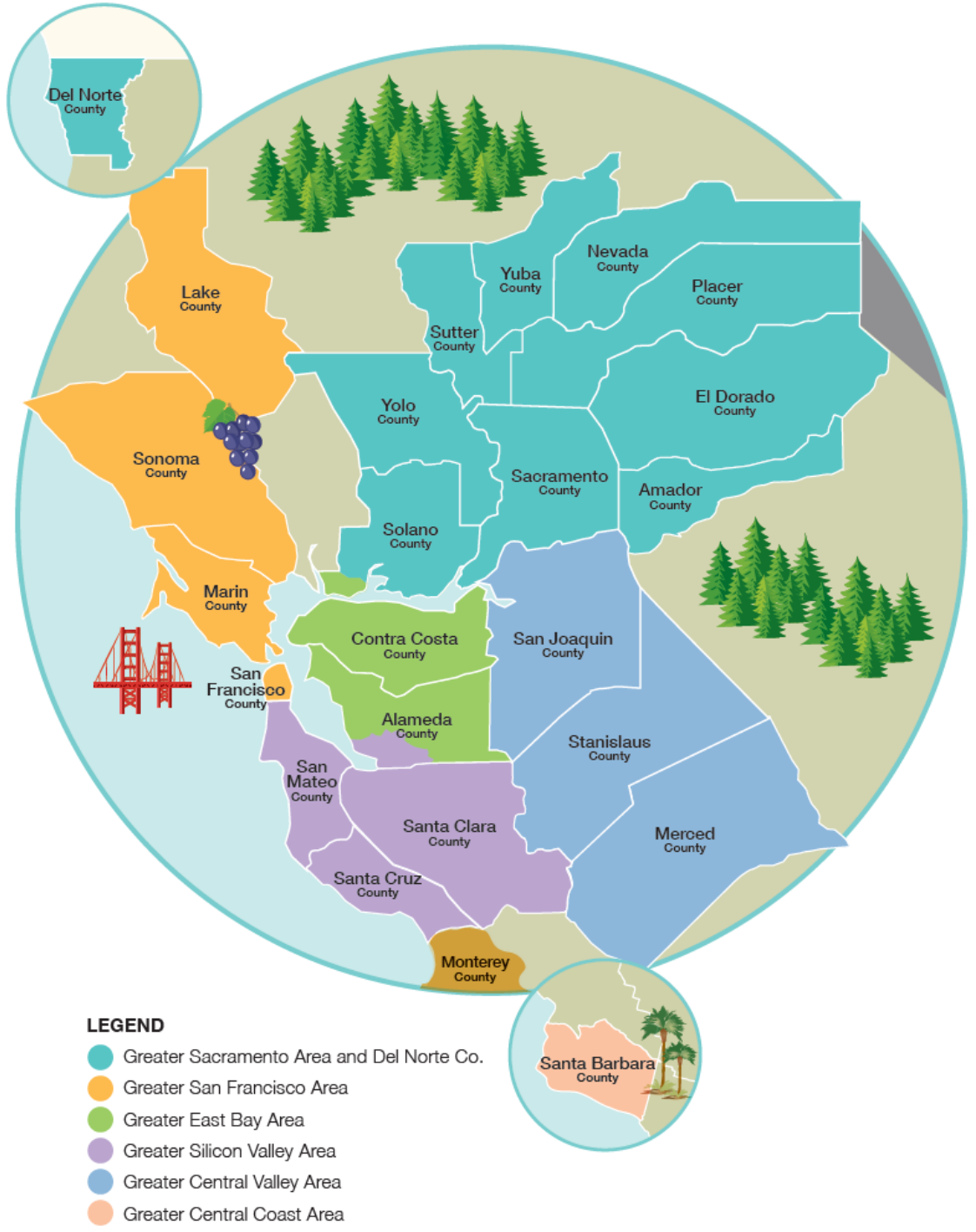
- Physicians — 12,000
- Advanced Practice Clinicians — 2,000
- Nurses — 15,000+
- Employees — 51,000+

Locations

- Hospitals — 22
- Ambulatory Surgery Centers — 33
- Cardiac Centers — 8
- Cancer Centers — 11
- Acute Rehabilitation Centers — 4
- Mental Health and Addiction Care Centers — 4
- Trauma Centers — 4
- Licensed Acute Care Beds — 4,094
- Neonatal Intensive Care Units — 7

In 2022

- Births — 25,934
- Discharges — 180,640
- Hospital Emergency Room Visits — 836,008
- Hospital Outpatient Visits — 1,767,511
- Medical Foundation Visits — 9,750,562
- Patient Days — 935,211
- *Sutter Care at Home*, Home Health and Hospice Visits — 914,613
- *Sutter Care at Home*, Among U.S. Home Health Organizations — 12th Largest



Facility scope

13.7 MM GSF owned space

- 7.4 MM GSF hospitals
- 4 MM GSF MOBs
- 1.4 MM GSF outpatient
- 0.4 MM GSF admin offices
- 0.5 MM GSF other

4 MM GSF leased space
(excluding land, parking, residential)

Energy Management at Sutter Health

Pre-history: before 2012

Facility Planning & Development (FPD)

- Planning & designing for clinical needs
- Managing construction
- Delivering new facilities, major renovations

2012

Department Scope Expanded

- Added Facility Management
- Added Lease Management
- New name! Facility & Property Services (FPS)

2013 - 2016

Part of Facility Management = Energy Management

- Centralized management of utility supply, efficiency
- 4-year funded energy efficiency program

➢ Lessons and Successes

2012 - 2016

Energy Management at Sutter Health

2016 - 2017

Environmental Stewardship

- Formed network of topical committees
- Established sustainability goals

2017 - 2019

Energy Management Development

- Established EUI as performance metric, and LCC as evaluation tool
- Began to formalize demand-side program

2018 - 2020

On-Site Solar Pilot Program

- To address Environmental Stewardship goals
- Start of larger supply-side program

➢ Lessons and Successes

2016 - 2019

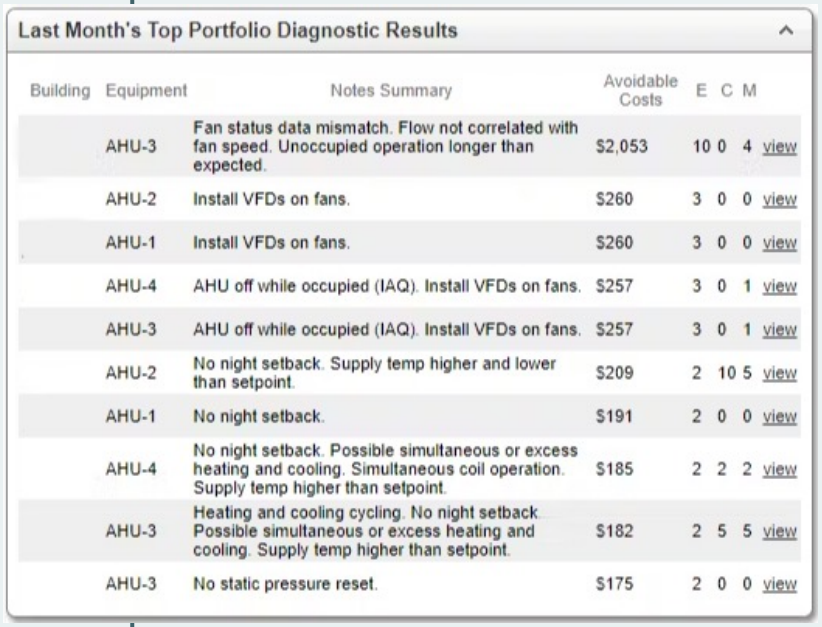
3. Target Conditions (Goal(s)): *What specific outcome is required?*

#	Metric	Target	By
1	EUI (1000 BTU/ft²/yr)	All: Acute <200, Ambulatory <75	2030
2	Energy Portfolio Renewable Mix	50%	2025
3	Energy Star Rating	>55, >75	2020, 2030
4	Anesthesia Gas Consumption	Need to define current state first	
5	Greenhouse Gas Reduction	50%, 80%	2025, 2030

ENERGY STAR® PortfolioManager®

The most-used energy measurement and tracking tool for commercial buildings.

Energy Management at Sutter Health



Last Month's Top Portfolio Diagnostic Results

Building	Equipment	Notes Summary	Avoidable Costs	E	C	M	
	AHU-3	Fan status data mismatch. Flow not correlated with fan speed. Unoccupied operation longer than expected.	$2,053	10	0	4	view
	AHU-2	Install VFDs on fans.	$260	3	0	0	view
	AHU-1	Install VFDs on fans.	$260	3	0	0	view
	AHU-4	AHU off while occupied (IAQ). Install VFDs on fans.	$257	3	0	1	view
	AHU-3	AHU off while occupied (IAQ). Install VFDs on fans.	$257	3	0	1	view
	AHU-2	No night setback. Supply temp higher and lower than setpoint.	$209	2	10	5	view
	AHU-1	No night setback.	$191	2	0	0	view
	AHU-4	No night setback. Possible simultaneous or excess heating and cooling. Simultaneous coil operation. Supply temp higher than setpoint.	$185	2	2	2	view
	AHU-3	Heating and cooling cycling. No night setback. Possible simultaneous or excess heating and cooling. Supply temp higher than setpoint.	$182	2	5	5	view
	AHU-3	No static pressure reset.	$175	2	0	0	view

2019

New approach to energy efficiency

- RCx/EE (retro-commissioning, energy efficiency)
  - ❑ Assessment
    - Safety & regulatory compliance first
    - Establish trust in the automatic controls
    - EUI & emissions goals, reduce end-use first
    - Savings is a result, not the focus
  - ❑ Scopes of Work
  - ❑ Multi-phase implementation
  - ❑ Training for operators
  - ❑ Continuous monitoring
- Selected two campuses to "prove the concept"

SkySpark by SkyFoundry

2019 - 2022

"Nose to the grindstone"

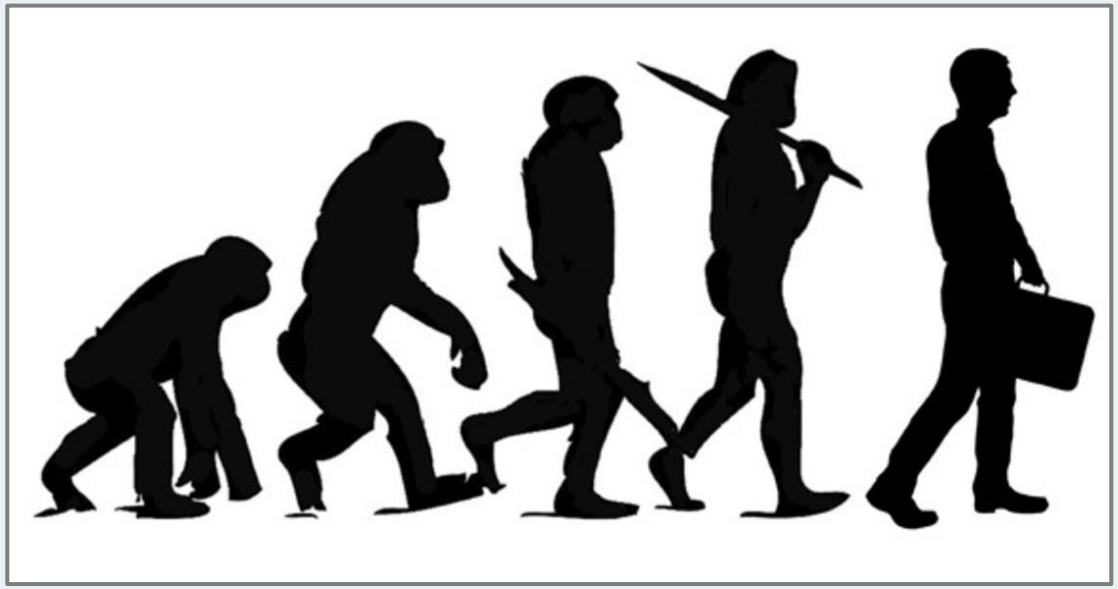
- Carried out RCx projects
- Discussed program funding options with Administration
- Continued on-site solar installations

CLOCKWORKS ANALYTICS

➢ Goals, Lessons and Successes

2019 - 2022

Energy Management at Sutter Health



2023

Evolution of approach

- Energy Master Planning
  - ❑ Includes RCx/EE
  - ❑ Expands list of stakeholders (not just Facilities)
  - ❑ Learn future plans as relates to the facilities
  - ❑ Anticipate codes & regulations (e.g. emissions reporting, decarbonization, etc.)
  - ❑ Integrate renewable energy supply
  - ❑ Consider energy resilience
  - ❑ Create "living document" for facility

2024

"Settling in"

- Identifying new projects
- Developing Energy Master Planning process
- Continuing on-site solar & battery storage

➢ Goals, Lessons and Successes

2023 - 2024

Energy Management at Sutter Health

2024 & Beyond

Elevate Energy Management

- Begin Energy Master Planning projects
- Establish engineering team
- More emissions mitigation
- Climate adaptation, resiliency
- BMS “unification”
- Central BMS & FDD resource

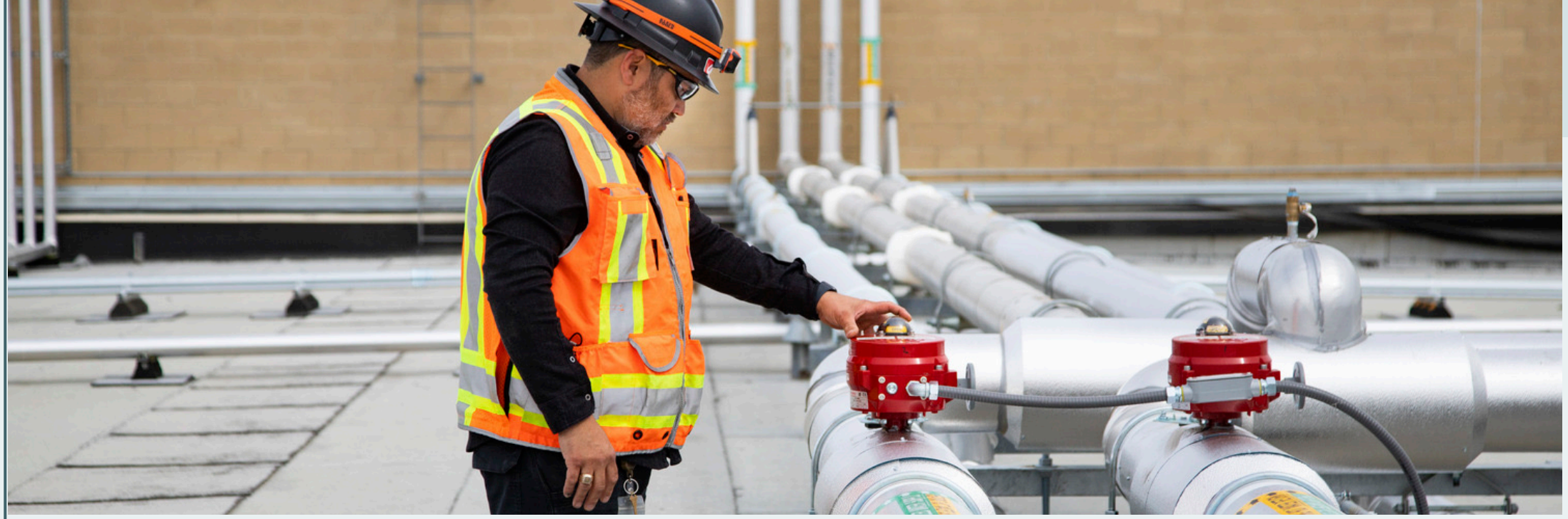
➢ Goals

Future

Development & Project Example

MPMC – Burlingame, CA

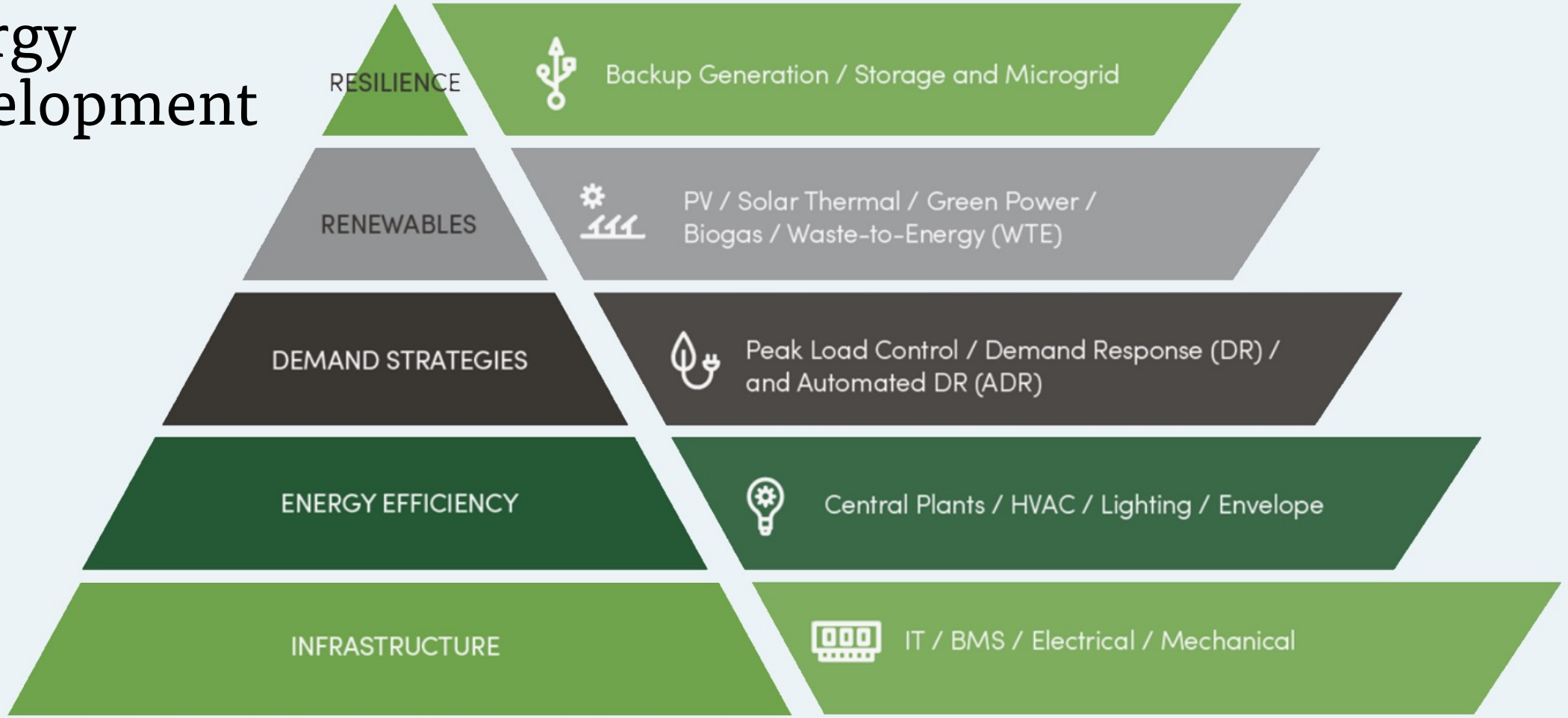
Eric Nyenhuis, PE



Objectives

- Improve Building Performance, Operations and Occupant Comfort
- Address Regulatory Compliance Issues
- Advance Sustainability Goals
- Reduce Energy and Maintenance Costs
- Identify Opportunities for Deeper Energy Retrofits

Load Order Driven Energy Development



Mills Peninsula Medical Center (MPMC)

Campus Details

Location : 1501 Trousdale Dr, Burlingame, CA

Square Footage : Hospital – 450,000; MOB – 150,000

Beds : 241

Systems : Chilled Water / Hydronic Heating / 100% OSA w/ Heat Recovery

Development Timeline

- Assessment – 2017
- Investment Grade Audit – September – December 2019
- Phase 1 Execution – Dec 2019 – Mar 2020
- Phase 2 Execution – Jun 2022 – Feb 2024

Strategies

1. Focus on reducing energy used to condition spaces **first**, and then work back to primary equipment.

When Occupied	When Unoccupied
Meet current requirement	Go to a set-back condition

2. Start by first improving "what we've got", rather than replacing capital equipment, e.g. make the most of the systems as-designed. Address CapEx opportunities in a later phase.
3. Work with Ops staff and stakeholders (controls, mechanical) to establish a "culture" focused on performance and continuous improvement.
4. Identify potential for further process and/or capital equipment improvements to achieve < 200 EUI.
5. Document, educate, train, and use FDD to ensure savings persistence.

Project Profile as Engineered

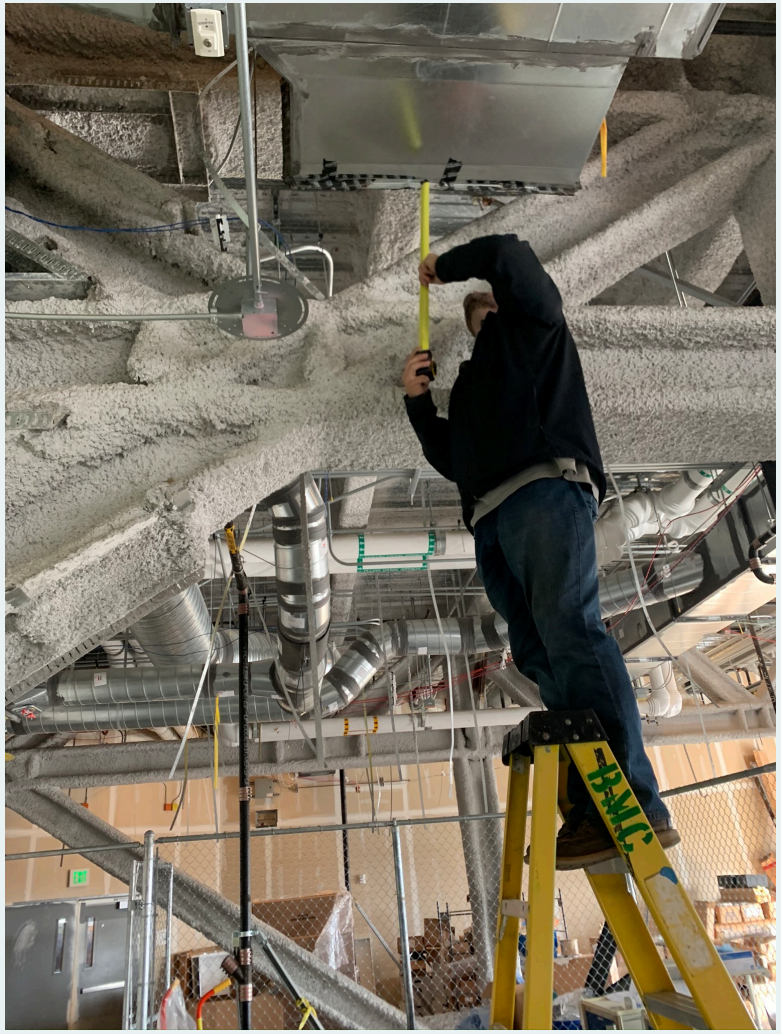
Parameter	Baseline	Phase 1	Phase 2	Total
Utility Cost	$3,585,000	$3,225,000	$2,392,000	$2,392,000
Savings	-	$360,000	$833,000	$1,193,000
Permitting	-	Non-OSHPD	OHSPD	-
Cost / Return (SPB)	N/A	$1.1 M 3.3 yrs	$4.8 M* 5.7 yrs	$5.9 M 5.0 yrs
EUI (kBtu/sq-ft)	245	224	192	-

~ 33% Savings

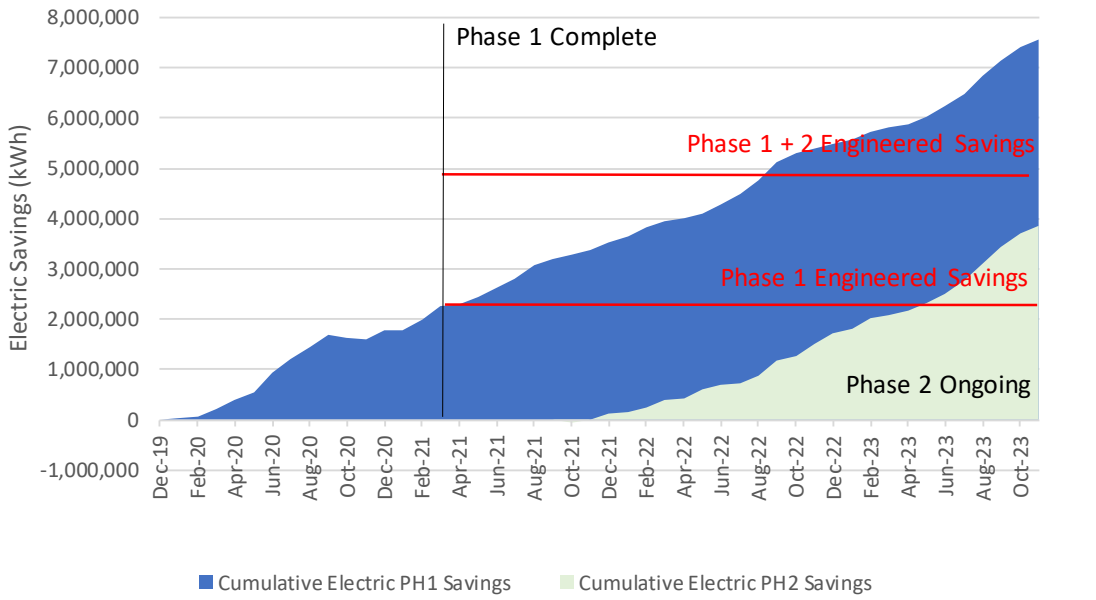
Mills Peninsula Medical Center (MPMC)

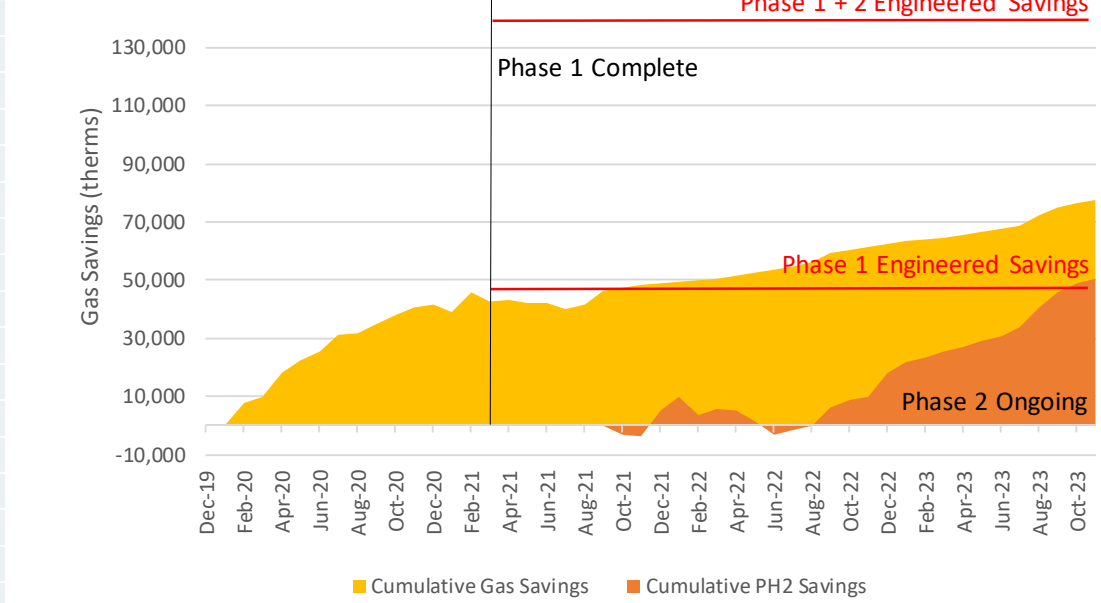
Scope:

- Phase 1
  - Chilled Water System Optimization (2,400 T)
  - AHU Static Pressure Reset (350 Zones)
  - Occupancy Based Control in Conference / Training Areas
  - RCx Watt Stopper Lighting Control System
- Phase 2
  - Interior / Exterior Lighting Efficiency Upgrade
  - Variable OR Air Flow / Code Min Air Flows
  - HHW Plant Supply Temperature Reset
  - Upgrade Eaton Power Metering Server / User Interface
  - Analytics (Clockworks)



Energy Savings Performance as Verified



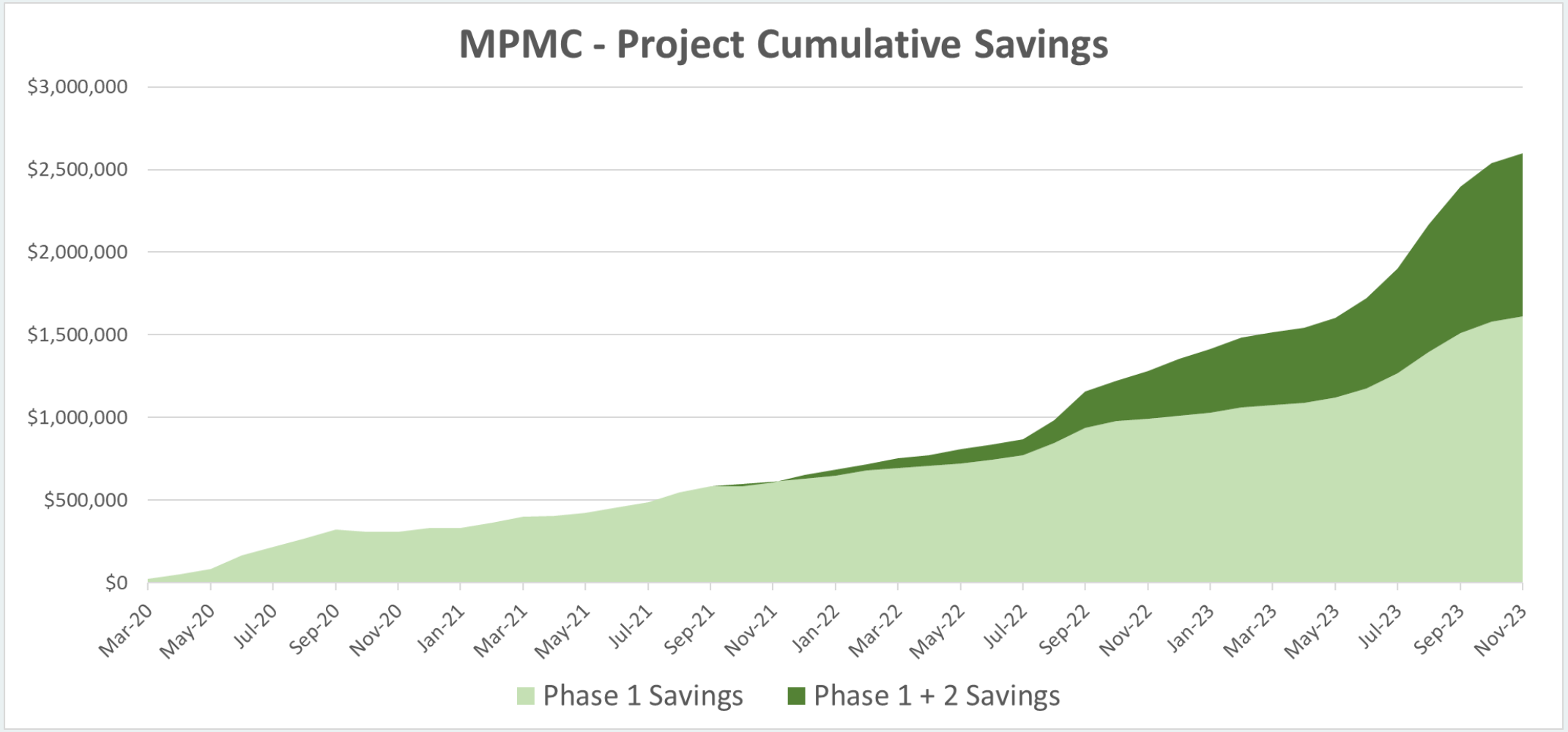


- Phase 1 Year 1 electric savings met expectations / gas savings fell short
- Phase 2 just completed; savings are being monitored.
- Phase 2 work uncovered and corrected unknown parasitic issues with boiler integration and control
- "Do nothing case" means utility cost continues to rise at compounded rate of 3 – 6%.

Cost Savings Performance

Project Parameters and Outcomes		
Phase 1	$ Savings	Year
Original Savings Estimate	$360,000	0
Savings Escalated (@5%)	$437,582	4
Phase 2	$ Savings	Year
Original Savings Estimate	$833,000	0
Savings Escalated (@5%)	$874,650	1
2023 MPMC Savings Expectation	$1,312,232	
12 Mo Savings Ending Nov-23	$1,315,803	
Total Savings to Date	$2,598,493	

Cumulative Cost Savings



Sustainability Metrics

	Parameter	Baseline Annual	Annual Savings	Total to Date
	Total CO_2 Equivalent* (tons)	12,361	4,212	8,569
	Energy Used by Passenger Vehicles Driven for One Year	2,942	1,002	2,040
	Energy Used by Homes for One Year	1,612	550	1,118

** - Reflects Annual Average. Not adjusted for PG&E's generation mix.*

Benefits

- New facilities team gained insight into building's proper operation
- Identified fundamental deficiency in exhaust system control
- Lower maintenance on AHU fan motors in surgery areas
- Insight into electrical gear w/ new electrical monitoring system

Big Picture & Take Aways

Brent Patera

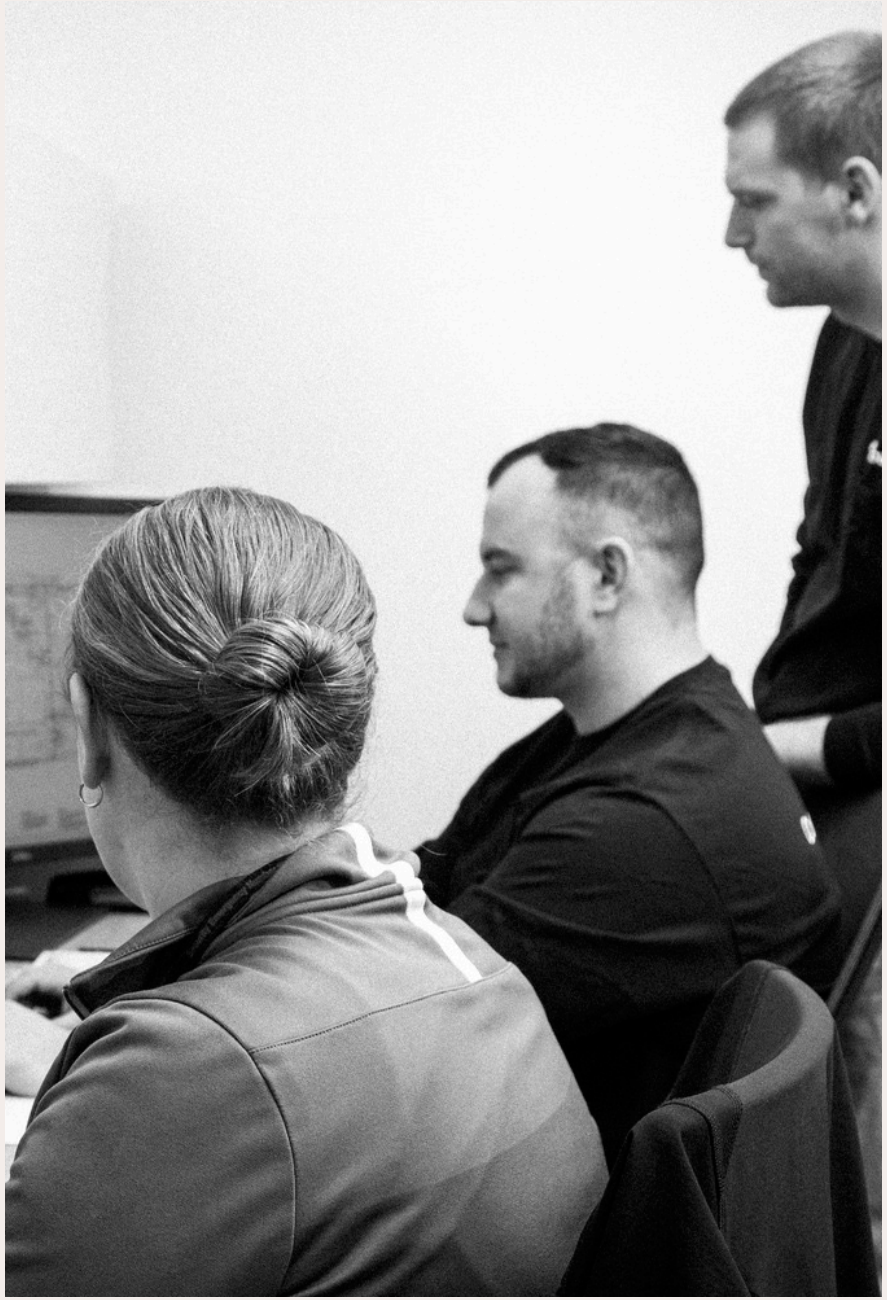
Big Picture

1) There is **significant opportunity** to reduce operating cost & GHG while improving building performance, regulatory compliance & patient satisfaction

2) Energy projects produce their own funding and ROI

3) Projects are **achievable** with a comprehensive plan and collaboration between stakeholders

4) There will be **challenges** that require energetic and creative navigation
   - Resistance to change
   - Traditional silos for "Build" and "Operate & Maintain"
   - Project delivery focused on replacing things not enhancing performance
   - Disconnect between cost and benefit
   - Funding (who recognizes/appreciates the ROI?)



Take Aways

Proceed with confidence = You can expect to realize ~ 20% reduction in cost

Find the "metric" (or metrics) that inspires attention, support and **action**

Tell that **story** to whomever will listen ☺

Identify and cultivate a **sponsor** and "partners" within your organization

Preach "overall performance" vs. "replace in-kind"

Discover the "do-ability" of design-build construction via energy performance contracting

Find a qualified energy partner with experience in acute care hospitals – and particularly in HVAC, controls and SOO

Challenge the status quo of "embedded" proprietary control systems

Thank you

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