APPA 2017 Conference
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Condition Assessments

How to Keep Deferred Maintenance from Nipping at Your Heels

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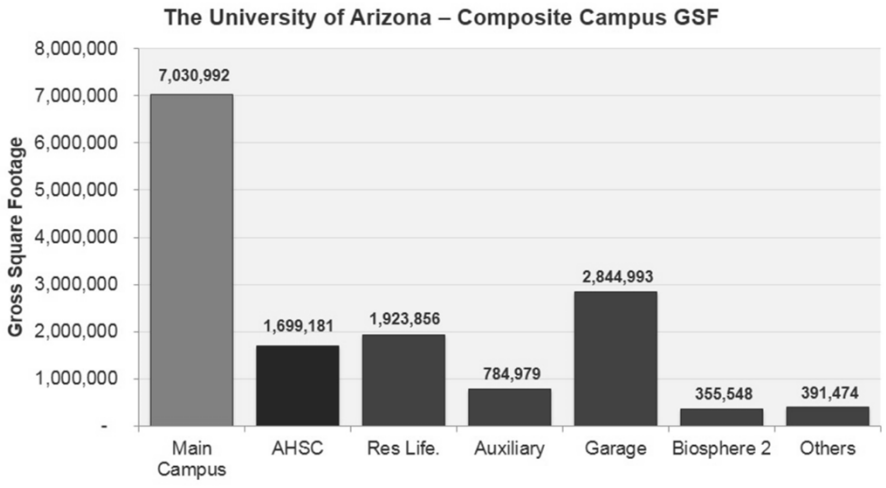
THE UNIVERSITY OF ARIZONA

UA CAMPUS OVERVIEW

- +43,000 Students
- 11 Million Square Ft.
- +267 Buildings
- 600 Facilities Staff
- 3 Central Plants
- 22 Chillers
- 2 Turbines
- 33% Electricity produced on site
- 300 Storage tanks ice storage

THE UNIVERSITY OF ARIZONA FACILITIES MANAGEMENT DEPARTMENT

The University of Arizona Space Profile



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Putting Your Campus Building Age in Context

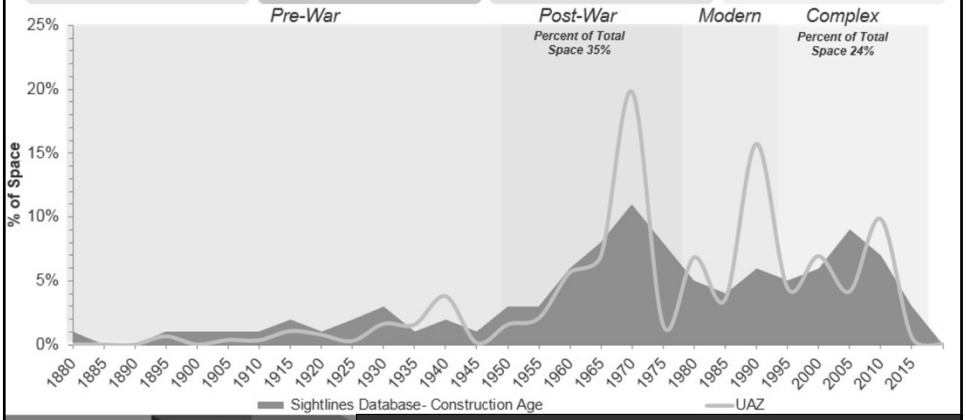
The campus age drives the overall risk profile

Pre-War
- Built before 1951
- Durable construction
- Older but typically lasts longer

Post-War
- Built from 1951 to 1975
- Lower-quality construction
- Already needing more repairs and renovations

Modern
- Built from 1976 to 1990
- Quick-flash construction
- Low-quality building components

Complex
- Built in 1991 and newer
- Technically complex spaces
- Higher-quality, more expensive to maintain & repair



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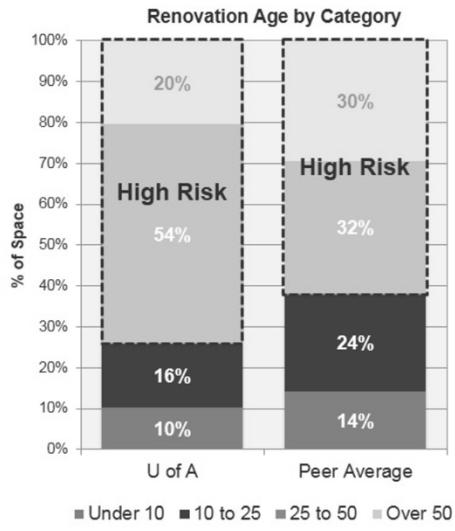
Campus Age Profile

Impacts of concentrated age profile



Buildings over 50
Life cycles of major building components are past due. Failures are possible. Core modernization cycles are missed.
Highest risk

Buildings 25 to 50
Major envelope and mechanical life cycles come due. Functional obsolescence prevalent.
Higher Risk

Buildings 10 to 25
Short life-cycle needs; primarily space renewal.
Medium Risk

Buildings Under 10
Little work. "Honeymoon" period.
Low Risk

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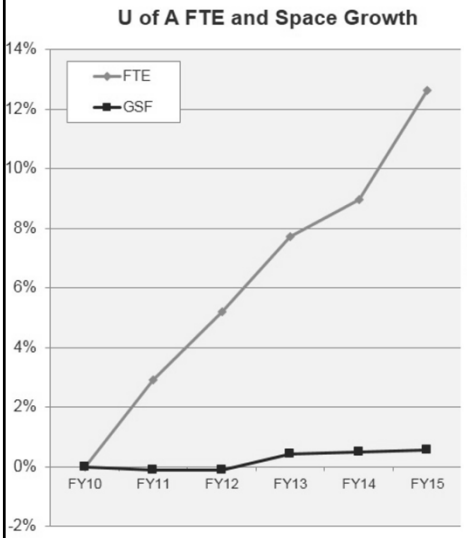
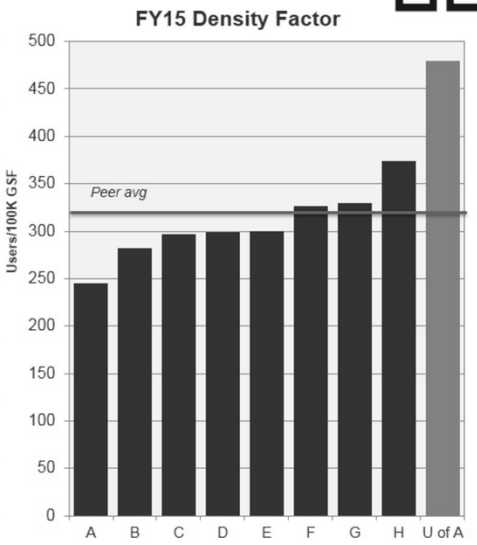
With More Users, Density Increases





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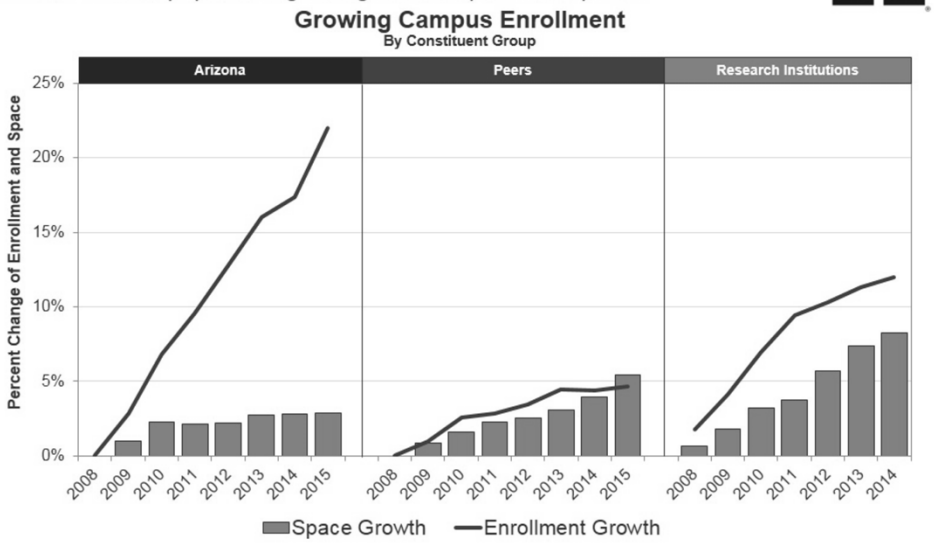
Campus Space and Enrollment

U of A's student population growing at faster pace than peers



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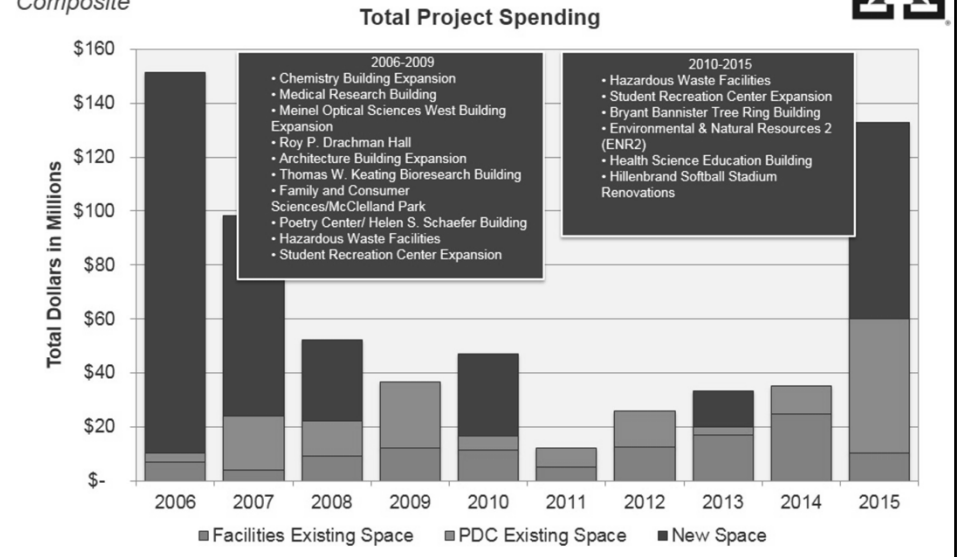
Total Project Spending

Composite



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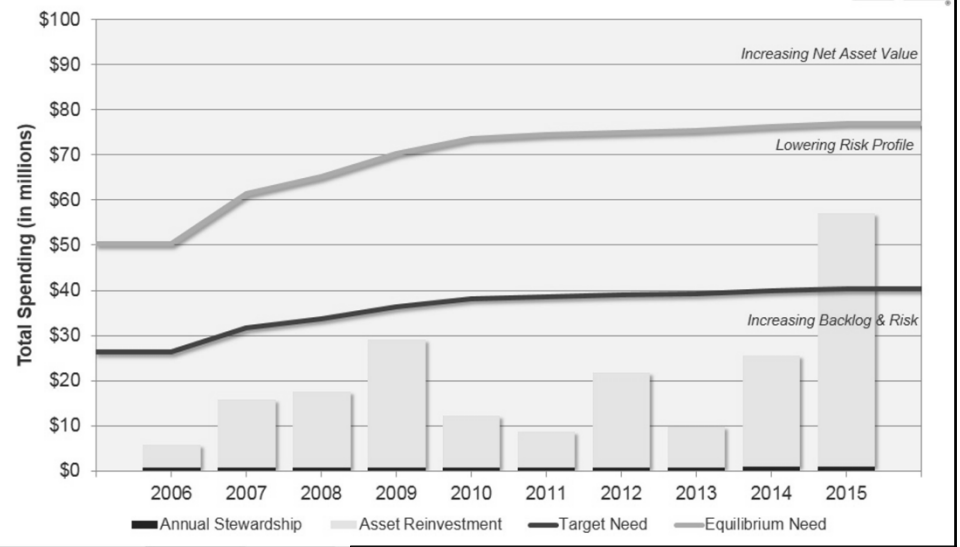
Lack of Capital Leads to Increasing Needs

Meeting target need with one-time capital



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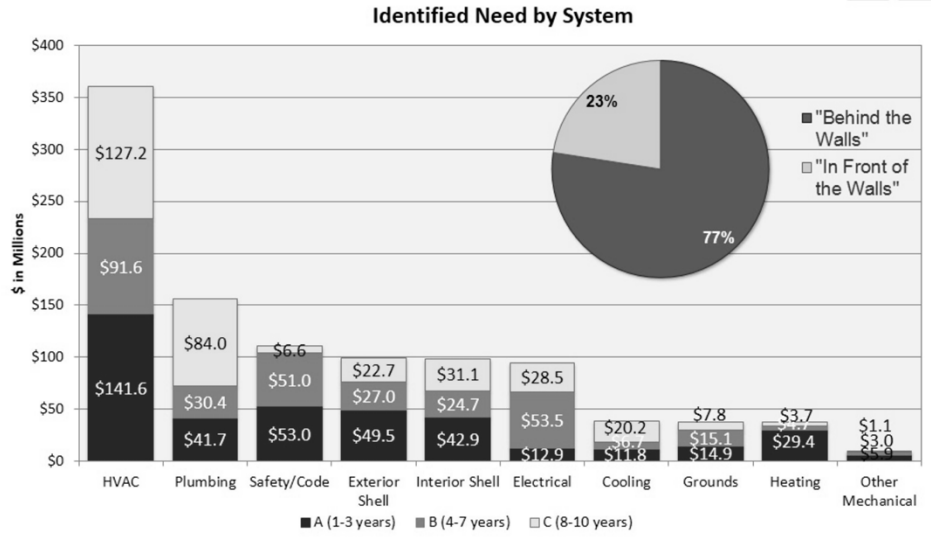
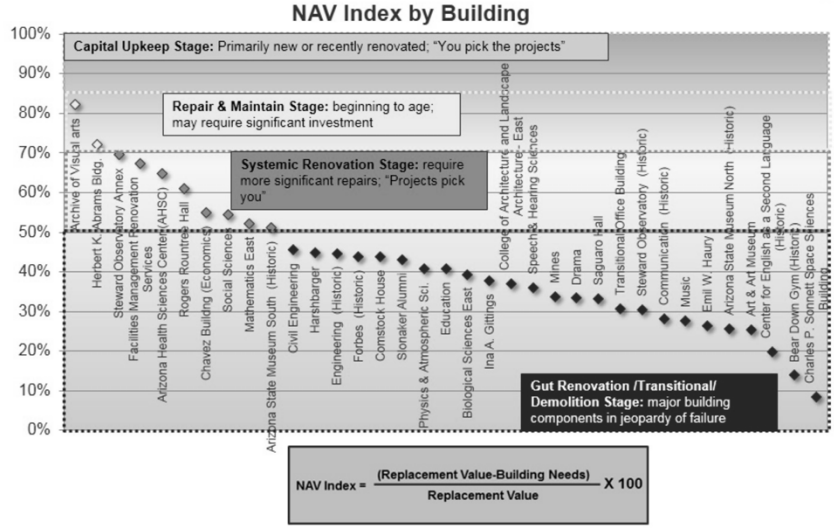
Identified Needs by System - $1.04B

Timeframes A, B, & C only – excluding new construction



Net Asset Value

Buildings over 50 years old; average NAV of 42%



Replacement Value: the cost of replacing a building in kind. Influenced by building function and technical complexity.

Building Needs: identified backlog of critical needs and upcoming 10 year lifecycle needs.

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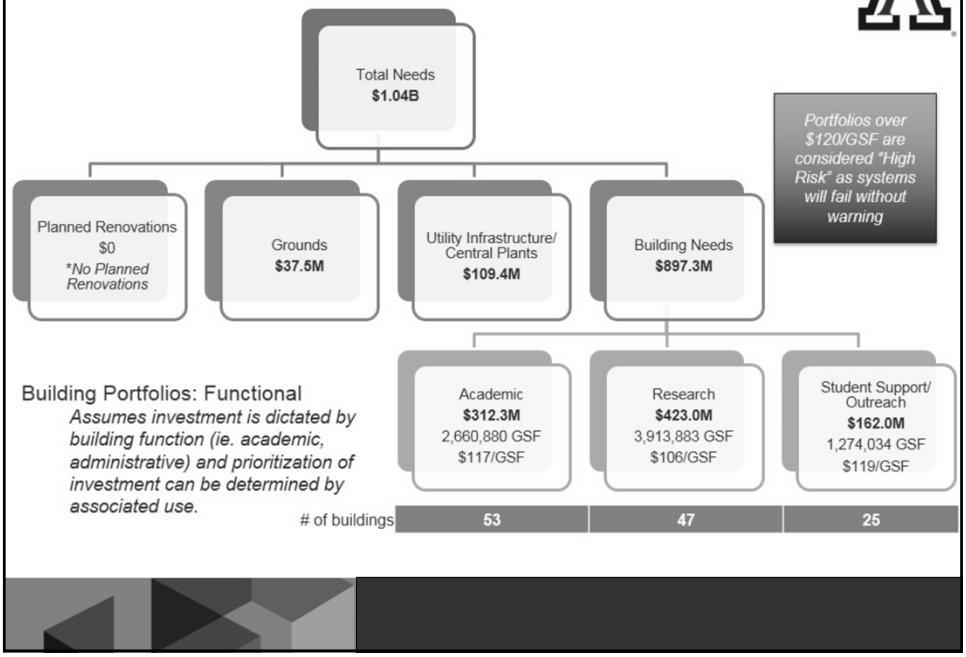
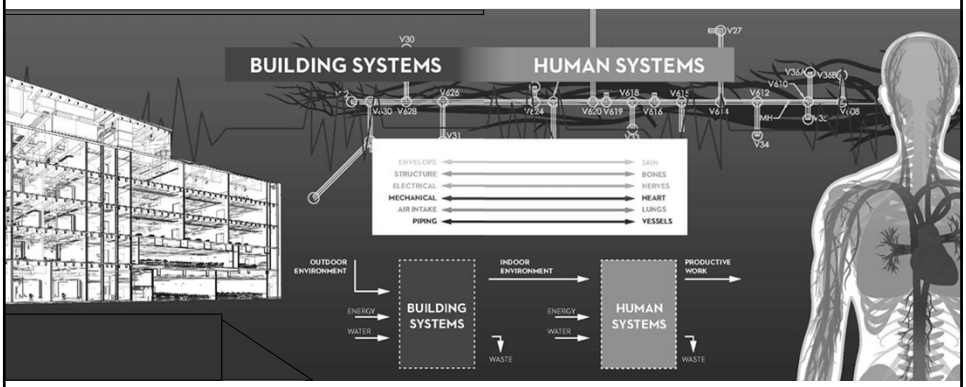
Building Portfolios



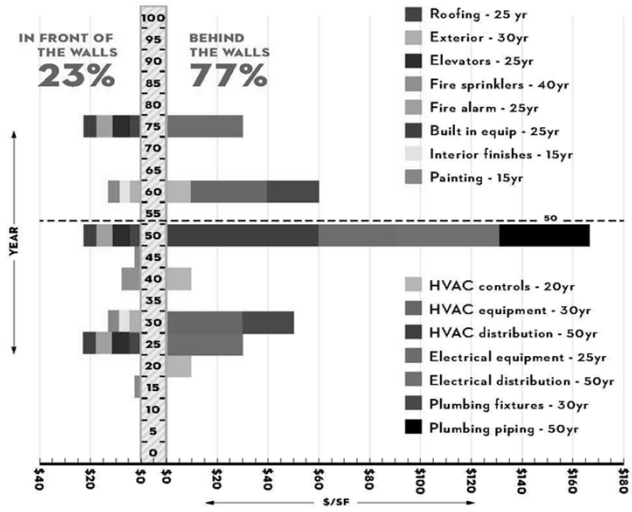
Building Portfolios: Functional

Assumes investment is dictated by building function (ie. academic, administrative) and prioritization of investment can be determined by associated use.

TWO SYSTEMS: BUILDINGS AND HUMANS



LIFE CYCLES AND PERIODIC RENEWAL COSTS OF BUILDING SYSTEMS



INDOOR HEALTH ISSUES

The effect of building health on the humans and human systems housed within is not insignificant.

Emerging research suggests long term exposure to very low concentrations of certain molds, allergens and other airborne contaminants may lead to sensitization, manifested in a broad spectrum of symptoms.

1/3

Occupants spend up to one third of their lives within the indoor environment.

Many of the symptoms associated with indoor air quality directly affect concentration and productivity.

Long term effects of temperature, humidity, pressure, noise, vibration, particulates and airborne contaminants may have direct and indirect consequences on individual health.

Buildings are communities where the knowledge, perception and concern of individuals becomes a part of the collective experience.

Indirect effects of indoor building health include recruitment, retention, productivity, and culture.

DETAILED FACILITY CONDITION ASSESSMENT

- When to Perform an FCA
  - Aging building suffering from compounded deferred maintenance
  - Increasing amount of ongoing repairs
  - Loss of functionality
  - Health concerns from occupants
- Goal of FCA
  - Systematic identification of major deficiencies
  - Generation of Building Renewal Roadmap
  - Comprehensive building system assessment

DIAGNOSIS
FACILITY CONDITION ASSESSMENT

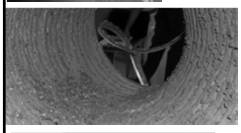
- Assemble Project Task Force Team
- Weekly meetings / Interview occupants
- Coordinate and work with building manager
- Room-by-Room Architect / Engineer survey
- Airflow Testing
- Fire Safety / Emergency Egress assessment
- Structural assessment

- Building Envelope / Evaluation of Water Infiltration
- Above-Ceiling survey
- Camera Survey of HVAC systems
- Terminal Unit dissection
- Ventilation assessment
- Laboratory Testing of Contaminants (CO, CO2, SO2, mold spores, airborne debris)
- Energy Savings

FACILITY CONDITION ASSESSMENT RESULTS

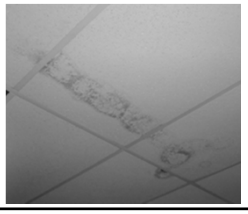






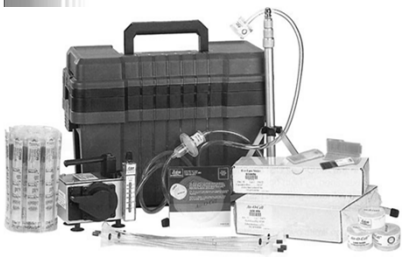






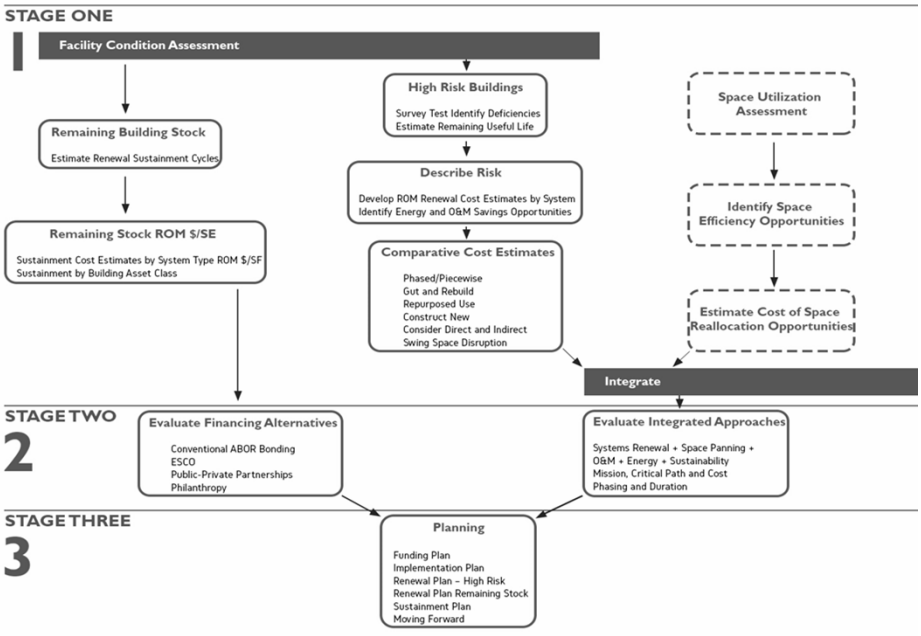

- Cracked concrete floors
- Antiquated cold rooms
- Envelope leakage
- Asbestos fireproofing
- Deteriorated insulation
- Duct leakage
- Constant volume air handlers
- Inefficient lab exhaust
- No energy recovery
- Low air changes
- Dirty ductwork
- Interior duct lining
- Exterior standing water
- Grading / site drainage issues
- Piping dead legs
- Industrial Hygienist results

DETAILED FACILITY CONDITION ASSESSMENT
MOLD TESTING



- Mold Testing / Results
  - Mold is ubiquitous in nature
  - No standards for testing
  - No standards for acceptable levels
  - Differing opinions among experts
  - Differing sensitivity levels
  - ASHRAE design guidelines (Standard 160)
  - NYC Department of Health guidelines

-COMPREHENSIVE CAMPUS PLAN- -VISION- -MISSION-



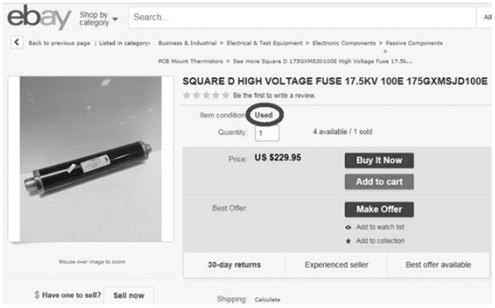
RENOVATE OR REPLACE?

RENOVATE	REPLACE
$300/sf	**$420/sf**
•Architectural - $44/sf	
•HVAC - $194/sf	
•Plumbing - $44/sf	
•Electrical - $18/sf	

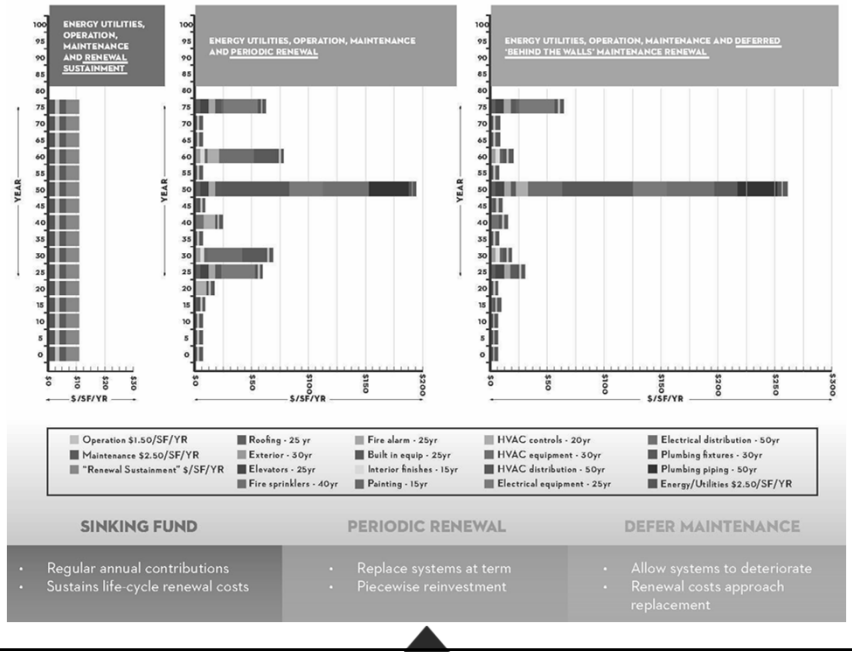
- Cost Factors
  - Building type (lab / classroom / offices)
  - Quality of construction
  - Space usage efficiency

BUILDING RENEWAL FUNDING

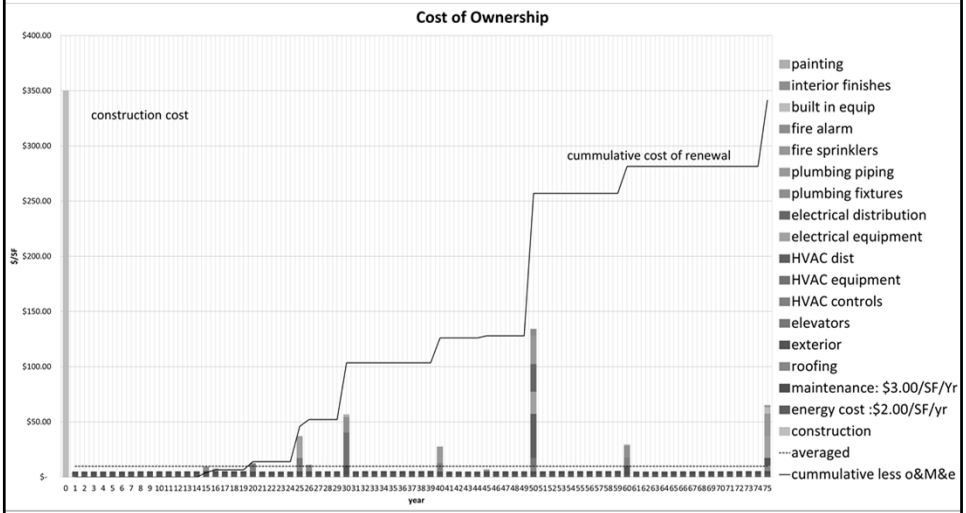
- Planned/Holistic vs. Temporary/Piecemeal
  - Temporary solutions easier to fund
    - Downfall – Higher life-cycle cost
    - Downfall – Do not comprehensively address issues
  - Deferred maintenance dollars typically allocated to life safety
    - Downfall – Little left over for latent issues: Building functionality, health, energy efficiency



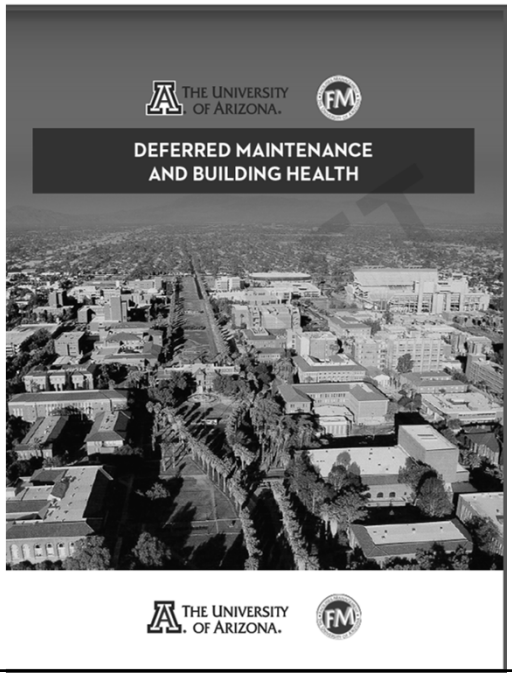
OPTIONS FOR RENEWAL APPROACH
FROM A LIFE CYCLE STANDPOINT



PLANNED MAINTENANCE vs. DEFERRED MAINTENANCE



CAMPUS WIDE FUNDING NEEDS



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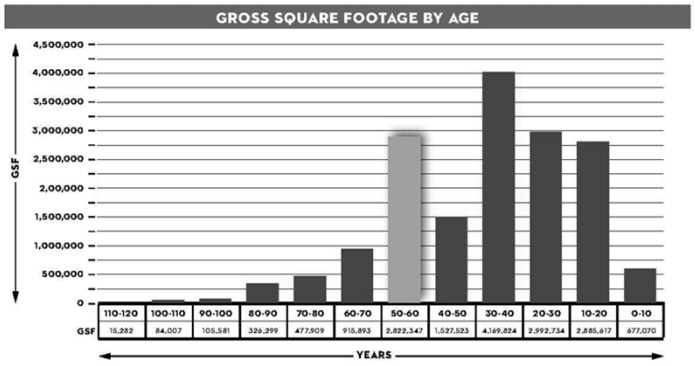
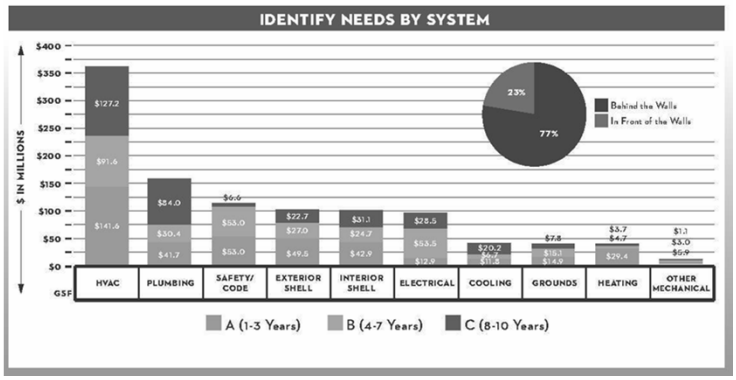


- In the absence of renewal, Lab Buildings from the 1950's and 1960's are becoming high risk
- Buildings from more recent decades will soon become the focus of tomorrow

CAMPUS WIDE FUNDING NEEDS



- Building Renewal "inside the walls" represents the most urgent and highest renewal needs and costs

TWO DISTINCT FUNDING MATTERS

- Recovering from the past
  - High level of campus growth in 1960's era
  - Building renewal costs now on uprise
  - Similar to impending social security crisis
  - Funding paradigm must adapt to current campus needs
- Systematic planning for future
  - Mitigate issues of deferred maintenance moving forward

RESOLUTION STRATEGIES

- Strategy for Increasing Deferred Maintenance Funds
  - Building users / College
  - University level
  - State level
- Strategy for Decreasing Current Demands
  - Campus-wide space mining
  - Space usage efficiency planning

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