



Getting Ready for Gut Rehab

Preparing for Renovation,
Remodel, Major System
Replacement, or Additions

Introduction



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- **Architecture – 4 decades**
Renovation, Restoration, Adaptive Reuse, Historic Rehab
- **Real Estate Due Diligence**
49 states and 6 countries
- **Facility Forensics**
Building Envelope, Energy, ADA, Building Code Compliance
- **Capital Planning**
Municipalities and Parks, Universities, Schools, Hospitals

Agenda



1. The state of US Educational Facilities
 2. Hitting the Sweet Spot for Renovation, Restoration, Repurposing,
 3. The impact of Structure and Sustainability
 4. The impact of Infrastructure
 5. The impact of Energy Efficiency Goals and Legislation
 6. The impact of Renovation and Remodeling Codes
 7. The impact of Space Utilization and Education Objectives
 8. The impact of Building Envelope Issues
 9. The Impact of Primary and Secondary systems equipment
 10. The Importance of Budgeting and Cost Engineering
- Q & A

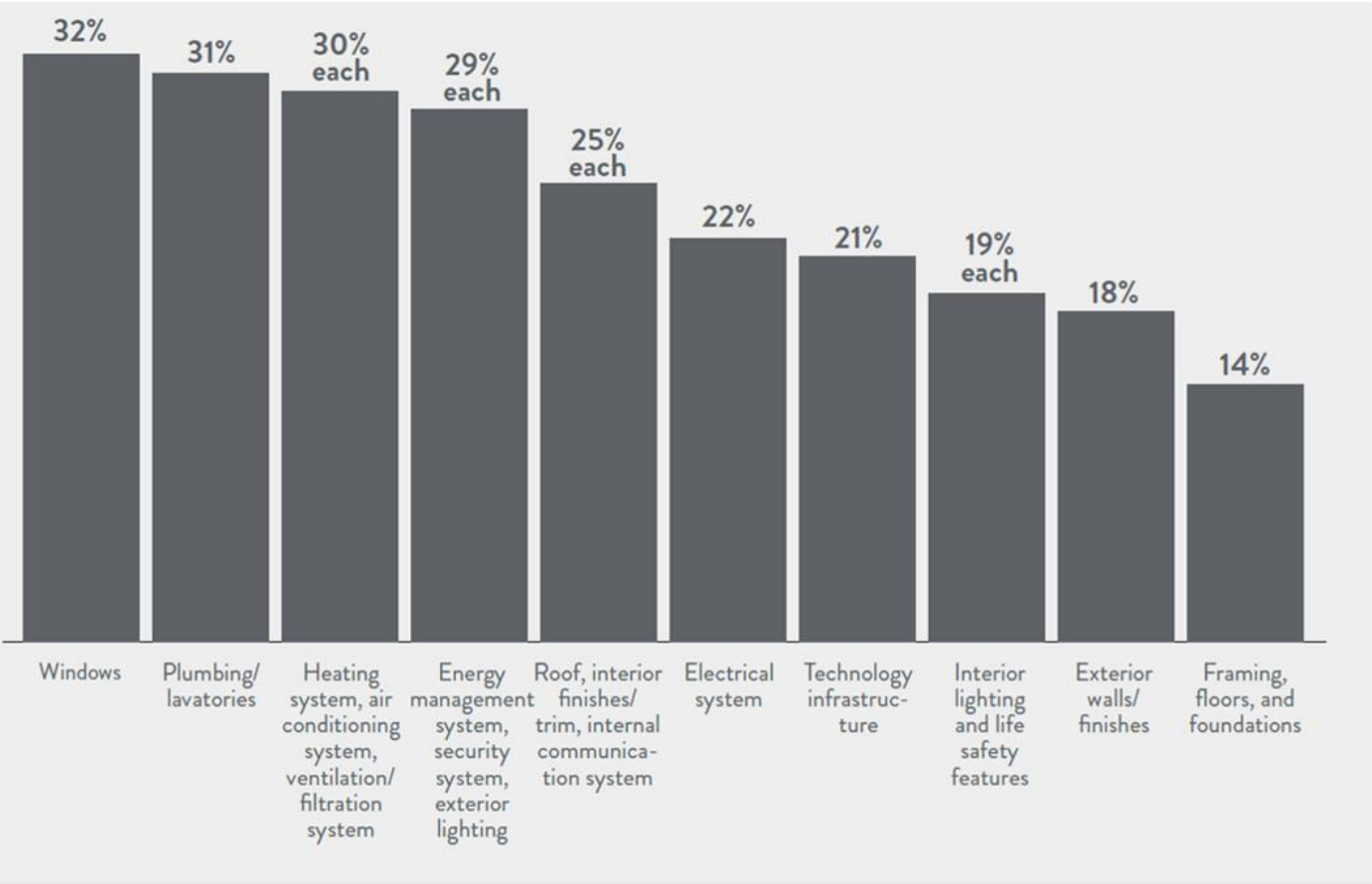
Setting the Table

1. The State of US Education Facilities



- 45% of schools are 50+ years old
- 45% of schools need \$4.5 Million to restore
- Federal Government grades the average school a D+
- Average commercial building in the US is 50 Years Old
- Schools are being challenged to improve:
 - Energy and sustainability enhancements
 - Air quality
 - Space utilization
 - Safety
 - Code and ADA compliance.

The State of US Education Facilities



Percent of building systems and features in fair and poor condition in public schools with all permanent buildings.

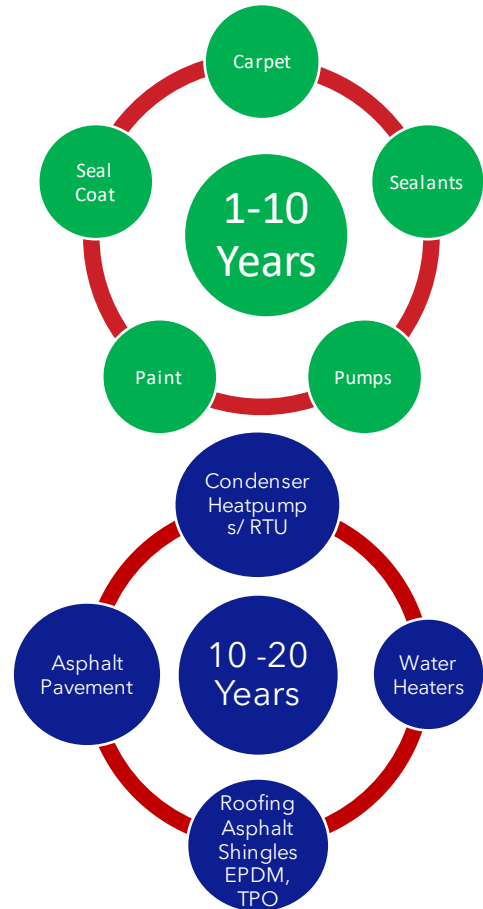
Six Stages - Risks of Aging

Yearly Physical Check-up:

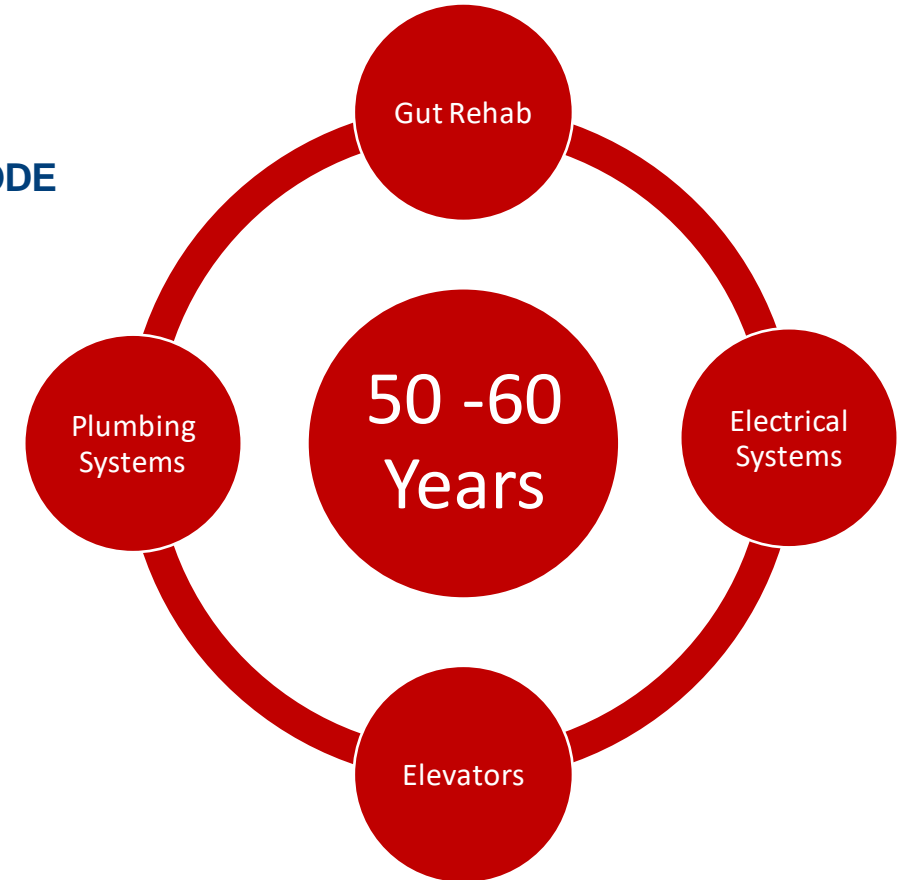
- Stage One (Years 1-10) – Cosmetic Concerns
- Stage Two (Years 10-20) – Minor and Exterior Systems
- Stage Three (Years 20-30) - Remodeling, Secondary and Control Systems
- Stage Four (Years 30-40) – Building Envelope / Life Safety Systems
- Stage Five (Years 40-50) – Major System Replacement and Infrastructure Repair
- Stage Six (Years 50-60) – Gut Rehab / Infrastructure Replacement



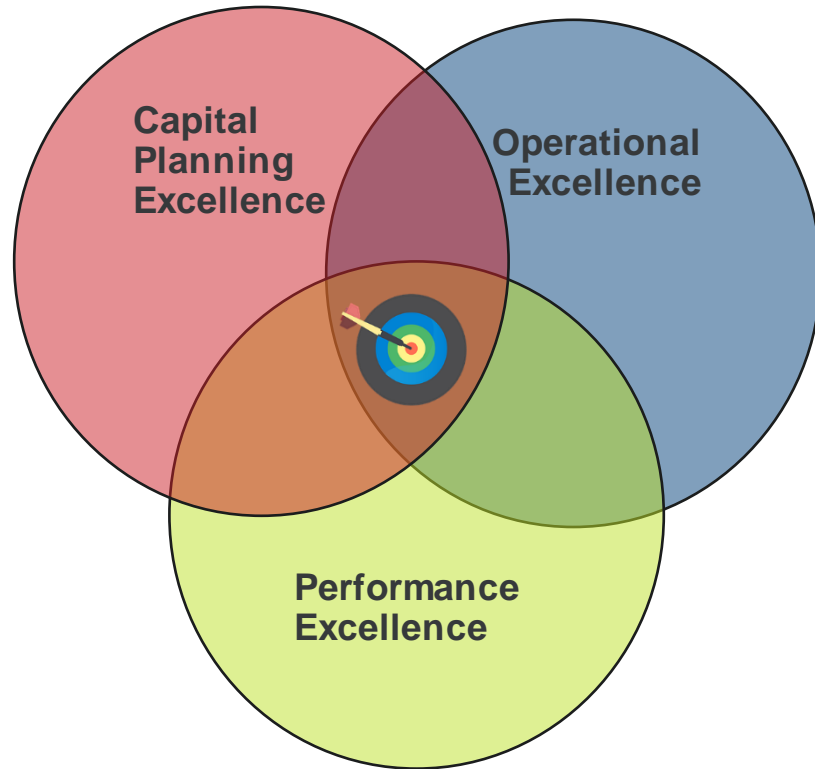
Stage #6: 50 – 60 years



THE CHALLENGE OF YEARS 50 TO 60 IS SUBSTANTIAL RENOVATION TO ADDRESS INFRASTRUCTURE, MAJOR SYSTEMS, AND CODE CONFORMANCE – AS WELL AS REPEATING STAGES (CYCLES) 1, 2, & 3



2. Hitting the Sweet Spot for Renovation, Remodeling, and Adaptive Reuse



- **PERFORMANCE EXCELLENCE:**
 - Conformance with codes and legislation
 - Energy efficiency
- **CAPITAL PLANNING EXCELLENCE:**
 - Understanding costs, EUL, condition
 - Setting priorities / Managing Inflation
- **OPERATIONAL EXCELLENCE:**
 - Optimizing space and use with educational priorities

3. What Role Does Structure and Sustainability Play?



- **Case Study of 277 demolished buildings in North America** (2004 study by Forintek Canada Corp.)
 - Only 8 buildings were demolished due to structural concerns
- **Majority of demolished steel and concrete buildings in study were less than 50 years old.**
 - This shifts the spotlight away from durability of materials and on to Whole Building Calculations for Life Cycle
 - FCI – Facility Condition Index
- **Research shows other reasons for demolition, including:**
 - Changing land values
 - Lack of suitability of the building for current needs
 - Lack of maintenance of various non-structural components
- **Whole Building Assessments Start with FCIs**

FCI - Facility Condition Index

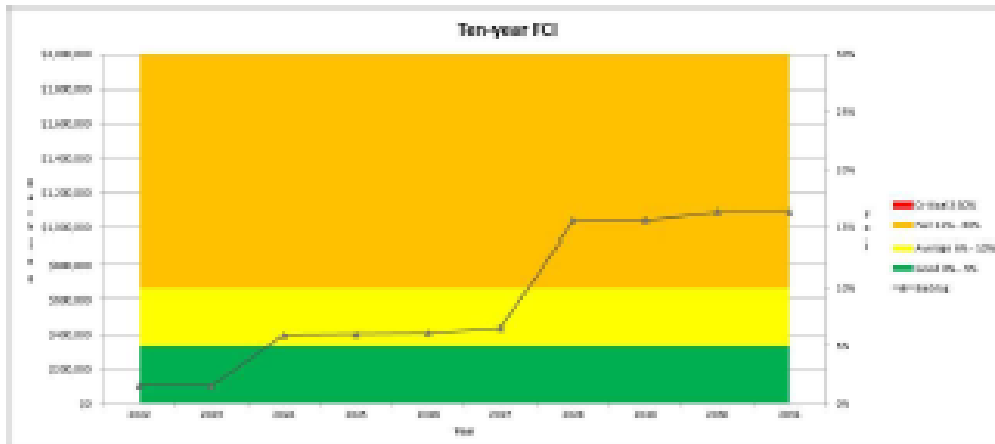
$$\text{FCI} = \frac{\text{Renewal Requirements in 10 Years}}{\text{Current Replacement Value}} \times 100$$

$$\text{FCI} = \$1,091,468 \div \$6,850,000$$

$$\text{FCI} = \underline{15.9\%}$$

Based on the FCI standard rating scale (See Section 3.8), the building is in fair condition.

Figure 2 – 10-year FCI Table

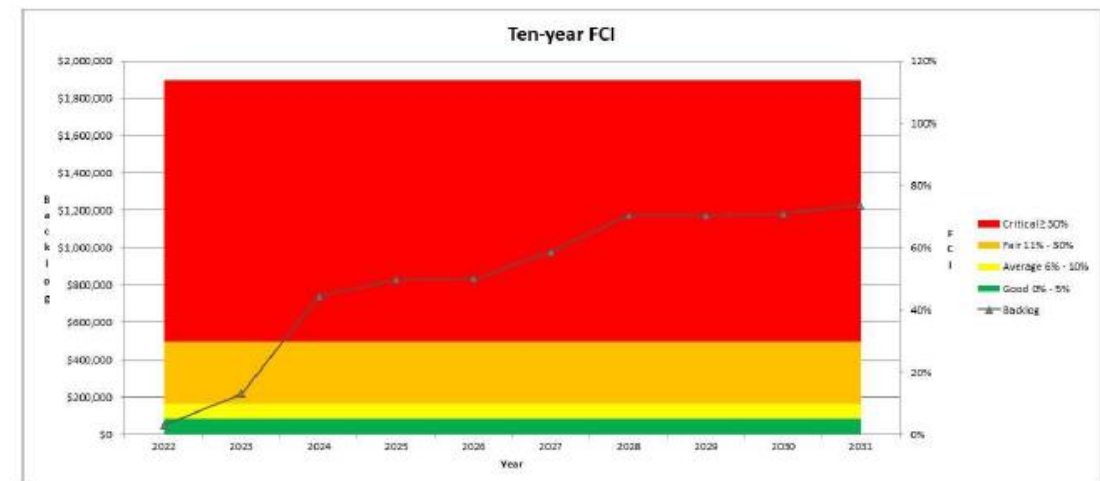


$$\text{FCI} = \$1,226,774 \div \$1,896,000$$

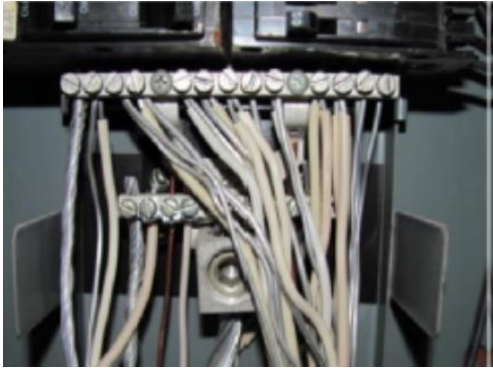
$$\text{FCI} = \underline{64.7\%}$$

Based on the FCI standard rating scale (See Section 3.8), the building is in critical condition.

Figure 2 – 10-year FCI Table



4. What Role Does Infrastructure Play ?



AT 60 YEARS, MAJOR HIDDEN SYSTEMS REQUIRE REPLACEMENT INCLUDING:

- **Plumbing: Water lines / Waste Lines**
- **Electrical: Distribution Systems**
- **Elevator: Core Piston or Cable Systems**
- **Fire Safety: Suppression and Alarm Systems**
- **Heating/Cooling Distribution Systems**
- **Central Heating Systems**



5. What Role Does Energy Efficiency and Legislation Play?

Energy Codes and Regulations:

Where did we come from?

25 Years of Changing Energy Standards

LEED (1994)

IBC (1997)

CA Benchmarking
(2012)

NYC and DC Energy-
use Laws (2019)

July 2019: Washington DC passed Omnibus Energy Act:

By 2021, DC owned buildings with more than 10,000 SF and commercial buildings with more than 50,000 SF will be required to be at or above the 85 percentile in efficiency, when compared to similar use buildings of similar size. If buildings fail to meet this ambitious and constantly moving target, they will be required to improve their energy efficiency by 20% before 2026 or face fines. The new fines have not been fixed as of yet. After 2021, the energy efficiency slowing changes to include commercial buildings with 25,000 SF by 2023 and DC buildings with 10,000 SF by 2026.



NYC CLIMATE MOBILIZATION ACT - 2020:

- Local Law 84 • **Benchmarking Disclosure:** [Local Law 84](#) requires annual benchmarking data to be submitted by owners of buildings with more than 50,000 square feet for public disclosure by May 1. This will bring transparency for energy and water usage and inform building owners and tenants on how to make their buildings more efficient.
- Local Law 85 • **Renovation Retrofit:** No longer exempting renovations affecting less than half of the building system, [Local Law 85 \(LL85\)](#), the second law in the Greener, Greater Buildings Plan (GGBP), now requires buildings to meet the most current energy code for any renovation or alteration project
- Local Law 87 • **Energy Use Reporting Requirement:** [Local Law 87](#) requires large buildings to audit, retro-commission, and submit information to the City. The audit and retro-commissioning information includes the following:
 - Basic team information
 - General building information
 - Existing equipment inventory
 - Energy end use breakdown
 - Energy conservation measures identified from the audit
 - Retro-commissioning measures



NYC CLIMATE MOBILIZATION ACT – 2020

Local Law 88

- **Submetering Requirement:** [Local Law 88](#) requires large non-residential buildings to upgrade lighting to meet current New York City Energy Conservation Code standards, and to install electrical sub-meters for each large non-residential tenant space and provide monthly energy statements

Local Law 95

- **Benchmarking:** Local Law 95 amends the ranges for how energy efficiency grades are calculated as required by [Local Law 33 of 2018](#). Local Law 33 of 2018 required the display of energy efficiency scores and grades for buildings that are required to annually benchmark their energy and water consumption. The energy label will be displayed near a public entrance and include both a letter grade and the energy efficiency score.



6. What Role Do Codes & Subcodes Play?



**Code Conformance - IBC - 35 chapters, 700 pgs
14 pages for Rehab**

- Chapter 7: In-kind Replacement
- Chapter 8: Level One: Less than 50% alteration
 - Windows, Exits, Egress, Space Reconfiguration
 - Change or Extend System
- Level Two: More than 50% alteration

Sub-codes for Renovation – 4 Categories

- Repair
- Alteration
- Change of Occupancy
- Addition

ADA CODES – 30 Years of change

ADA (1992)

FAIR HOUSING (1988)

ADA REVISED(2010)

Renovation – Defined as making structural or life safety changes

CODE COMPLIANCE

ADA COMPLIANCE 10% OF BUDGET FOR:

- Restrooms
- Lobbies
- Elevators

ENERGY BENCHMARKING

- Nation-wide requirements by State and City
- 2020 requirement in Washington DC

7. What Role does Space Utilization and Educational Objectives Play?



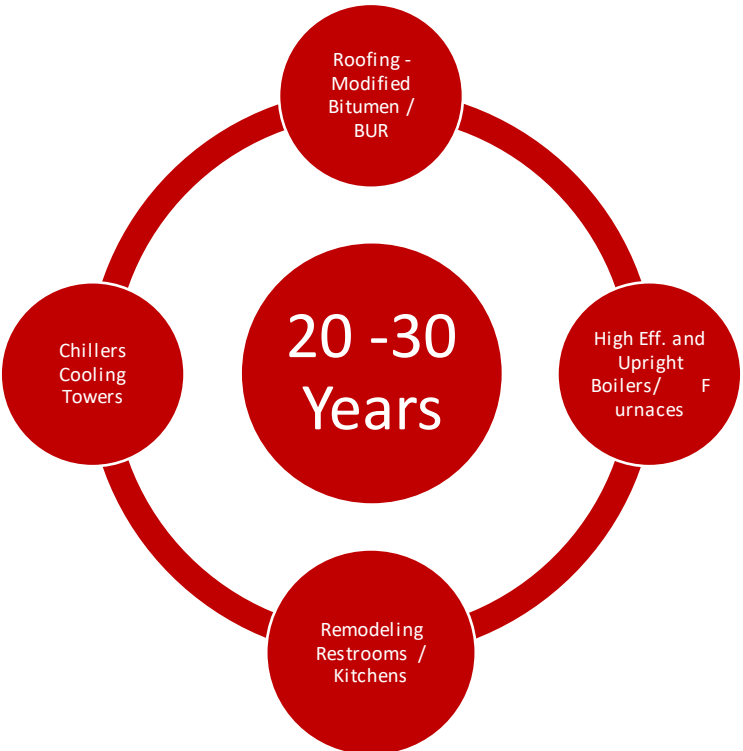
The Space Entanglement, Joe Bilotta FAUA, August 2023

“Planners have built utilization guidelines, utilization metrics, architectural standards, scheduling algorithms, and the list goes on.

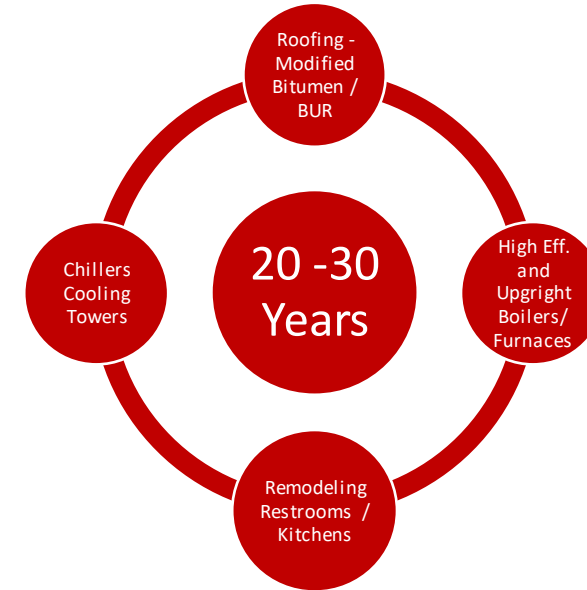
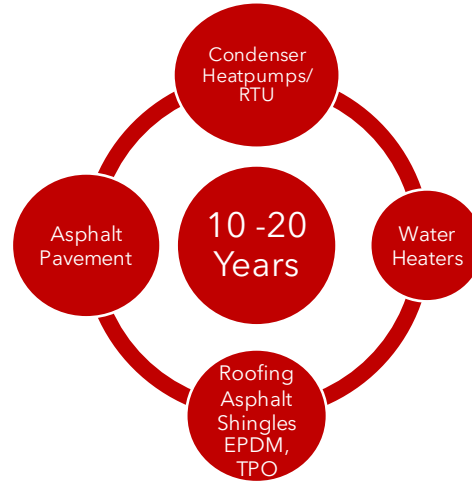
Yet, the expansion trend continues. The “black hole” of underfunded deferred renewal and increased operational costs continues to grow. “

Captain James T. Kirk might be correct when he said, “Space—the final frontier.”

8. What Role do Building Envelope Issues Play?



9. What Role do Secondary Building Systems Play?



Once ceilings are opened, multiple systems are candidates for replacement, including:

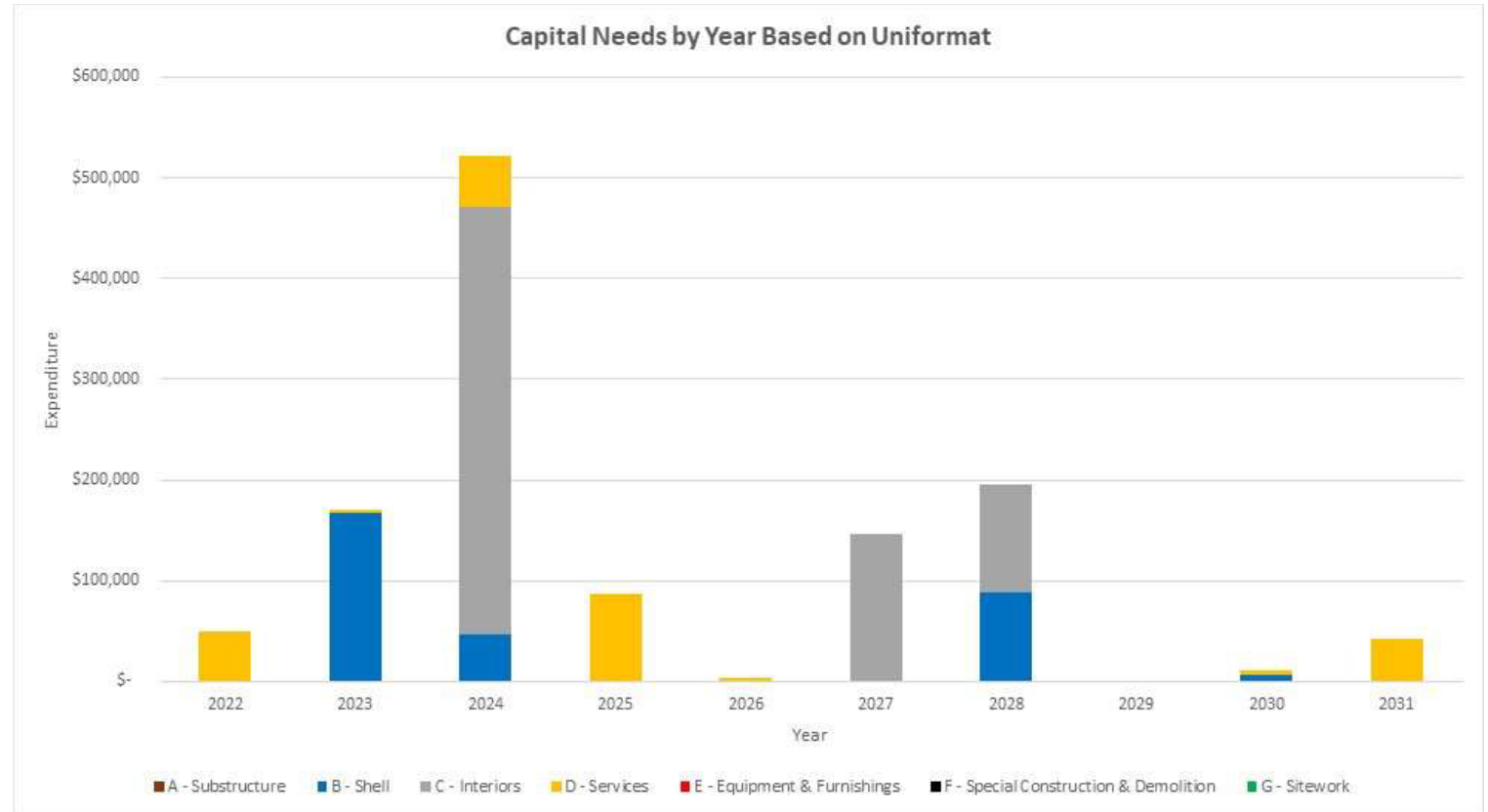
- Vav boxes,
- Fire alarm systems
- Acoustic ceiling panels and Lighting Systems

10. Role does Budgeting and Cost Engineering Play?

What is the current state of my assets?

- What do I own?
- Where is it?
- What condition is it in?
- What is its performance?
- What is its remaining useful life?
- What is its remaining economic value?

What is my best long-term funding strategy?



FCA provides a database that:

Element Description	
Name	D304011 - Air Handling Units - Packaged - AHU - 1 - Air Handling Unit
Installation Year	2018
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	26 Years
Renewal Year	2048
Quantity / Unit of Measure	1 / Each
Unit Cost	\$60,465.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.00000 / 1.00000
Replacement Cost	\$60,465.00

Description

Trane AHU - Unit has heating and cooling coils. Serves 1st floor - located in 1st floor Mech. Rm.

Condition Narrative

No deficiencies noted or observed.

Photos



Caylor Building - D304011



Caylor Building - D304011



Caylor Building - D304011

- Stores manufacturer data
- Collects historical information on each piece of equipment or building system
- Confirms age and EUL assessment
- Provides condition and maintenance comments

10. What Role does Budgeting and Cost Engineering Play?



- Priorities Start with Defensible and Consistent Data
- Planning Requires Proactive Scheduling
- Understanding the Value of Coordination of Infrastructure Systems
- Understanding Issues with Supply Chain Delays
- Respecting Inflation Effects on Materials and Labor
- Coordinating with Organizational Mission
- Coordinating with Design Professionals for Code Conformance
- Prioritizing Critical, Life Safety, and Comfort Systems

Summary

When preparing for major changes, facility managers are often looking at questions of:

- Infrastructure fatigue
- Energy and sustainability enhancements
- New technologies
- Space utilization
- Budget and finance
- Code and ADA compliance.



SUMMARY

MAJOR PROJECTS:

- Remodeling
- Renovation
- Additions
- Major system overhaul



INFLUENCES:

- Building codes
- Renovation codes
- Remodeling codes
- Energy codes
- ADA & fair housing
- Legislation
- Facility age
- System synchronization
- Organizational priorities



Q&A



Question 1



Who is Planning Substantial Renovation in
2023 or 2024?

Question 2



Who is Planning Adaptive Re-use in 2023 or 24 ?

Question 3



Who in the Audience is Planning Demolition of non-performing facilities?