CMAA Northern California Chapter
Education Program
May 2025

CMAA NORTHERN CALIFORNIA CHAPTER

# Approach to Decarbonization & High Performing Buildings

## Under the Progressive Design-Build Model


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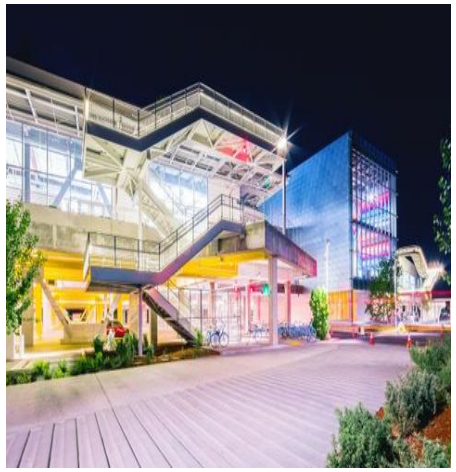
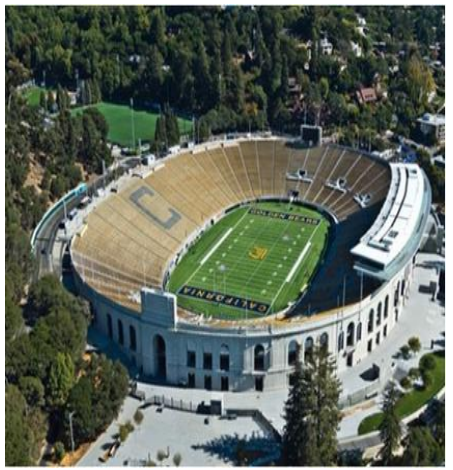
CAMBRIDGECM

# CAMBRIDGECM



Cambridge CM provides Project and Construction Management Services for public and private owners through all phases of a project. Our staff of over 70 employees is primarily made up of engineers, architects, construction managers, and quantity surveyors that come from a variety of backgrounds including design firms, developers, general and trade contractors.

We bring effective and proactive management techniques to the planning, design, and construction of a project from inception to completion with the purpose of controlling schedule, cost, and quality expectations. We don't just manage construction; we lead the process for our clients.

**23**
Years of Operations

**7**
Offices worldwide
Headquartered in Palo Alto, CA

**70+**
Employees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# CONTINUING EDUCATION **CREDIT**

A credit value is assigned to CMAA courses and seminars in units of Professional Development Hours (PDH), Learning Units (LU), and CCM Recertification Points. CMAA guarantees that course material meets the minimum requirements for a PDH, which is 60 minutes of instruction, or increments thereof.

CCM
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All courses approved by CMAA count toward CCM recertification points. For more information on recertification points, please click here.

CONTINUING EDUCATION AIA

CMAA is registered with the American Institute of Architects (AIA) as an approved CES provider of LUs. One educational contact hour equals one (1) LU. To receive LUs through CMAA, you must provide your AIA member number on all registration materials and attendance forms. www.aia.org

ENGINEERING RCEP
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# UPCOMING EVENTS

# CMAA

## NORTHERN CALIFORNIA CHAPTER


Meet the Primes, In-Person Networking Event

**Wed, May 28 | The Overlook at t...**

More info


Programs Webinar - Future Trends in Healthcare Desig..

**Thu, Jun 12 | Zoom Webinar**

More info


EDUCATION WEBINAR - AI 101: Transform Your…

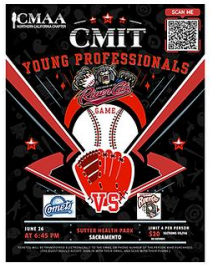
**Thu, Jun 19 | ZOOM Webinar**

More info


Awards Gala and Industry Celebration

**Wed, Jun 25 | California State R...**

More info




CMIT / Young Professionals River Cats Game

**Thu, Jun 26 | Sutter Health Park**

More info

# UPCOMING EVENTS

CMAA NORTHERN CALIFORNIA CHAPTER

WEDNESDAY | 5:30 PM

# JUNE 25, 2025

CALIFORNIA STATE RAILROAD MUSEUM

125 I STREET
SACRAMENTO 95814

## AWARDS GALA & INDUSTRY CELEBRATION

CMAA NORTHERN CALIFORNIA CHAPTER

UPCOMING EVENTS


THURSDAY
AUGUST 28th
IN-PERSON

CMAA Northern California Chapter
Education Program
May 2025

CMAA NORTHERN CALIFORNIA CHAPTER

# Approach to Decarbonization & High Performing Buildings

## Under the Progressive Design-Build Model

# Today's Panel

UC DAVIS HEALTH  Turner  Perkins&Will  POINTENERGY INNOVATIONS

**Jill Tomczyk**
Executive Director of Strategic Programs
**UC Davis Health**

**Wesley Ramirez**
Project Manger
**UC Davis Health**

**Brett Stuckey**
Regional Sustainability Manager
**Turner Construction Company**

**Brandon Kent**
Managing Director
**Perkins + Will**

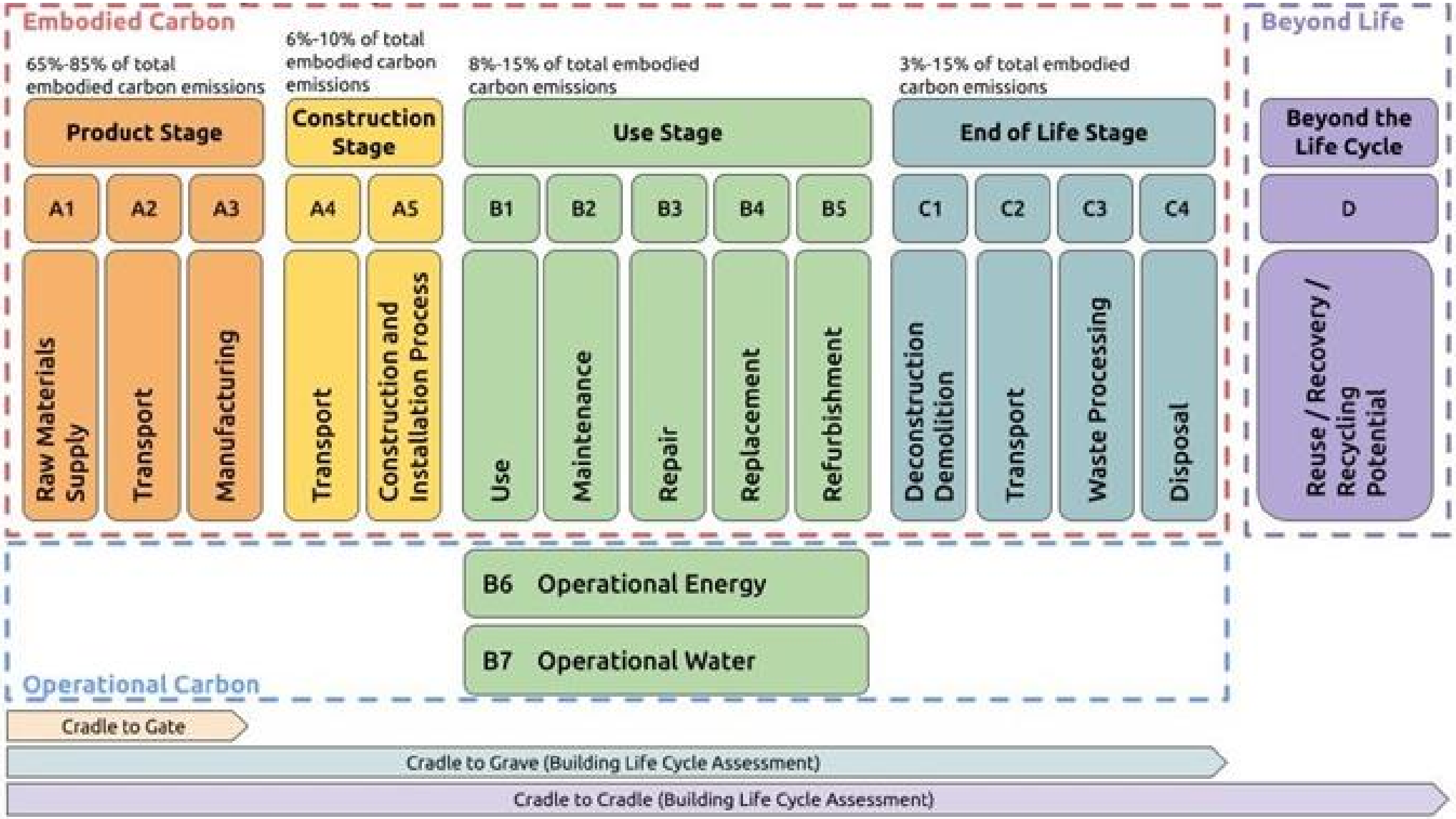
**Rami Moussa**
Managing Principal
**Point Energy**

**Alyse Falconer**
Managing Principal
**Point Energy**
**Moderator*

# What it Means to Decarbonize

## Operational and Embodied Emission

# Carbon Lifecycle Stages

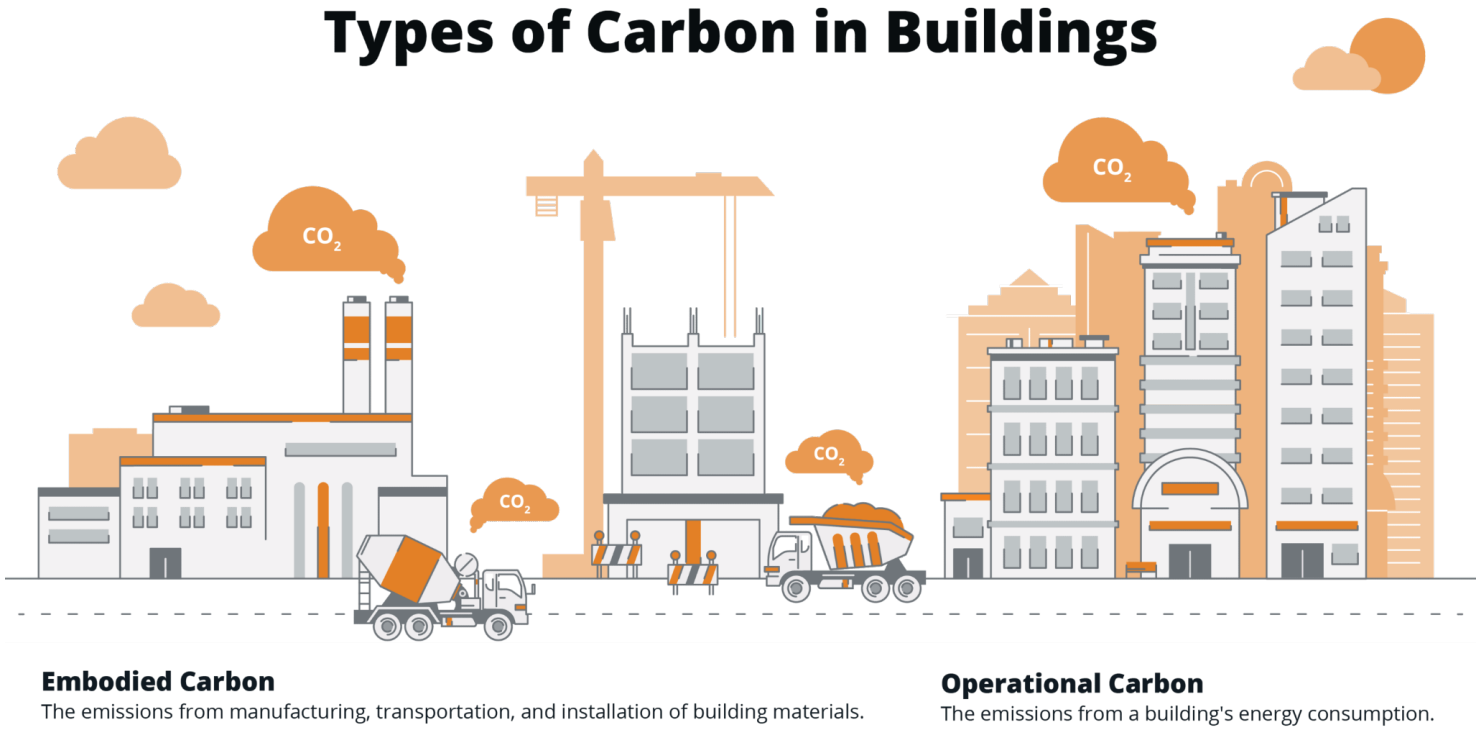


# Global $CO_2$ Emissions by Sector

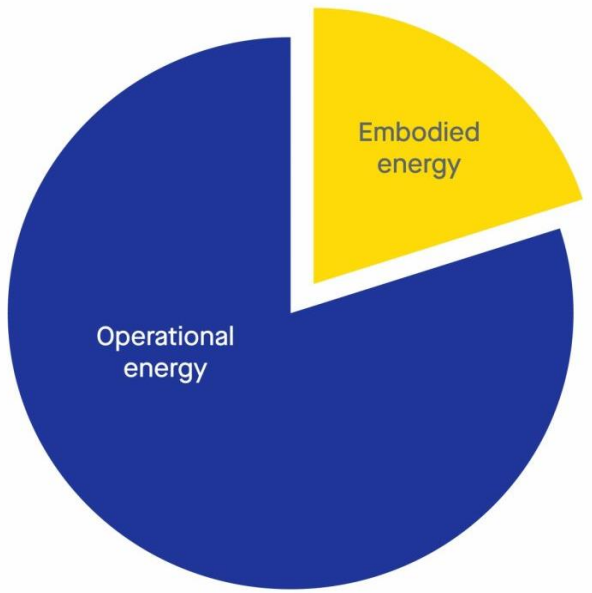
*Source: 2018 Global ABC Report; IEA*

| | |
|---|---|
| Concrete | 11.1% |
| Steel | 10.1% |
| Aluminum | 1.5% |

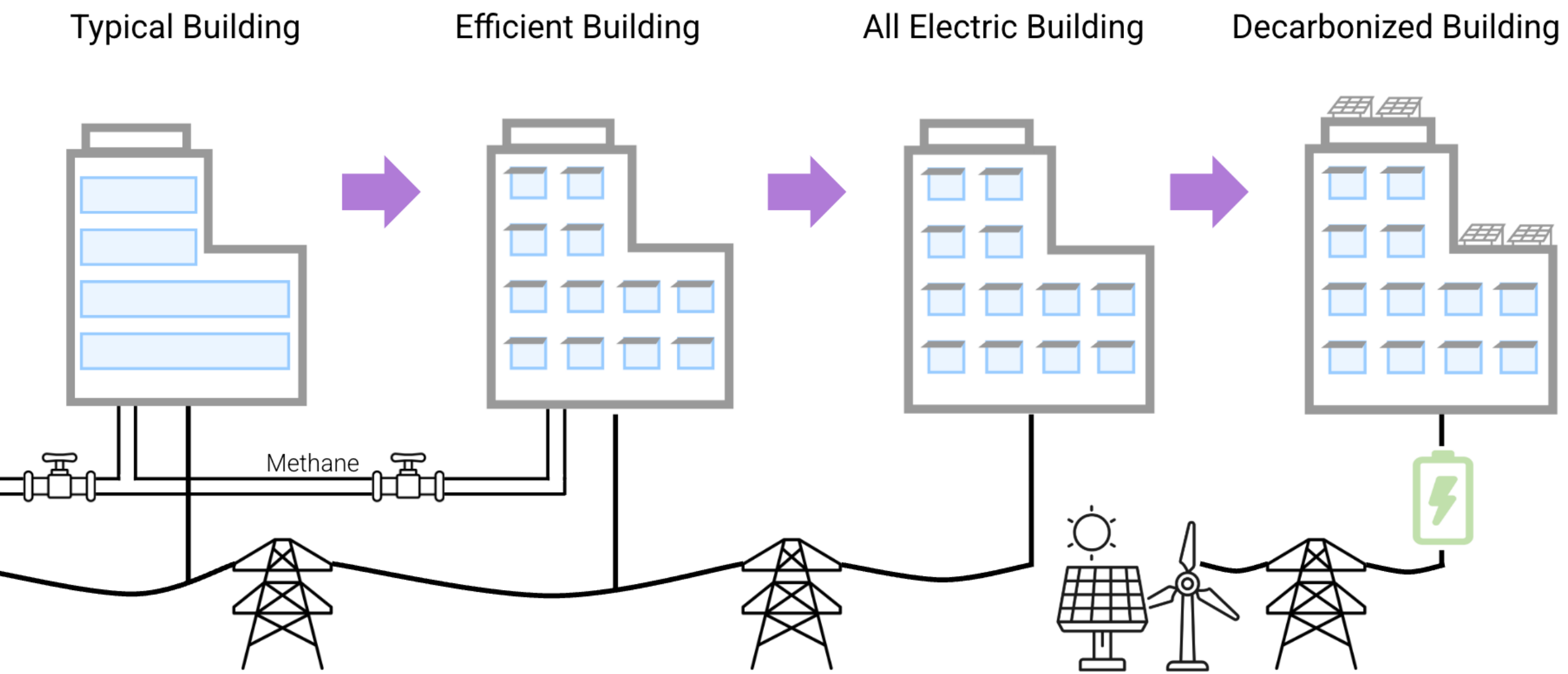
# Building Cabon Emission Sources




## Typical Lifecycle Emissions



# Design Path to Operational Decarbonization



# Developing High Performance Buildings Affordably

## Under the Progressive Design-Build Model


*Source: Design-Build Institute of America*

UC DAVIS HEALTH | Facilities Planning and Development Division

# UC Davis Health – Progressive Design-Build

## Pavillion OR Integration

$107M

***Make Ready Execution & CD***
**First Patient: 7/13/2028**


## Central Utility Plant Expansion

$406M

***Make Ready Execution & CD***
**First Patient: 5/17/2029**

## 48X Complex

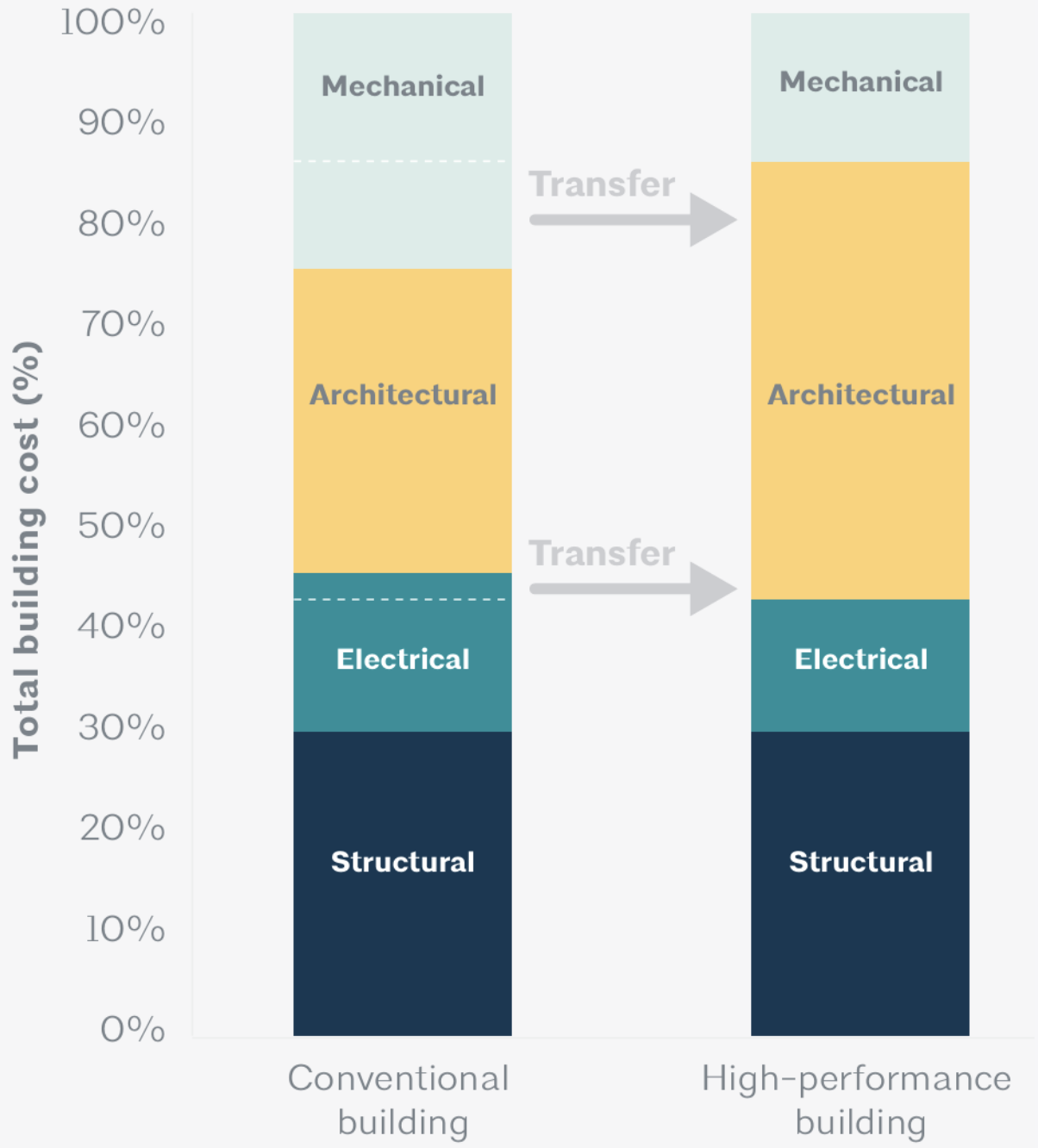
$589M

***Execution***
**First Patient: 7/1/2025**

## California Tower

$3.8B

***Execution***
**First Patient: 12/27/2030**




# High-performance Buildings Don’t Need to Cost More!

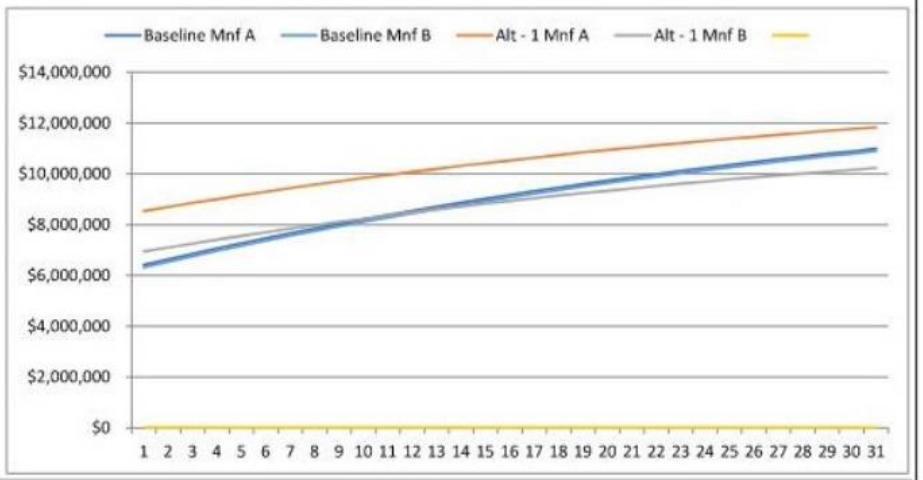
*Source: AIA Architect’s Guide to Building Performance*

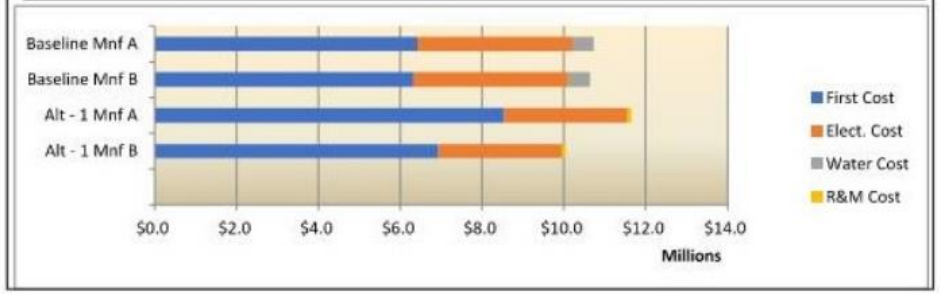
# Strategies to Maintain Early Project Cost Projections

## On High Performance MEP & Facade Systems

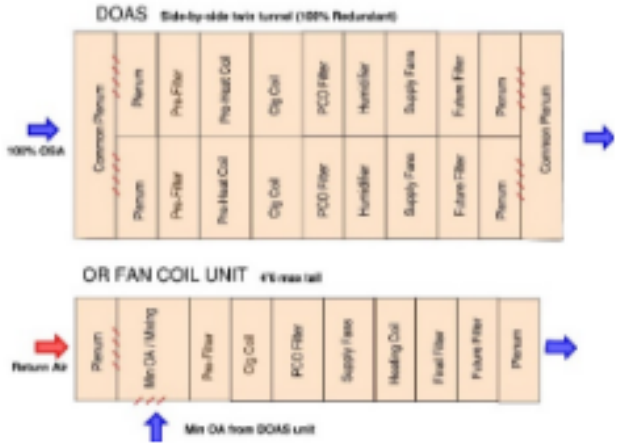
**LIFE CYCLE COST REPORTING OF OPTIONS**

| | | | | |
|---|---|---|---|---|
| Capital discount rate | 6% | **NET PRESENT VALUE OF OPTIONS** | | **Payback** |
| Electricity Escalation rate | 3% | Baseline Mnf A | $10,992,408 | Base |
| Natural Gas | 4% | Baseline Mnf B | $10,899,408 | -- |
| R&M Escalation Rate | 3% | Alt - 1 Mnf A | $11,834,491 | >30 |
| Study Life (Years) | 30 | Alt - 1 Mnf B | $10,235,491 | 10.7 |

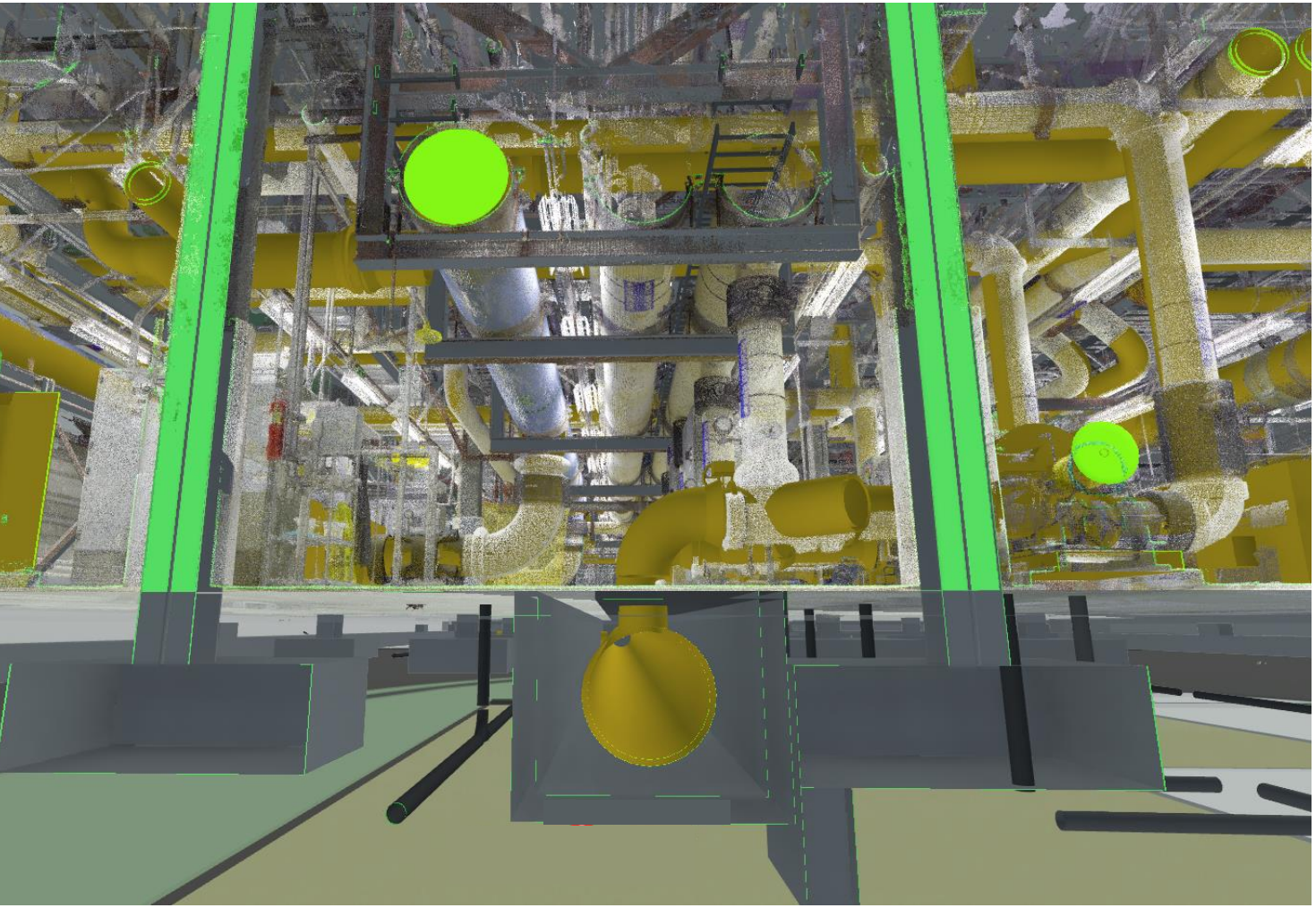


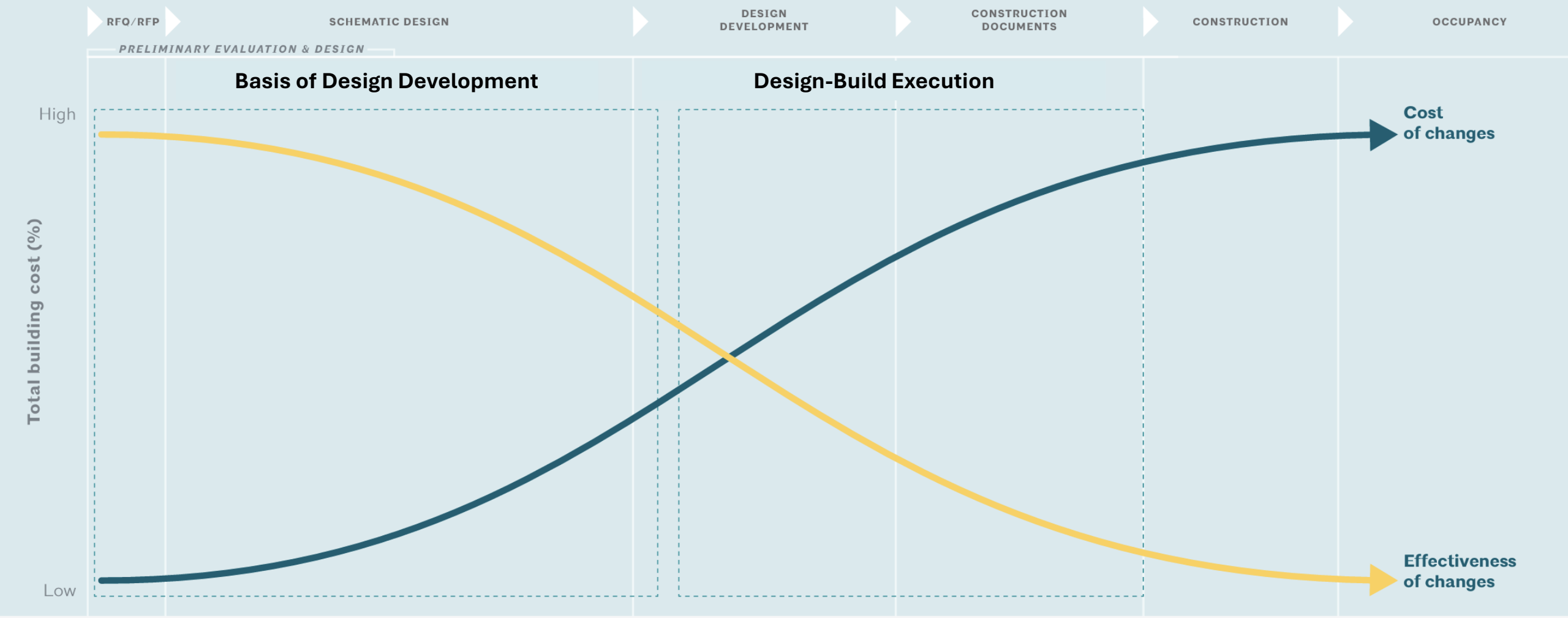

## Target Condition/Option Assessed




- To optimize energy efficiency, resiliency, and provides optimal IEQ using a system that is easily maintainable.
- The alternate system provides a 52% energy savings over the baseline system
- Provides a payback of 10.7 years using the alternate manufacturer with minimal impact to initial cost and no schedule impact. Costs are budget numbers from manufactures and have not been competitively bid.
- The alternate system analyzed uses a twin tunnel (fully redundant) 100% “minimum” outside air system serving recirculating fan coil units. Each OR is served by a single zone fan coil unit that includes cooling, heating, and final filtration and will include one N+1 fan module in a fan array. Unit selections include PCO filters will have seismic certification (OSP).




CHILLED WATER RETURN




*Source: AIA Architect's Guide to Building Performance*

# **High Performing Façade**

Impact on Building Performance

# Lock in Early Project Performance Requirements to Hit the Required Metrics

# Building Embodied Carbon Intensity & Developing Strategies to Reduce ECI

# Embodied Carbon on Bid Forms

Although embodied carbon information is requested at the time of bid, this information is not considered part of the "basis of award"; i.e. its completion is not required for submitting a fully responsive bid. The awarded subcontractor is still required to comply with the requirements set forth in the specifications. If not submitted at the time of bid, this information shall be submitted within five (5) working days of the bid opening OR the bid closedown meeting, whichever comes first.

| A. Product Category (Hot-Rolled, HSS, Plate, or Steel Deck) | B. Quantity (metric tons) | C. EPD Type (Facility, Product, Industry) | D. Facility | E. **Unfabricated** Global Warming Potential (kgCO2e/metric ton) |
|---|---|---|---|---|
| Hot Rolled | 1,829 | Product | Blytheville, AK | 875 |
| HSS | 192 | Product | Blytheville, AK | 1,650 |
| Plate | 324 | Product | Portland, OR | 1,440 |
| Steel Deck | 213 | Product | Antioch, CA | 1,805 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## LIFE CYCLE COST REPORTING OF OPTIONS

| | |
|---|---|
| Capital discount rate | 6% |
| Electricity Escalation rate | 3% |
| Natural Gas | 4% |
| R&M Escalation Rate | 3% |
| Study Life (Years) | 30 |

| NET PRESENT VALUE OF OPTIONS | | Payback |
|---|---|---|
| Baseline Mnf A | $10,992,408 | Base |
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| Alt - 1 Mnf A | $11,834,491 | >30 |
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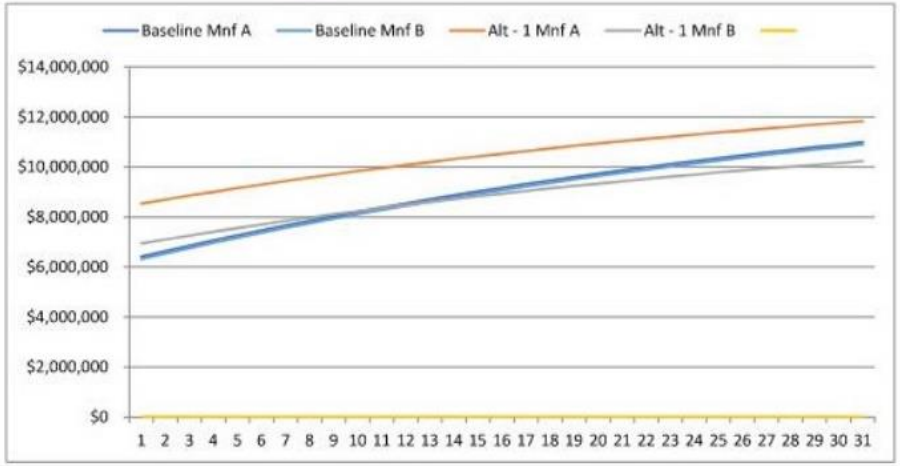
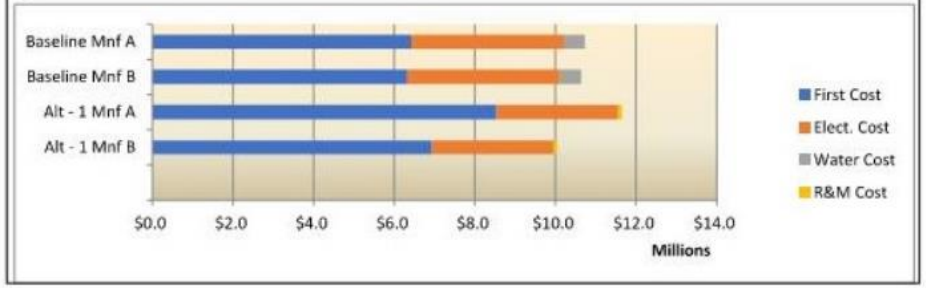



**Problem Statement/ Topic**

Selection of an optimal HVAC system for the ORs

California Tower Project

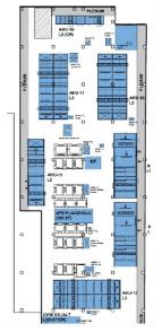
**A3 - 007 – OR HVAC System**
**Dated: 5/18/21**

### Background

Develop a system that provides safe and energy efficient HVAC that includes high air quality for patient care. And a system that minimizes downtime, includes a N+1 redundancy and is easily maintained and operated.

### Current Condition/Issue

- The baseline design is a return air central air handling unit with cooling, heating, filtration, and humidification located within the unit on the 4th level. There are (3) units which serve the ORs and surrounding support spaces.
- The distribution includes pressure independent air valves on the supply and return with heating allowing accurate pressure and temperature control and an unoccupied setback feature for energy savings.
- Other considerations: Final filter locations were discussed at the last stakeholders meeting. Consideration for ceiling mounted HEPA vs air handler unit mounted HEPA filters and the consensus was to locate them in the air handler.
- Code constraint – keep unit configuration and manufacturers to equipment that has code requirement seismic certification.



### Target Condition/Option Assessed

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- The alternate system provides a 52% energy savings over the baseline system
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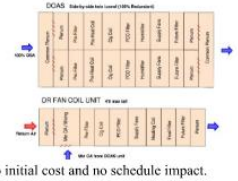
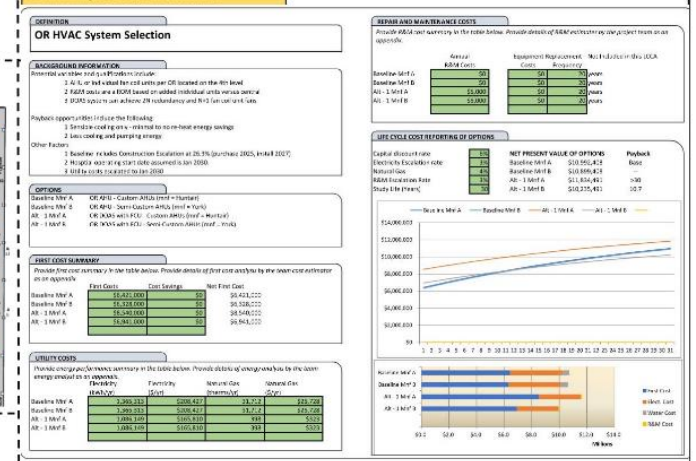



### Data/Analysis, Cost and Schedule




### Countermeasures/Recommendations

The design team recommends the alternate OR DOAS / FCU system with redundant DOAS units pending final cost review by the UCDH RHT team.

### Implementation Plan

### Follow-up Plan

Reviewed:

Participants: MARUP, UCDH/CCM, FD&C/PD&M

Authors: Mazzetti / Arup

Attachments: A,B,C,D,E

Date: 5/18/21

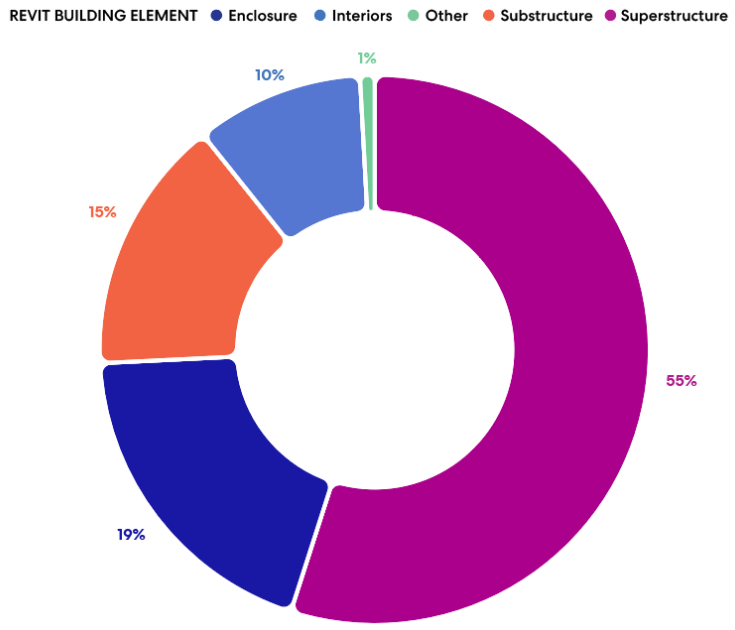
A3 No: 007

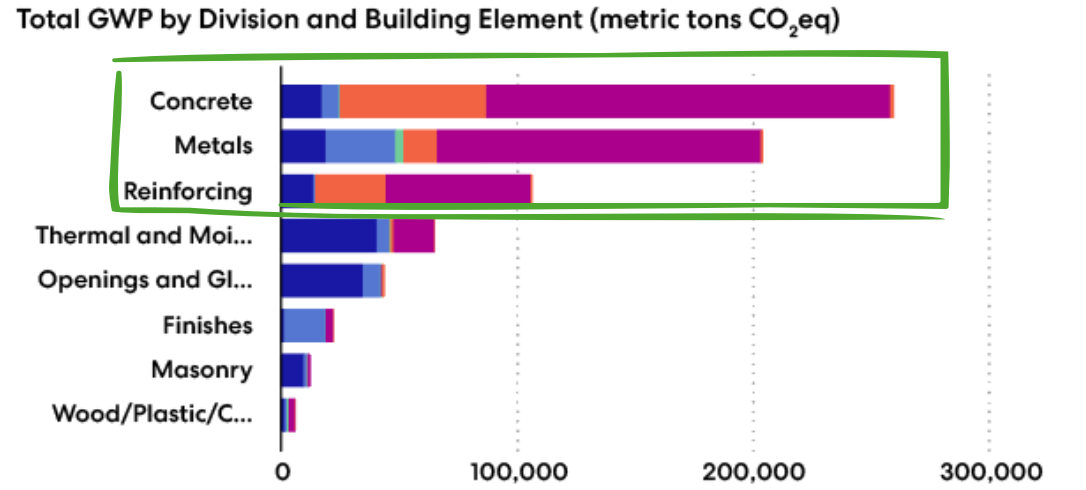
*Source: Perkins&Will Internal Study*

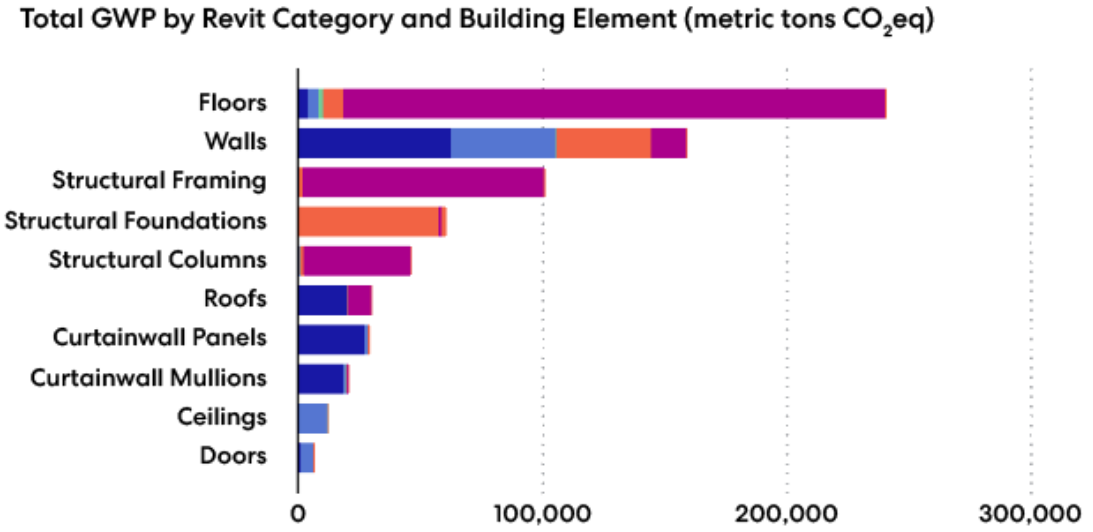
# Concrete and Steel. What can we do about it?

→ **We can't avoid concrete and steel, but large variations currently exist.**

→ **Insulation, envelope metals, and glazing are the next highest contributors (albeit much smaller in value).**



KEY FINDING #1

# **Concrete & Steel**
The elephant in the room.

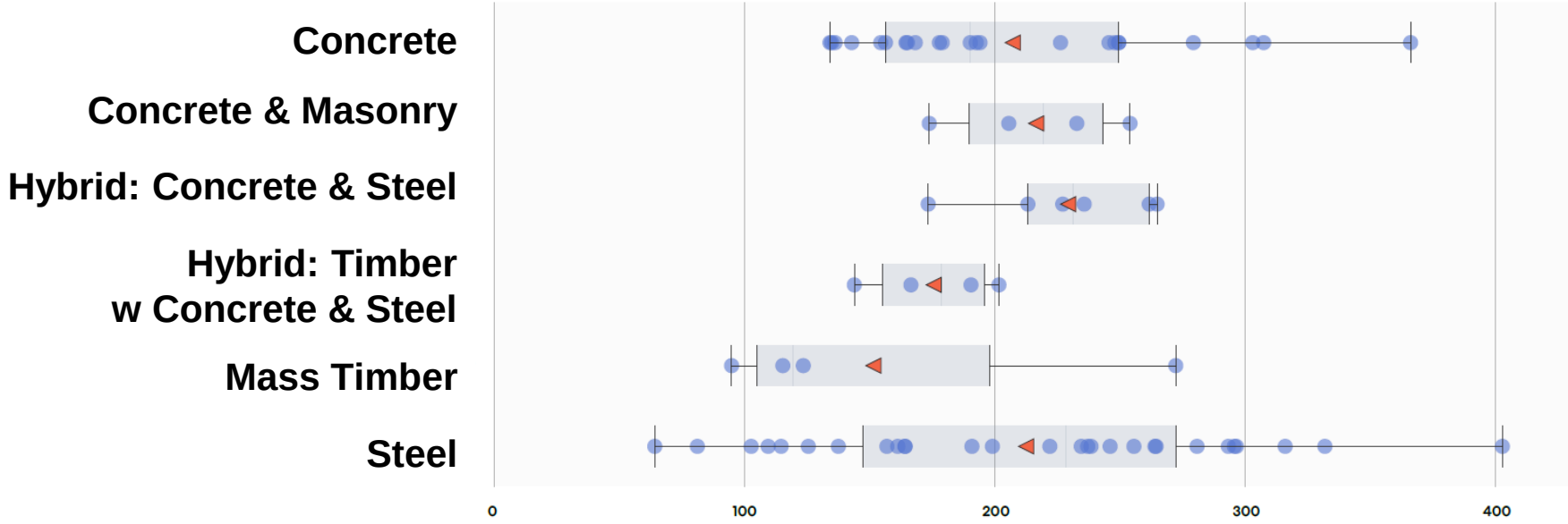



Figure 14B: Mean GWP Intensity of New Construction Projects, Superstructure / Projects by Structural System Type (kg $CO_2eq/m^2$), Life Cycle Stages A1-A3, excluding biogenic carbon

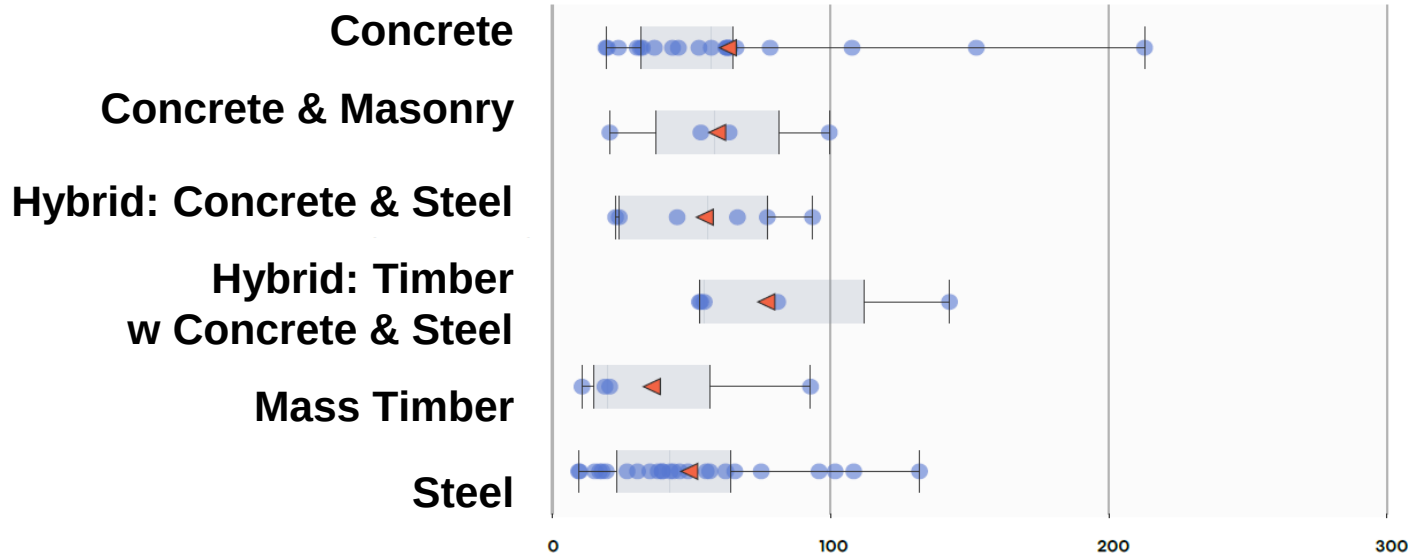
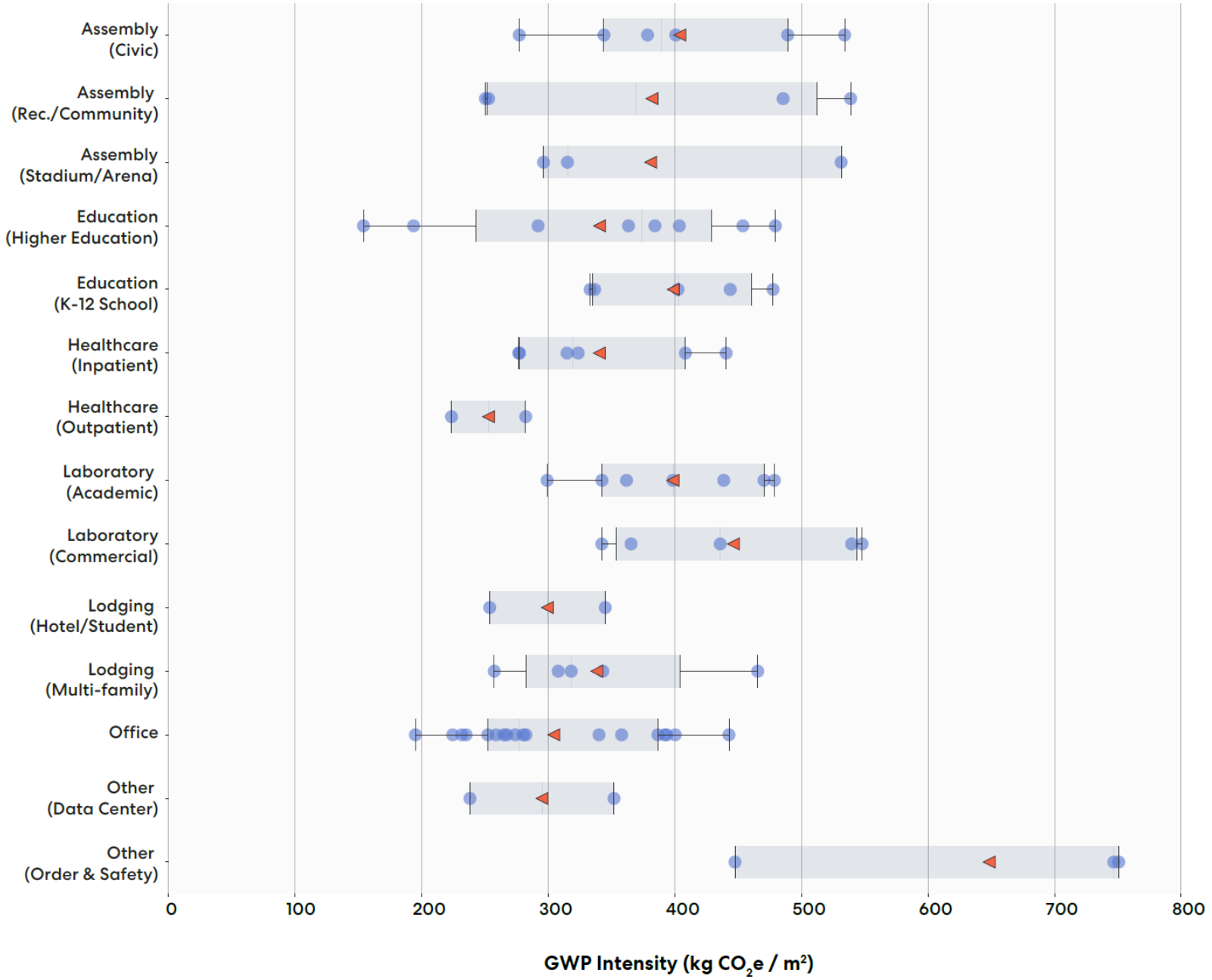


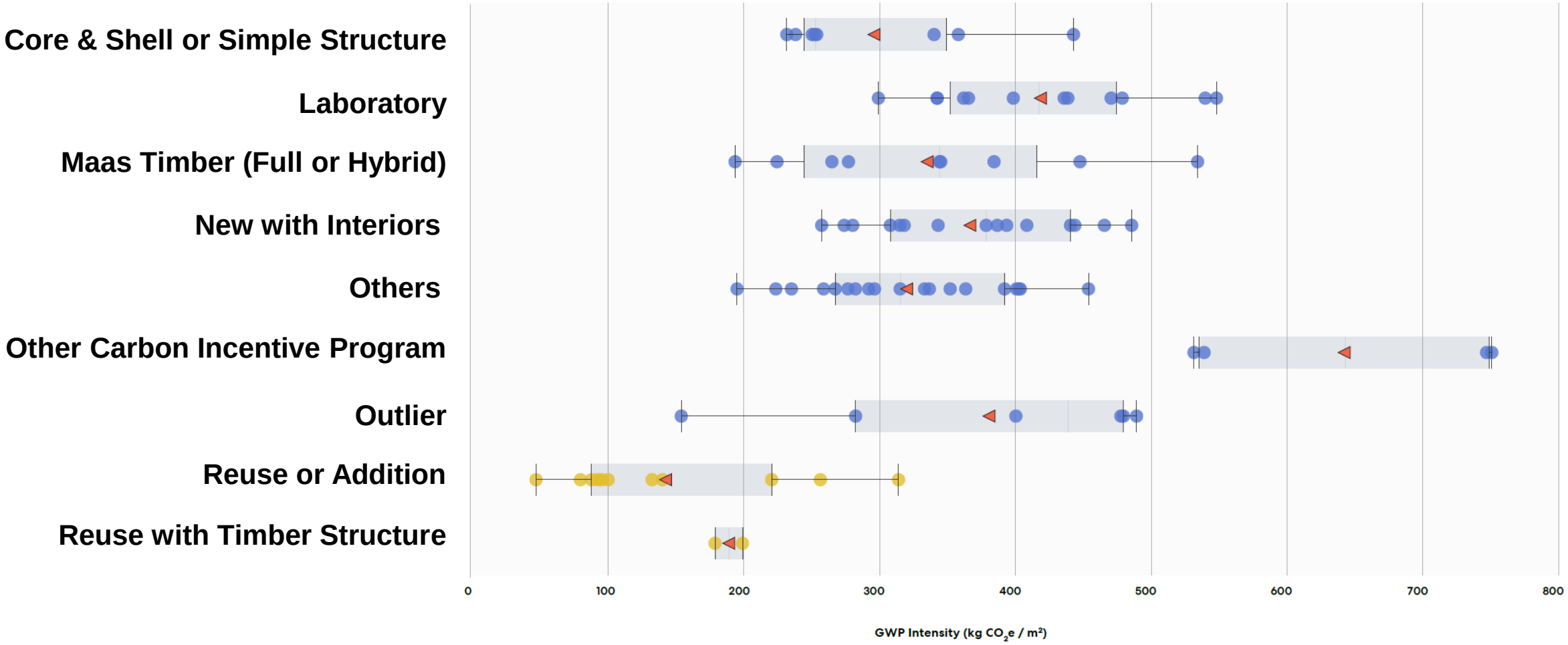

Figure 14C: Mean GWP Intensity of New Construction Projects, Substructure Only / Projects by Structural System Type (kg $CO_2eq/m^2$), Life Cycle Stages A1-A3, excluding biogenic carbon

KEY FINDING #1 — BUILDING USE TYPES

# Building Embodied Carbon doesn't appear to be driven by building use types.



KEY FINDING #2 — ADAPTIVE REUSE



# Question & Answer

## Open Discussion

CMAA
NORTHERN CALIFORNIA CHAPTER

# Thank You!

UC DAVIS HEALTH  Turner  Perkins&Will  POINTENERGY INNOVATIONS