Rocky Mountain APPA

RMA

Networking. Mentorship. Professional Development

A Building Renewal Case Study

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THE UNIVERSITY OF ARIZONA

THE UNIVERSITY OF ARIZONA

THE UNIVERSITY OF ARIZONA CAMPUS OVERVIEW

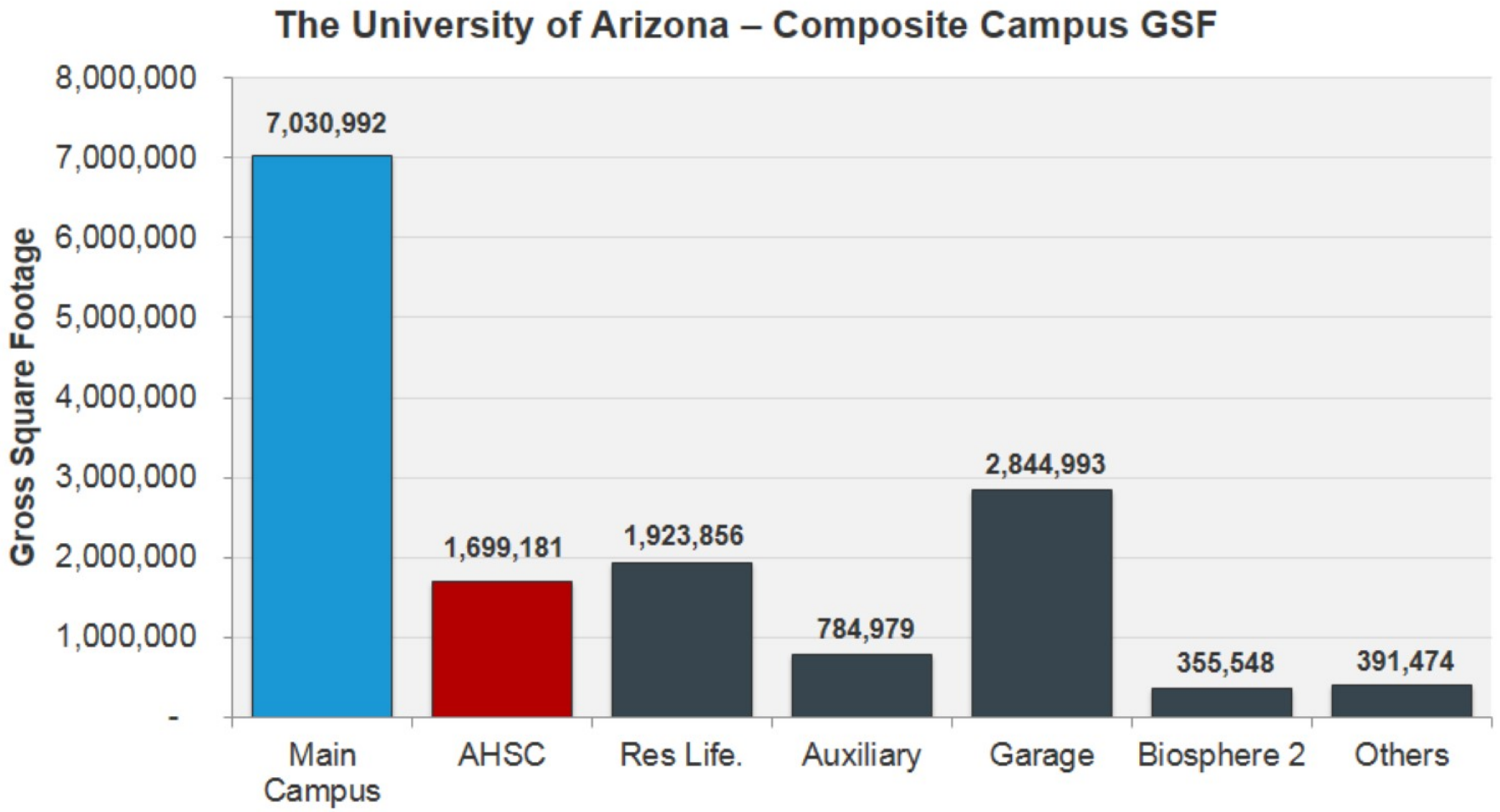
- +42,000 Students
- 11 Million Square Ft.
- +267 Buildings
- 600 Facilities Staff
- 3 Central Plants
- 22 Chillers
- 2 Turbines
- 33% Electricity produced on site
- 300 Storage tanks ice storage

THE UNIVERSITY OF ARIZONA FACILITIES MANAGEMENT DEPARTMENT

NEVER SETTLE

The plan for the University of Arizona

The University of Arizona Space Profile



sightlines

Putting Your Campus Building Age in Context

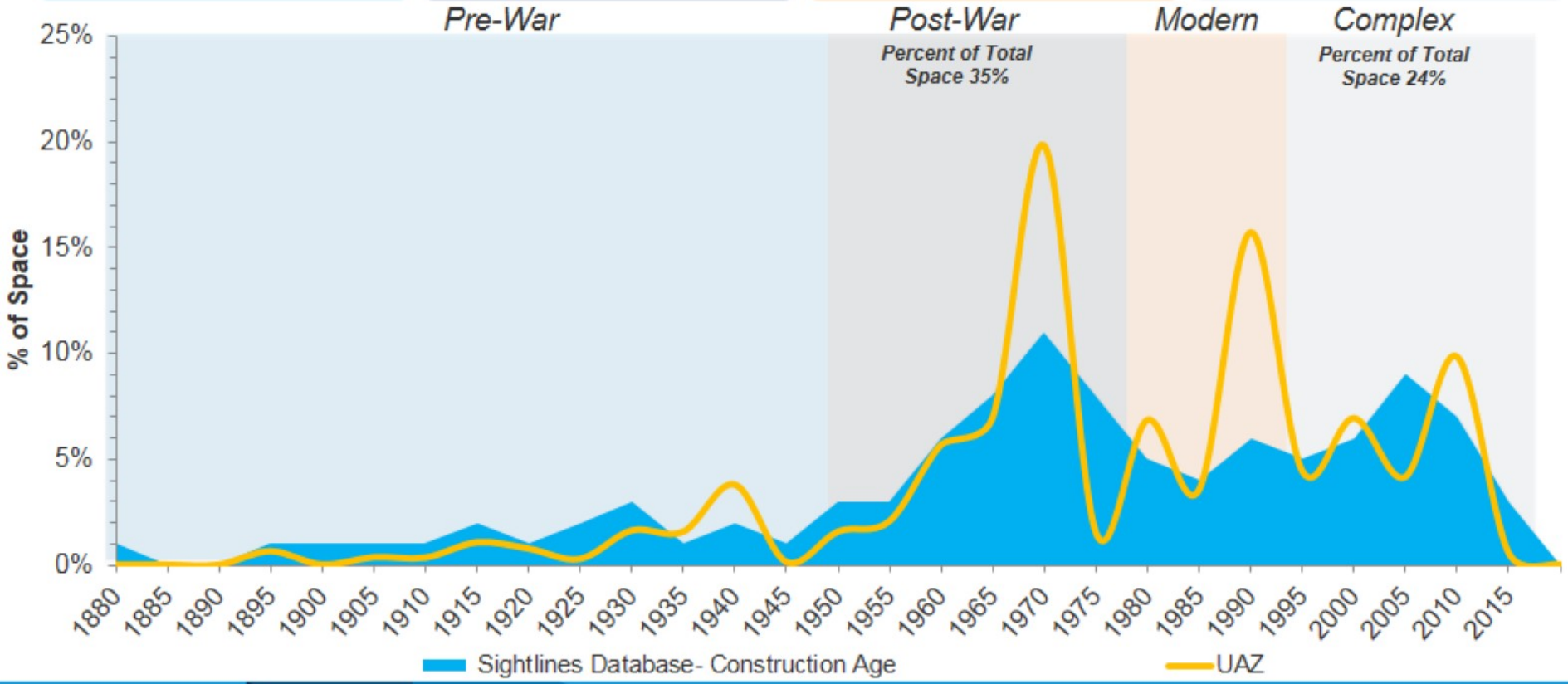
The campus age drives the overall risk profile

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

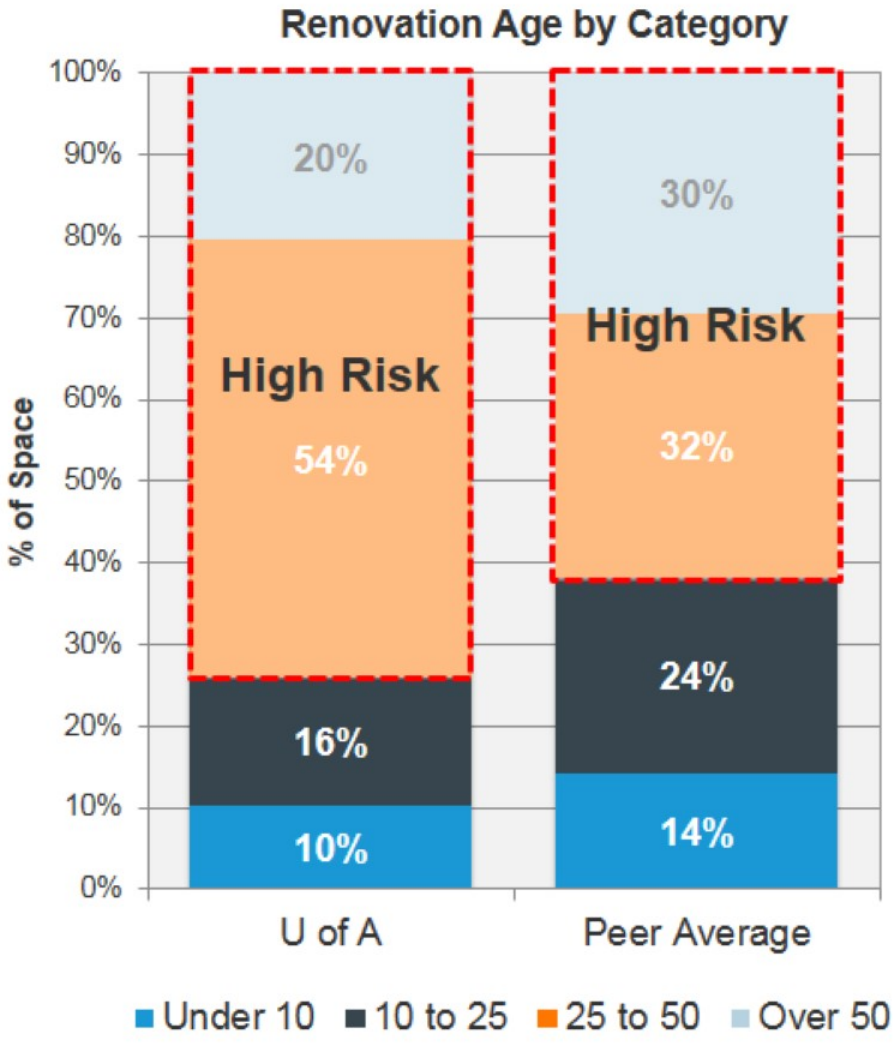
Complex
- Built in 1991 and newer
- Technically complex spaces
- Higher-quality, more expensive to maintain & repair



sightlines

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

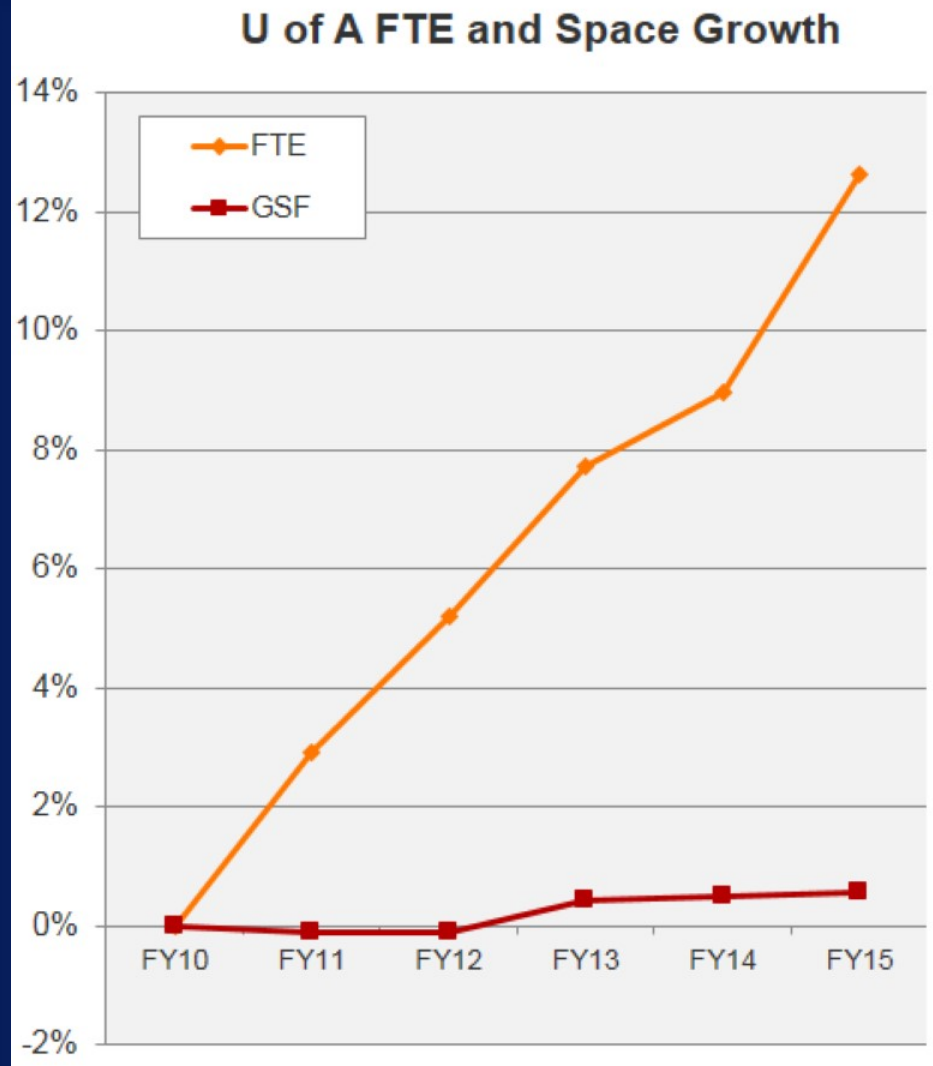
Buildings Under 10

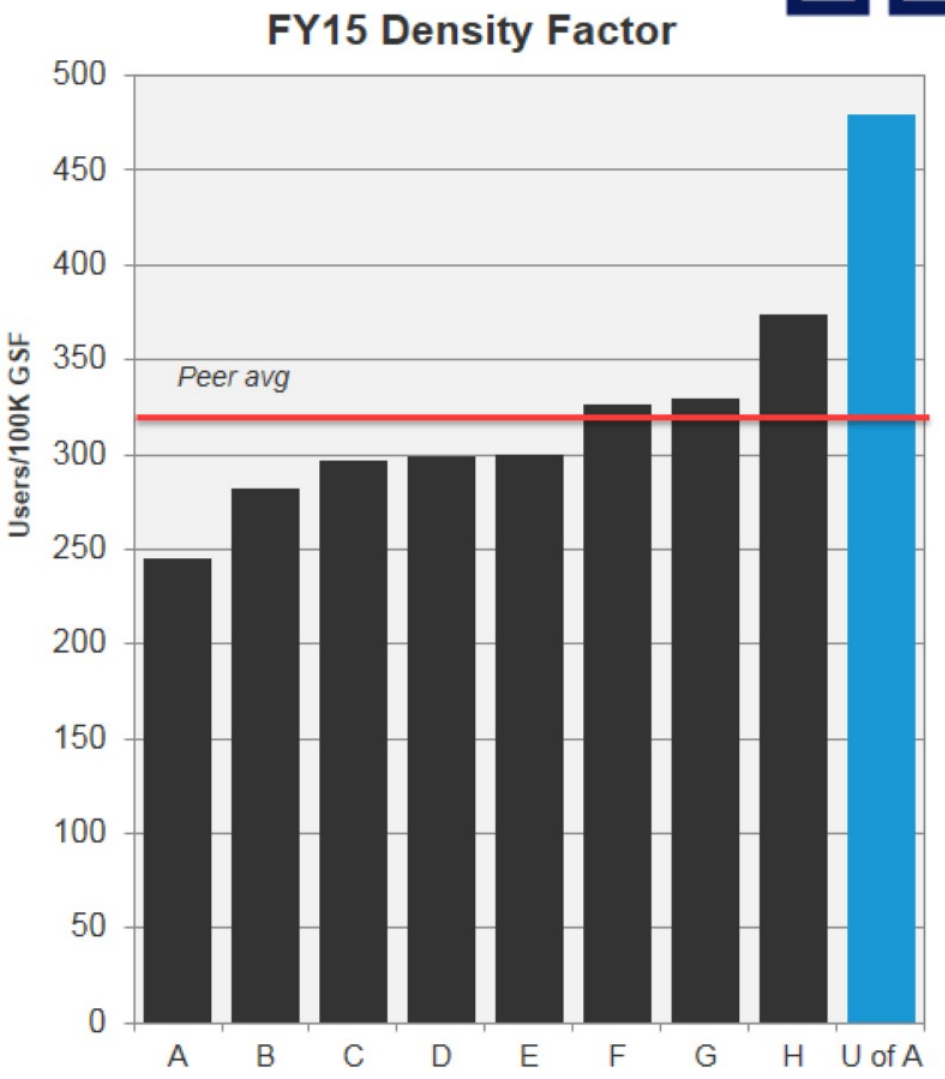
Little work. "Honeymoon" period.

Low Risk

sightlines

With More Users, Density Increases



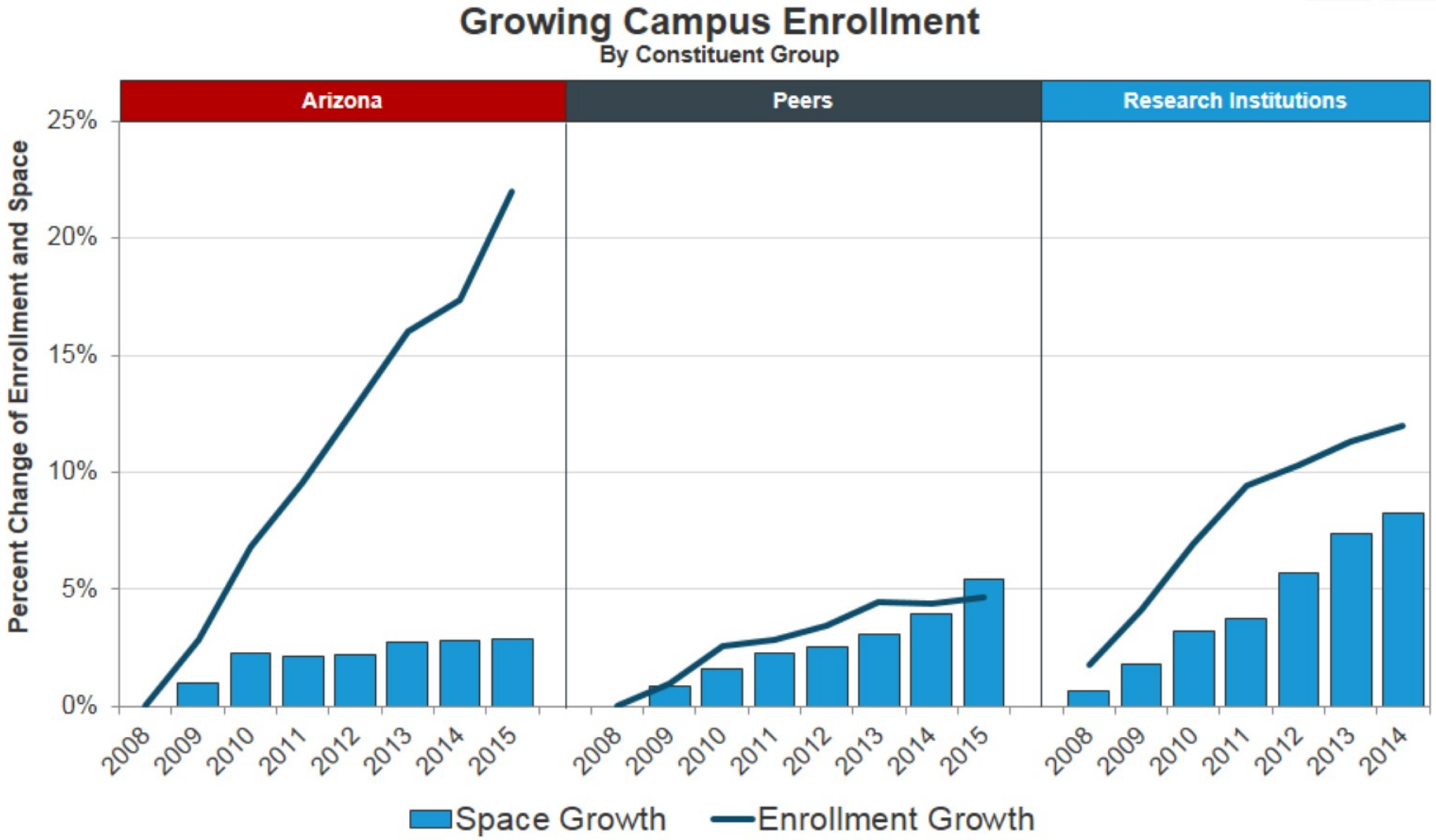


Higher density → less space per users, greater wear and tear

sightlines

Campus Space and Enrollment

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



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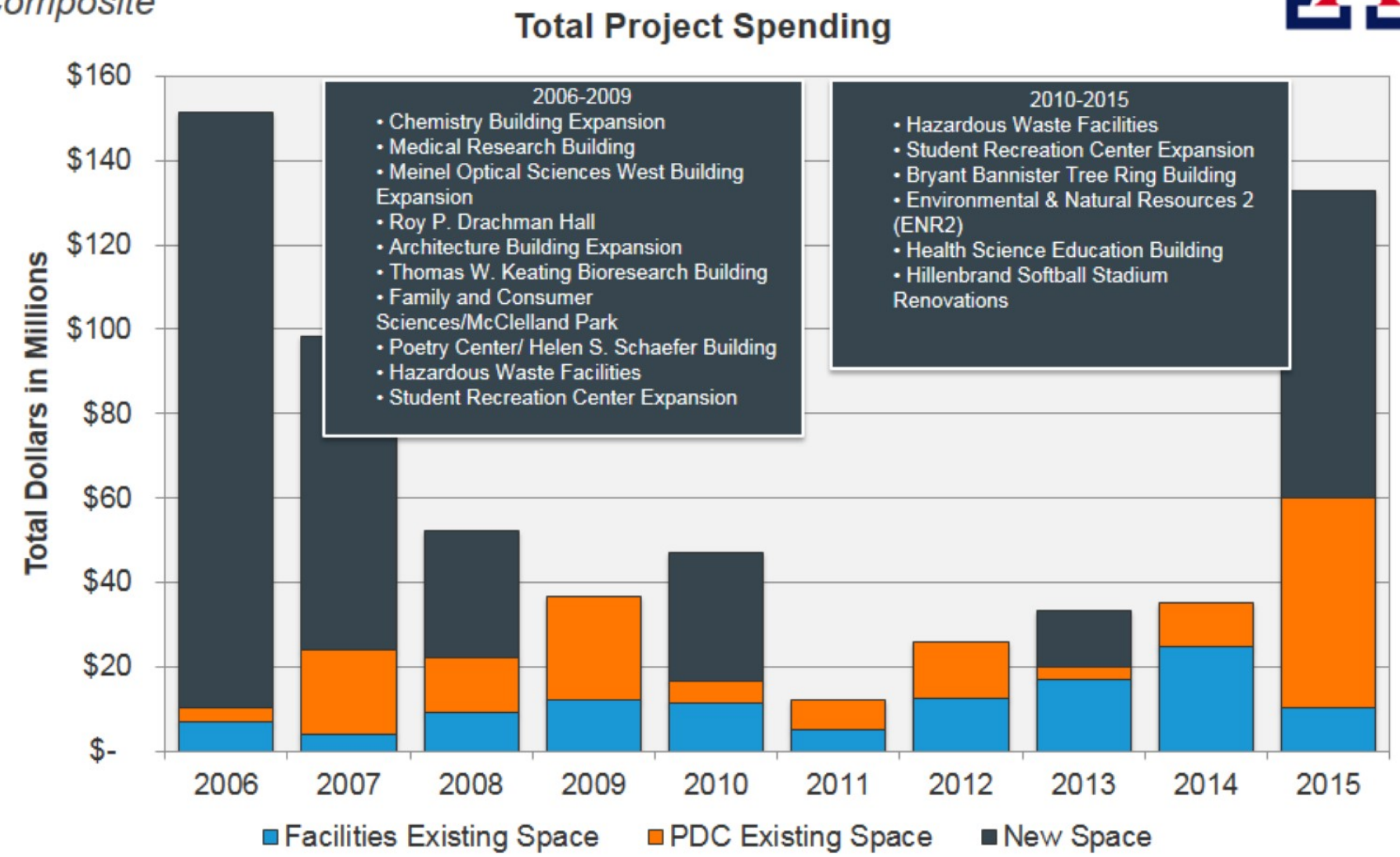
Total Project Spending

Composite



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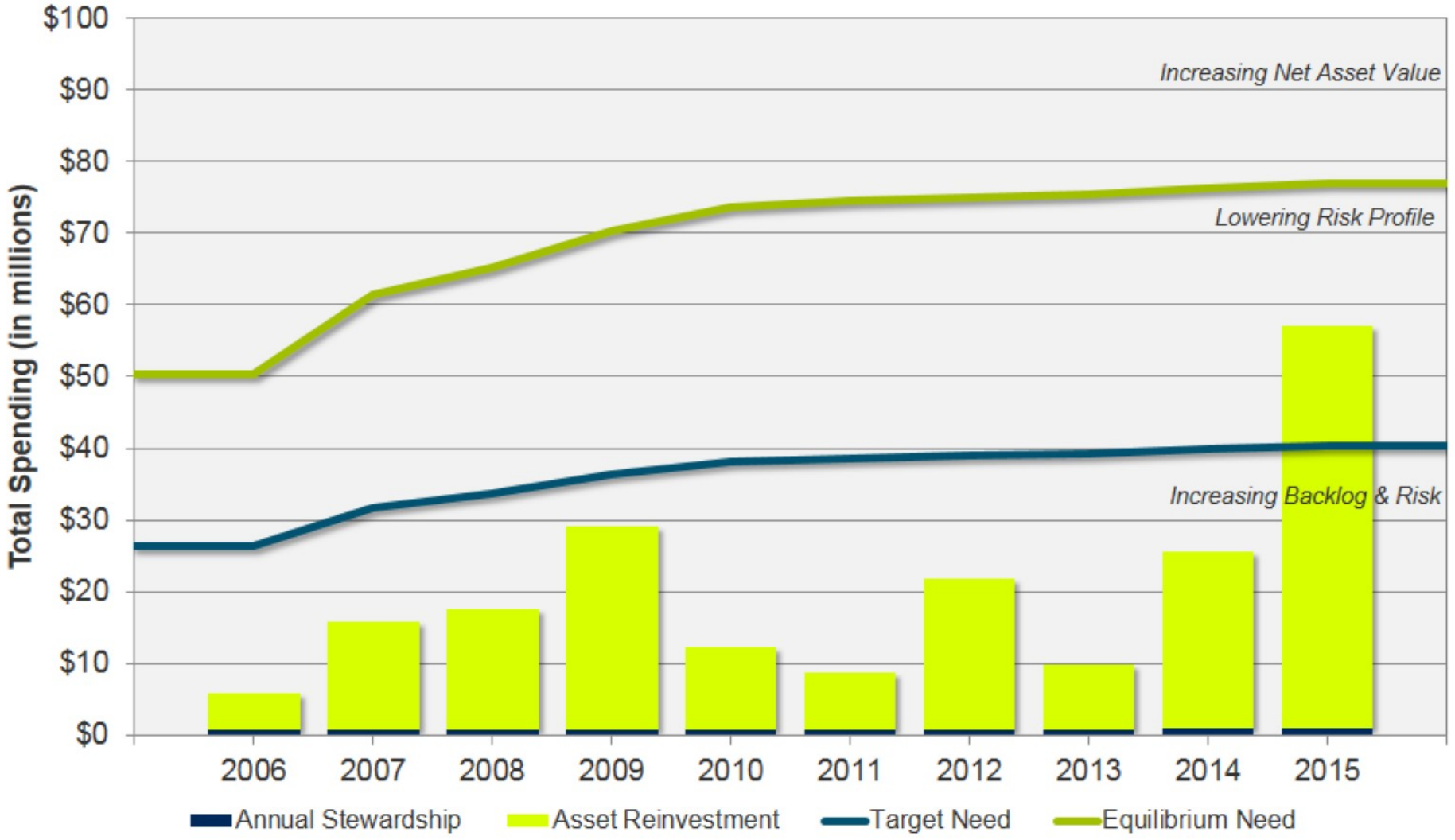
Lack of Capital Leads to Increasing Needs

Meeting target need with one-time capital



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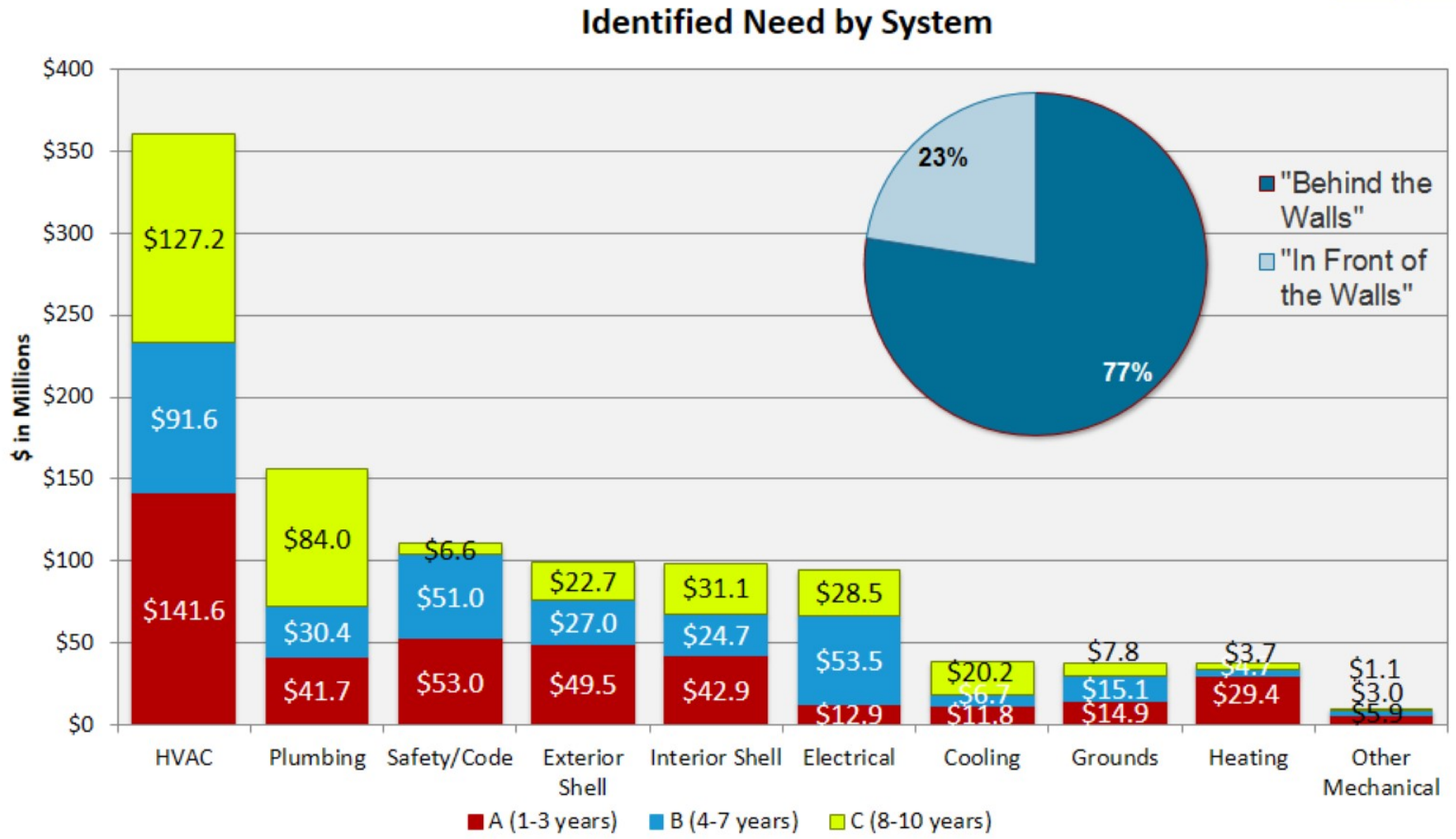
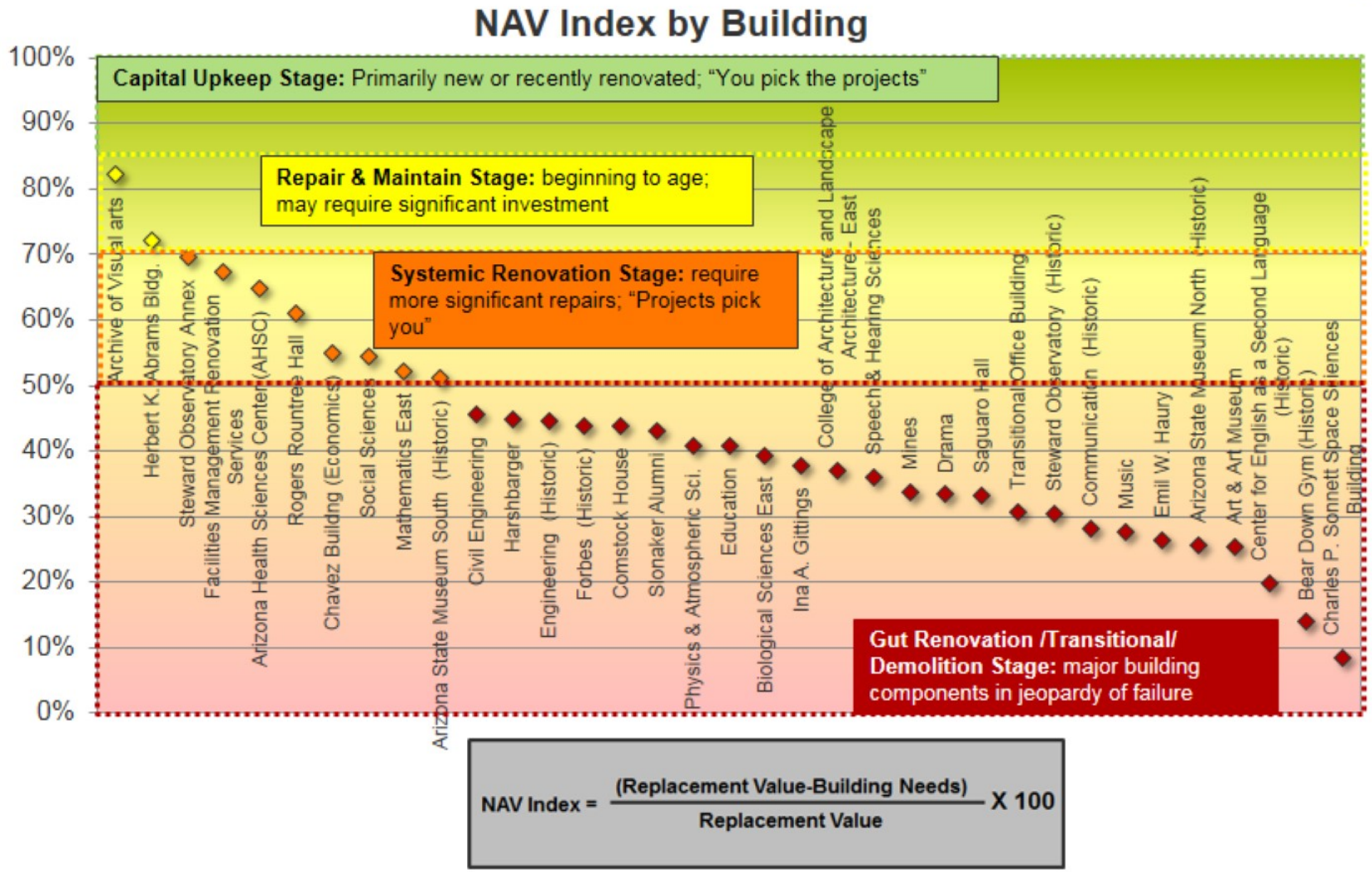
Identified Needs by System - $1.04B

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



Net Asset Value

Buildings over 50 years old; average NAV of 42%



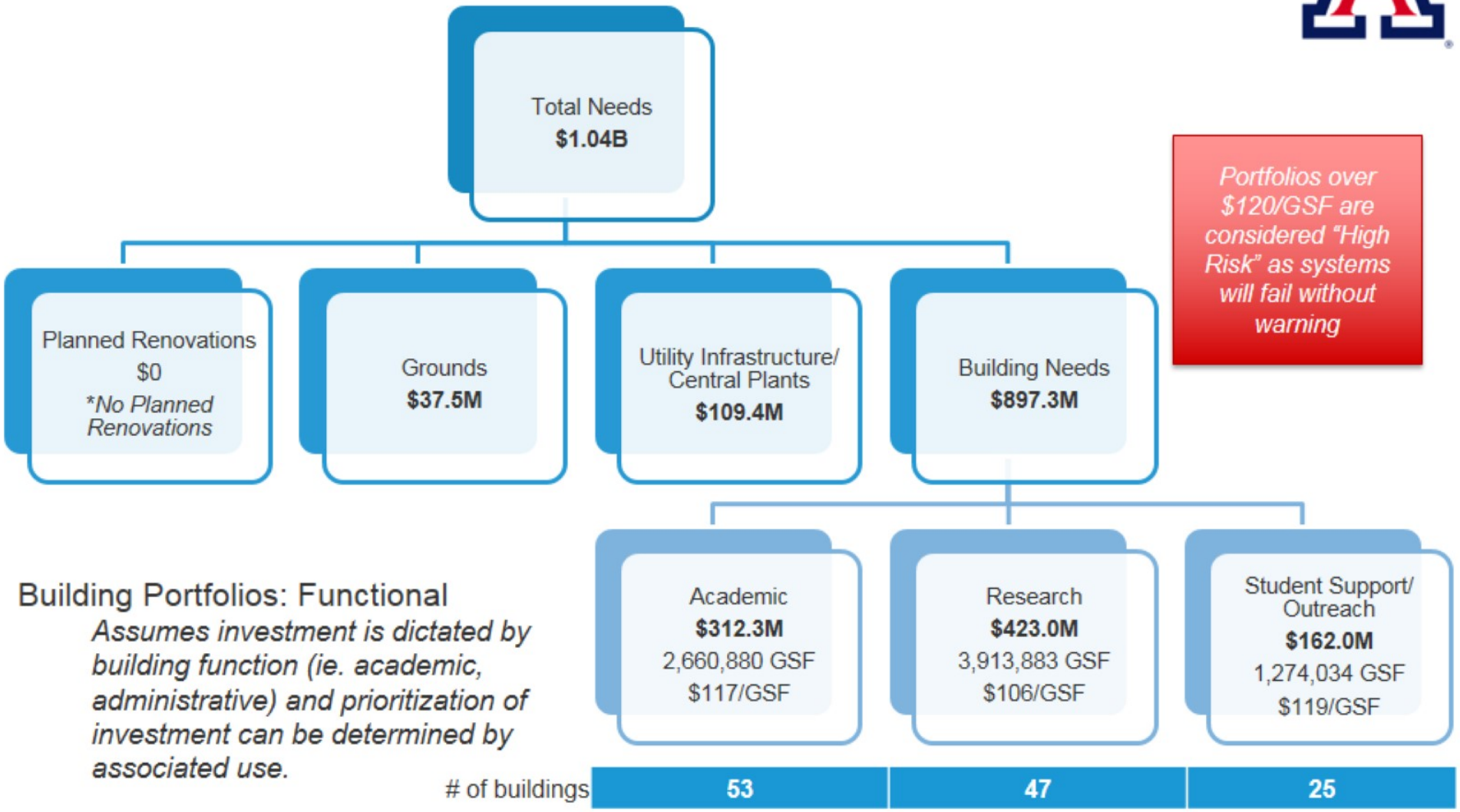
$$\text{NAV Index} = \frac{\text{(Replacement Value-Building Needs)}}{\text{Replacement Value}} \times 100$$

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.

sightlines

Building Portfolios



Portfolios over $120/GSF are considered "High Risk" as systems will fail without warning

Building Portfolios: Functional

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

sightlines

THE UNIVERSITY OF ARIZONA BUILDING 90

Built in 1967
5 stories, 70,000 GSF
Originally Pharmacy
Then Veterinary Sciences
Then Microbiology
Now Animal and Comparative Biomedical Science

Occupancy
Office
Classroom
Wet Lab
Lab Support
Vivarium

Issues
Mold
Asbestos
Ventilation
Piping
Power
Lighting

THE UNIVERSITY OF ARIZONA BUILDING 90
DEFERRED MAINTENANCE IMPROVEMENTS

1. Condition Assessment
   Comprehensive
   Professional
   - Documentation
   - Prioritized Matrix
   - Order of Magnitude Cost

2. Marketing to Acquire Funding
   Brochure in Layman Language
   Simple Graphics and
   Ties to University Mission

3. Establish occupancy, phasing fit scope to budget

4. Delineate Management, Scope, and Schedule

5. Vacate, Abate, Renovate, Reoccupy

TIME LINE

- 1995 -2015 Mounting Occupant Concerns and FM Costs
- 2016 Q2 Facility Condition Assessment
- 2016 Q4 Marketing
- 2017 Q1 Funding Approvals
- 2017 Q1 Release RFQ
- 2017 Q2 Select DB
- 2018 Q2-Q3 Design
- 2018 Q3-Q4 Abatement and Demolition
- 2018 Q3-Q4 Contractor Scope
- 2018 Q3- 19Q1 FM Scope
- 2019 Q1 Occupy

DIAGNOSIS FACILITY CONDITION ASSESSMENT

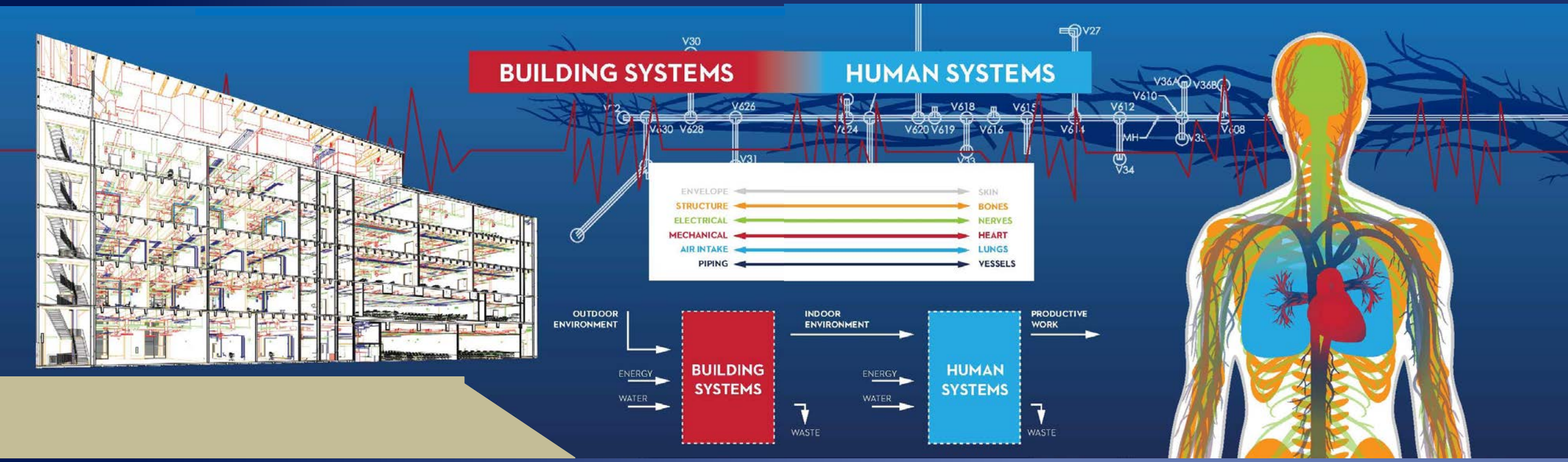
- Assemble Project Task Force Team
- Weekly meetings / Interview occupants
- Coordinate and work with building manager
- Room-by-Room Architect / Engineer survey
- Airflow Testing
- Fire Safety / Emergency Egress assessment
- Structural assessment

- 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

MARKETING BROUCHURE: SELL THE NEED FOR FUNDING



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.

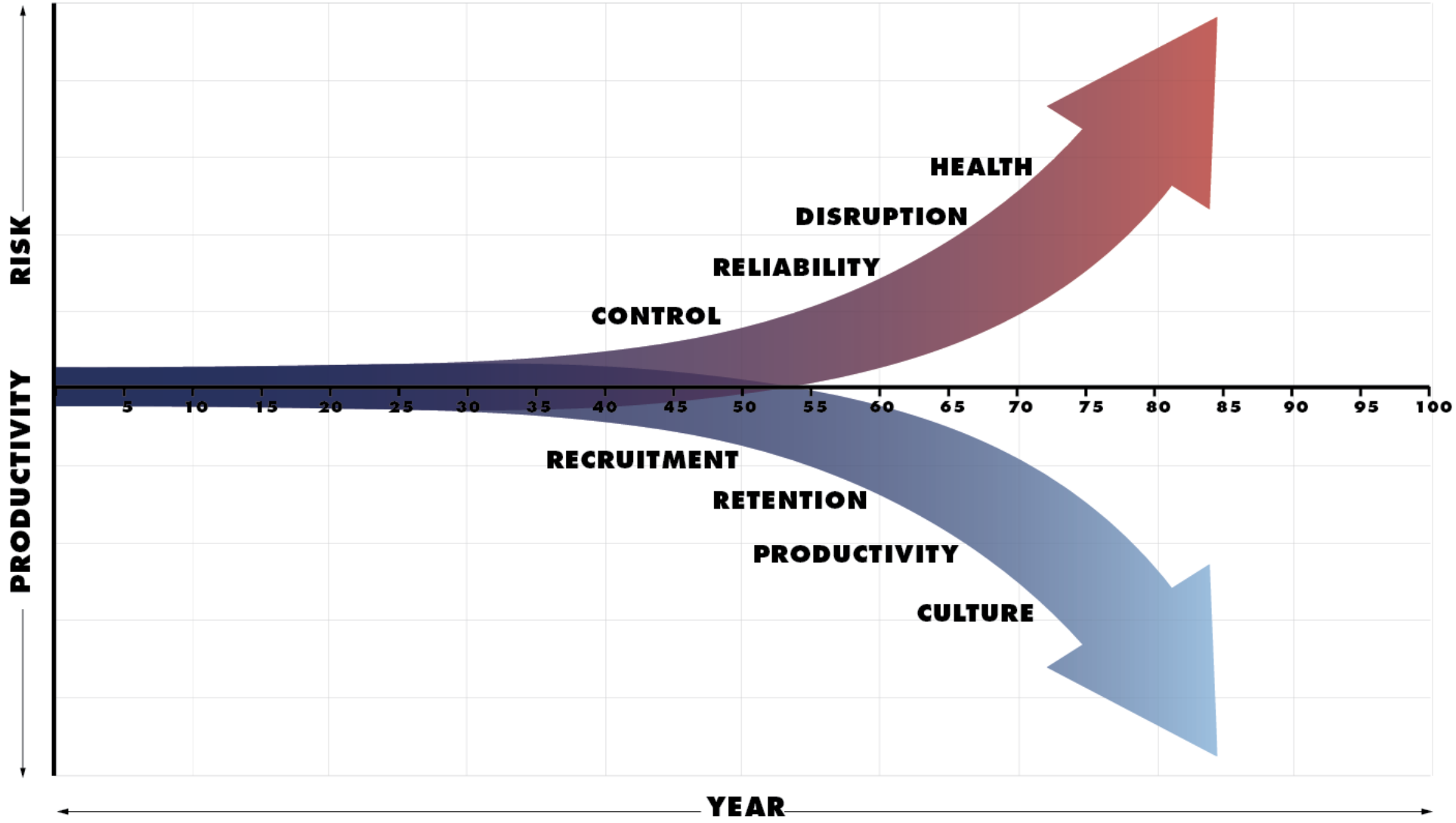
Many of the symptoms associated with indoor air quality directly affect concentration and productivity.

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

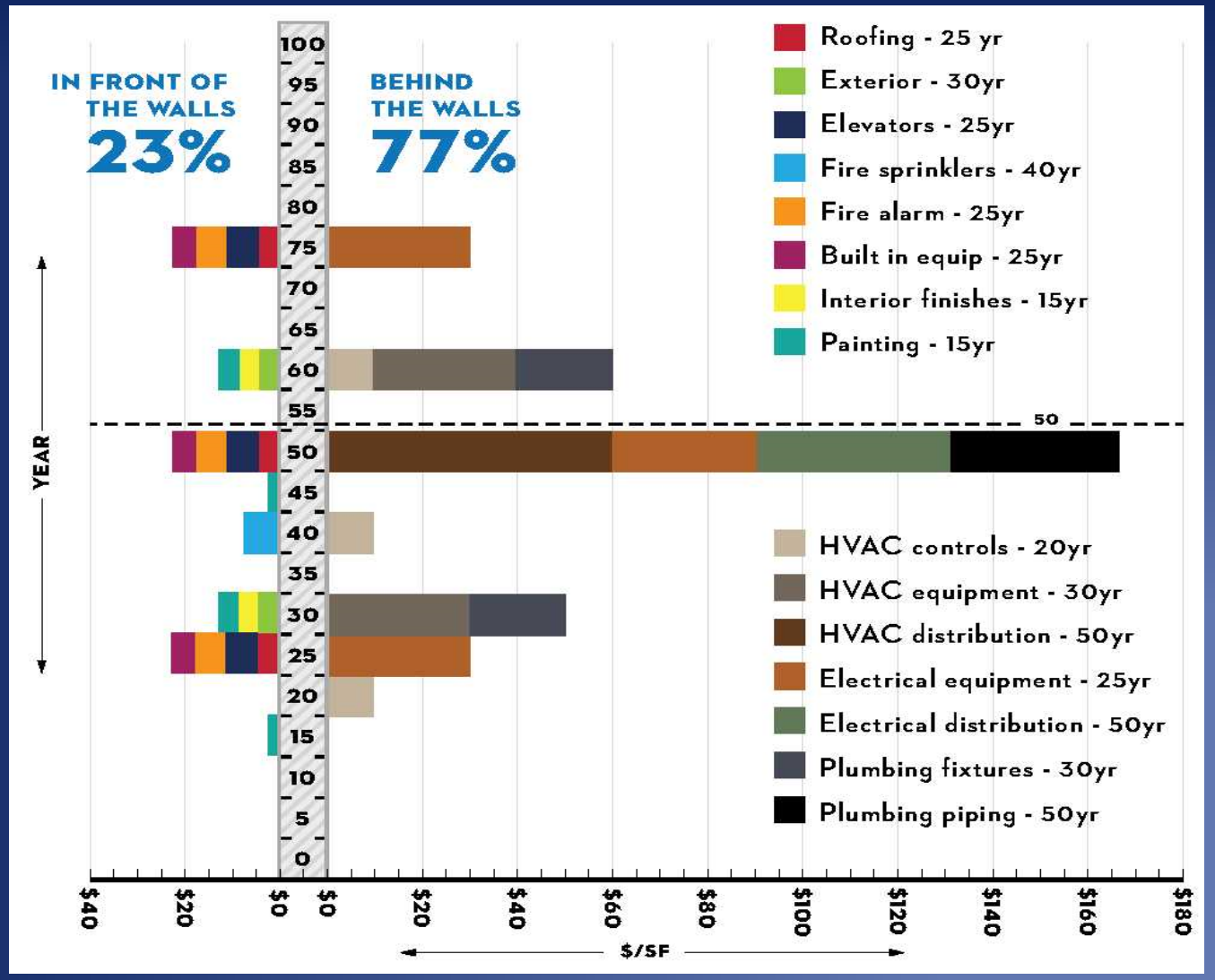
Buildings are communities where the knowledge, perception and concern of individuals becomes a part of the collective experience.

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

RISK AND PRODUCTIVITY IN THE ABSENCE OF DEFERRED MAINTENANCE



LIFE CYCLES AND PERIODIC RENEWAL COSTS OF BUILDING SYSTEMS



RENOVATION SCOPE PRIORITIZATION

Building needs
Asbestos Fire Proofing
HVAC Replacement
Electrical Replacement
Fire Alarm
Fire Sprinkler

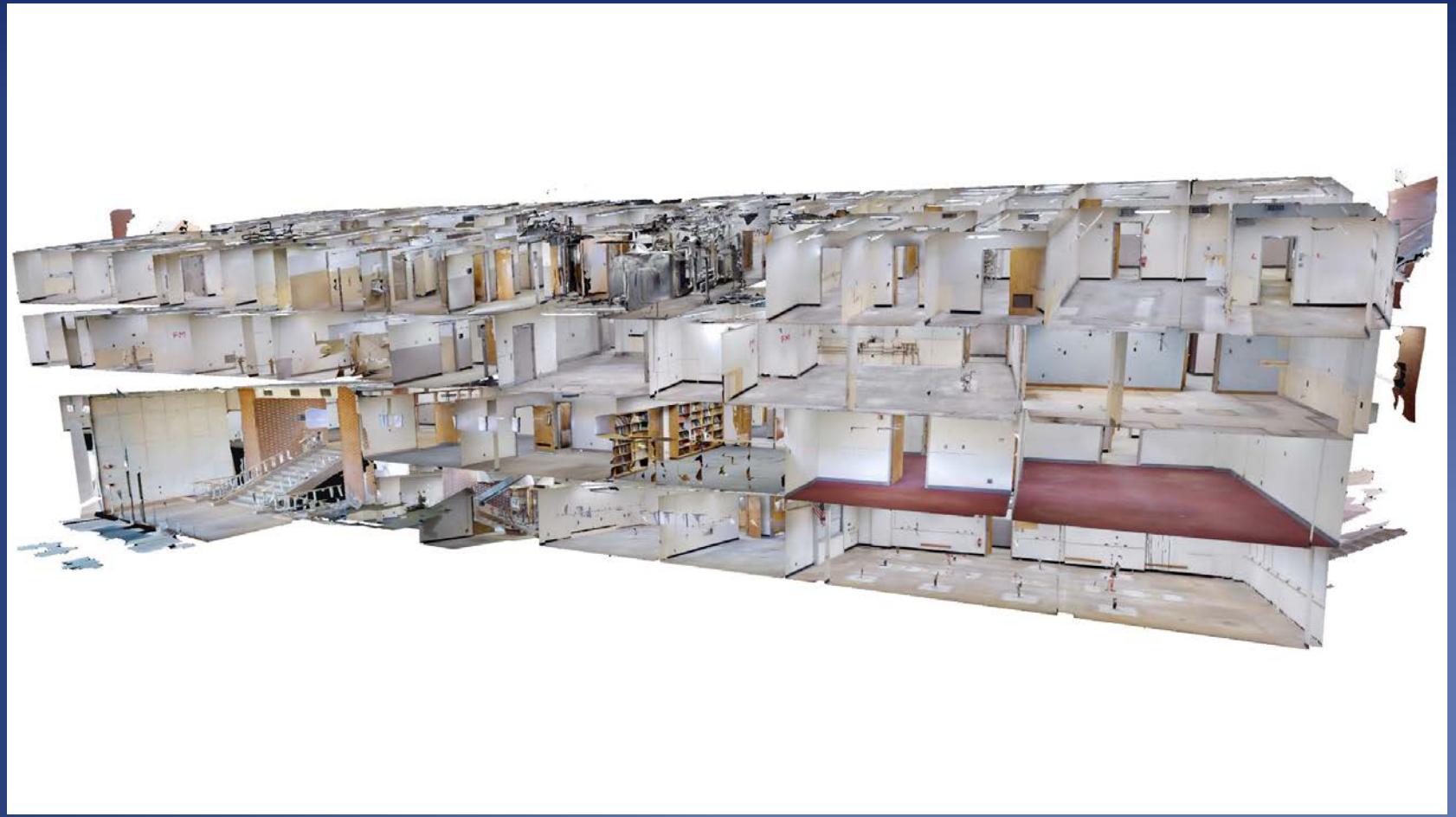
Occupant Needs
Reprogramming
Casework,
Interior Finishes

A SERIES OF DECISIONS

- Renovate existing structure or demolish and rebuild?
- Complete gut-to-shell or selectively salvage?
- Vacate occupants or phase construction around occupants?
- Comply with current university standards, or adapt?
- Completely reprogram spaces and utilization or stick with original?
- Limit to deferred maintenance or consider betterments?
- Project Procurement Methods

BUILDING 90 ON THE INSIDE – DIGITAL SCANNING

Design Work proceeds While Building is under Containment for Removal of fireproofing and Major Demolition

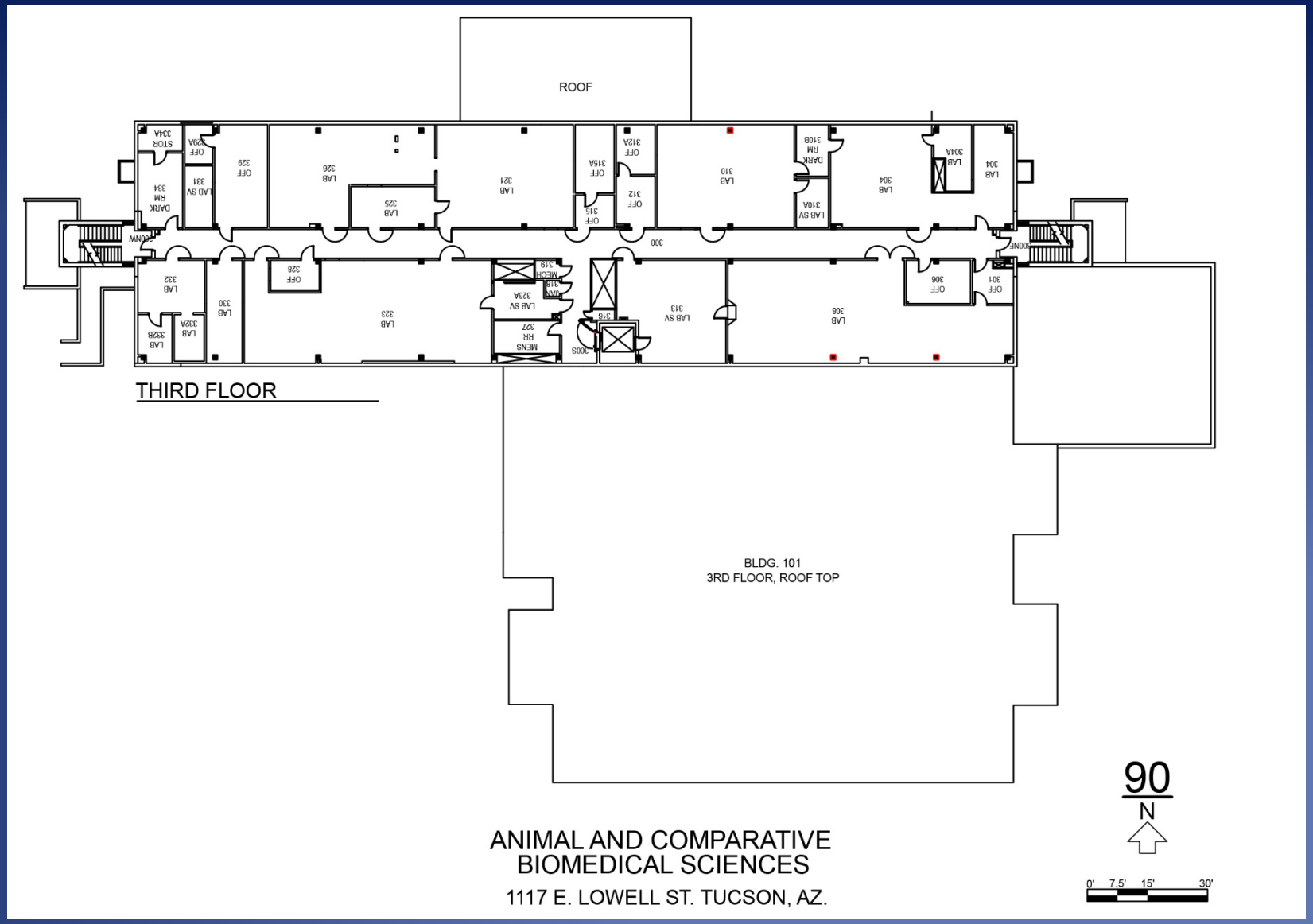


BEFORE AND AFTER

Near complete replacement of HVAC, Electric Power and Plumbing addresses Deferred maintenance

Reconfiguration of certain spaces enables improvements to laboratory usage

Replacement of casework, fume hoods, and lighting provides occupant benefits



ABOVE CEILING BEFORE

Filthy Duct
Failing Insulation
Leaking Pipe
Asbestos
Mold

ABOVE THE CEILING AFTER

New Ductwork
New Terminal Boxes
New Digital Controls
New air terminals

New waste system
New Laboratory Piping

New Electrical Feeder
New Panelboards
New Lighting

AHU BEFORE AND AFTER

Remove 50 year old dual deck air handlers

Install new single duct units-
Shipping splits to fit through building openings
Assemble in place
Air leakage test

BELOW CEILING BEFORE

Failing ceilings
Poor lighting
Cracked flooring
Moldy wooden cabinets

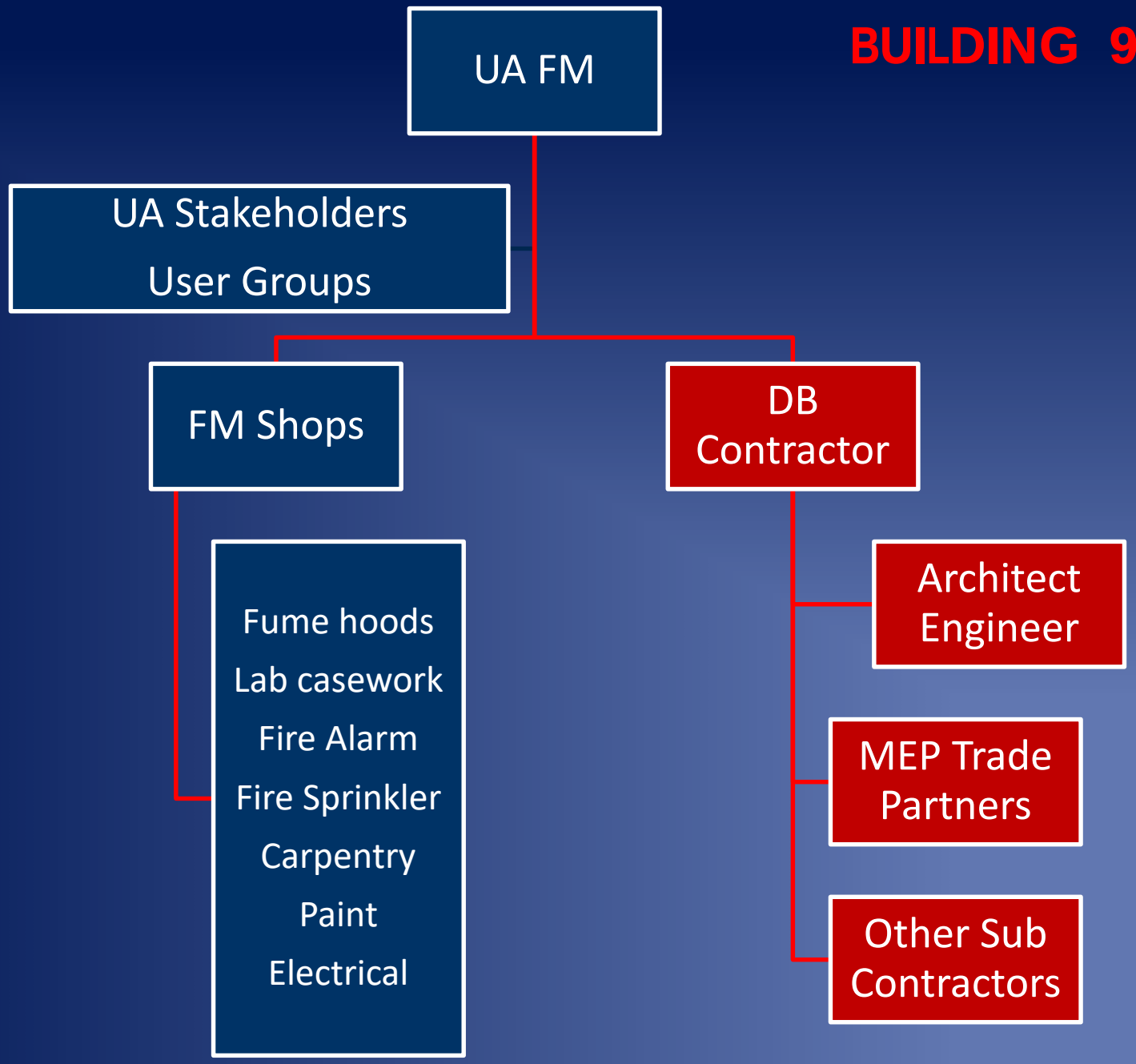
Actual Occupancy
Utilization At 50%

BELOW CEILING AFTER

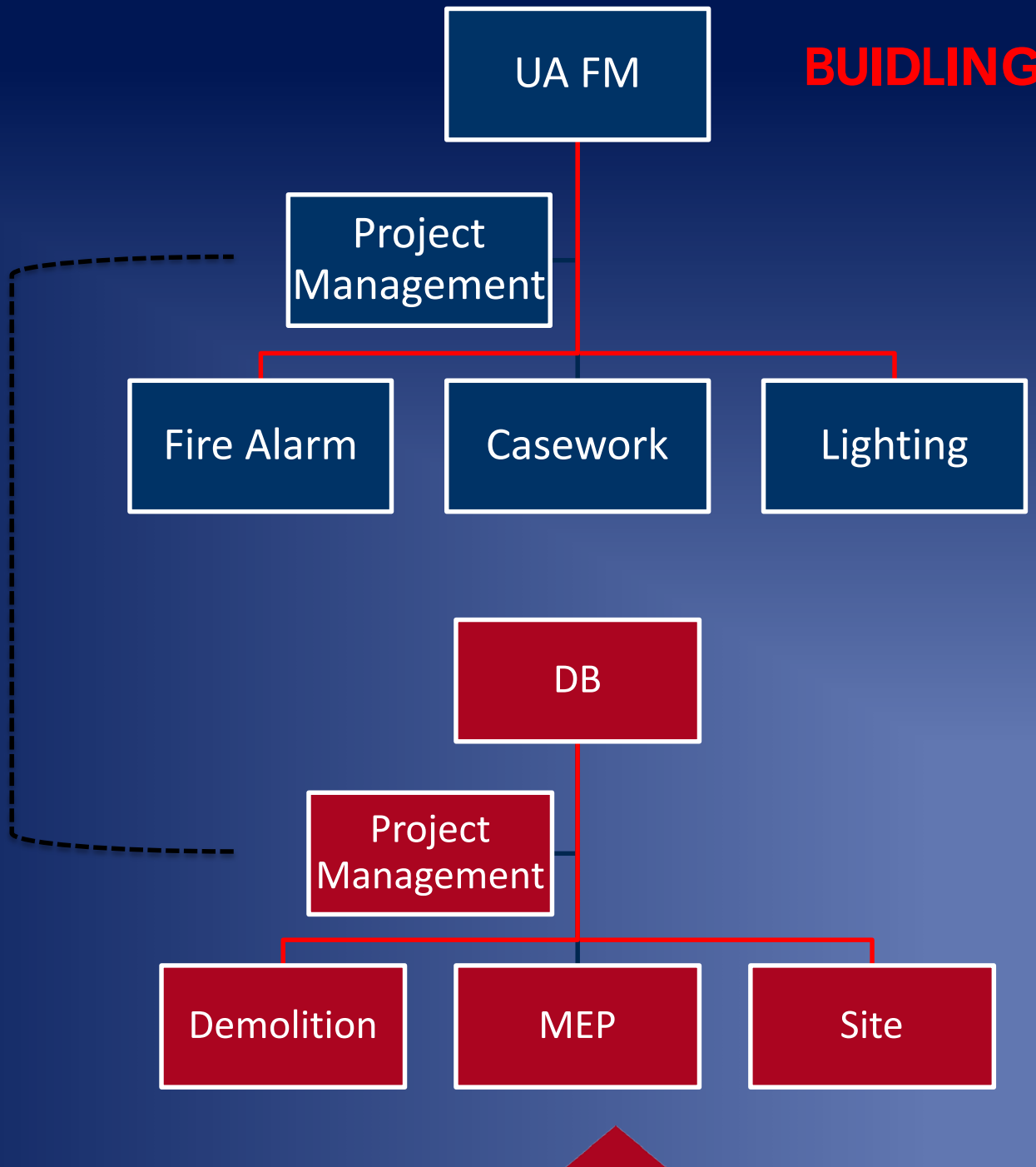
New Finishes
New lighting
New Floorting
New Casework

Actual Occupancy
Utilization At 100%

BUILDING 90 TEAM



BUIDLING 90 SCOPES

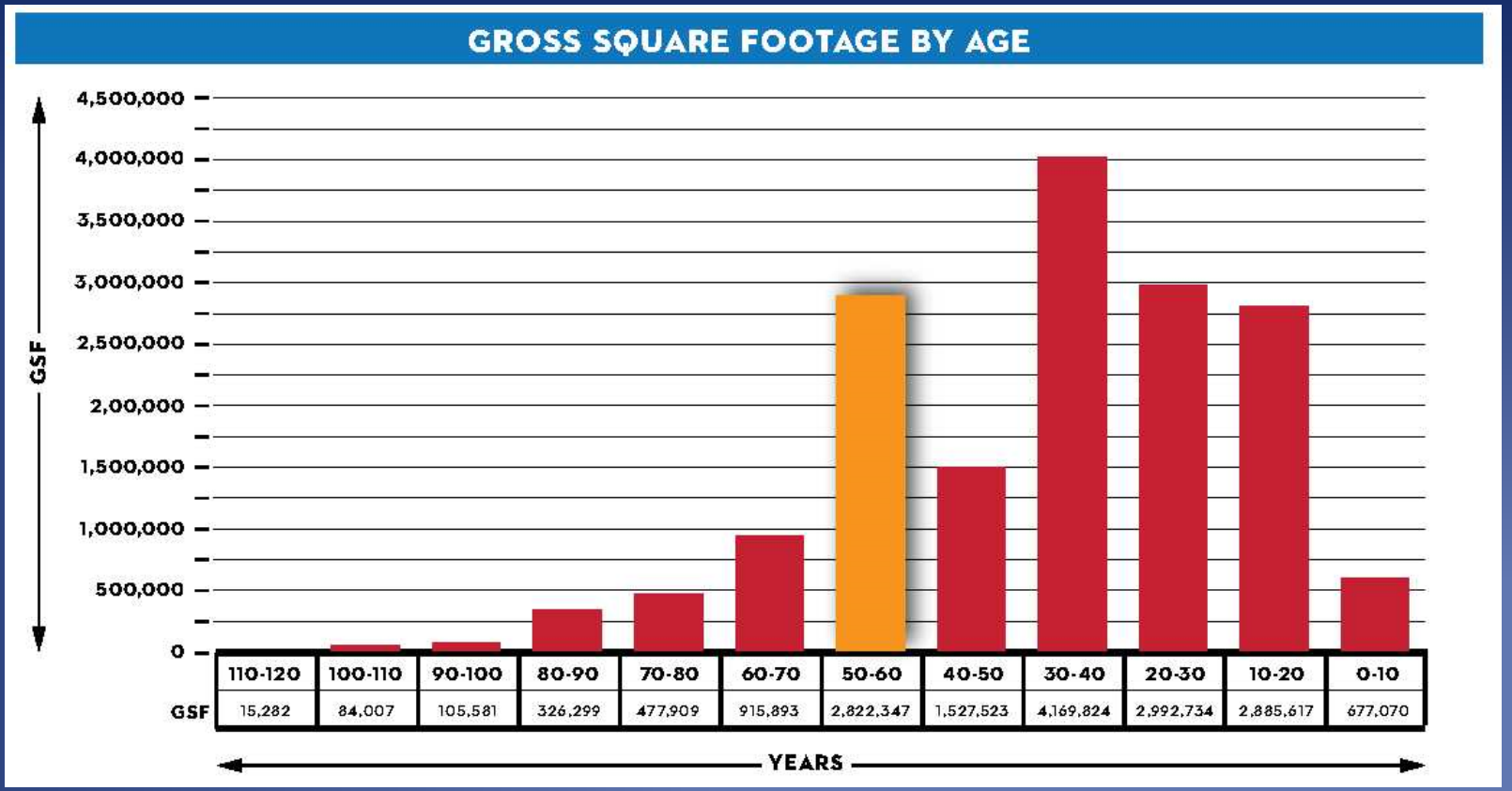


BUILDING 90 LESSONS LEARNED

- Vacate building and gut has advantages over extensive phasing and selective salvage
- A clear understanding of the Environmental Assessment
- Reprogramming and betterment are as essential to success as behind-the-walls renewal
- Clear demarcation and accountability of contractor scope
- Clear project scope with all users

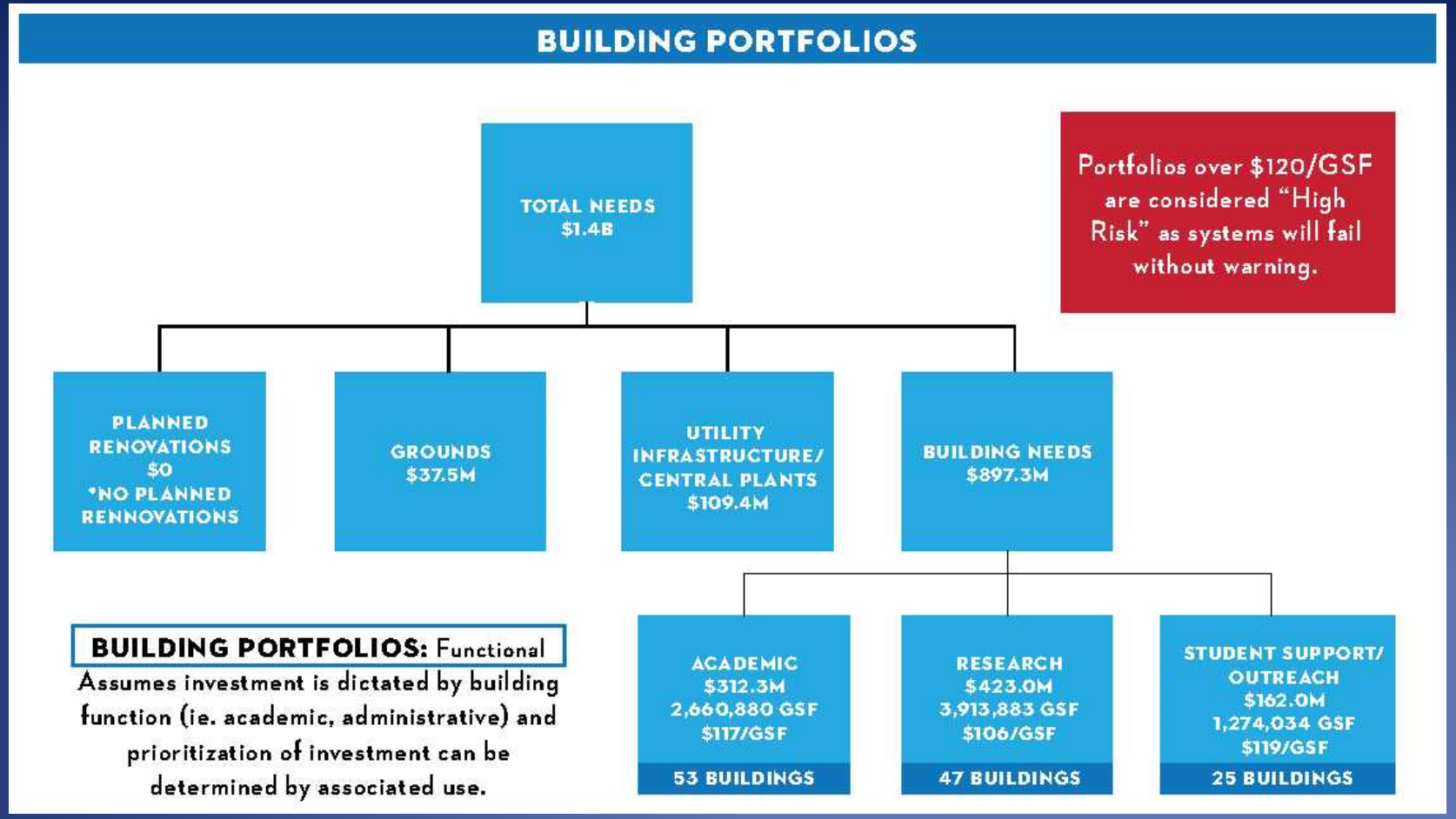
BEYOND BUILDING 90- NEXT STEPS

- 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



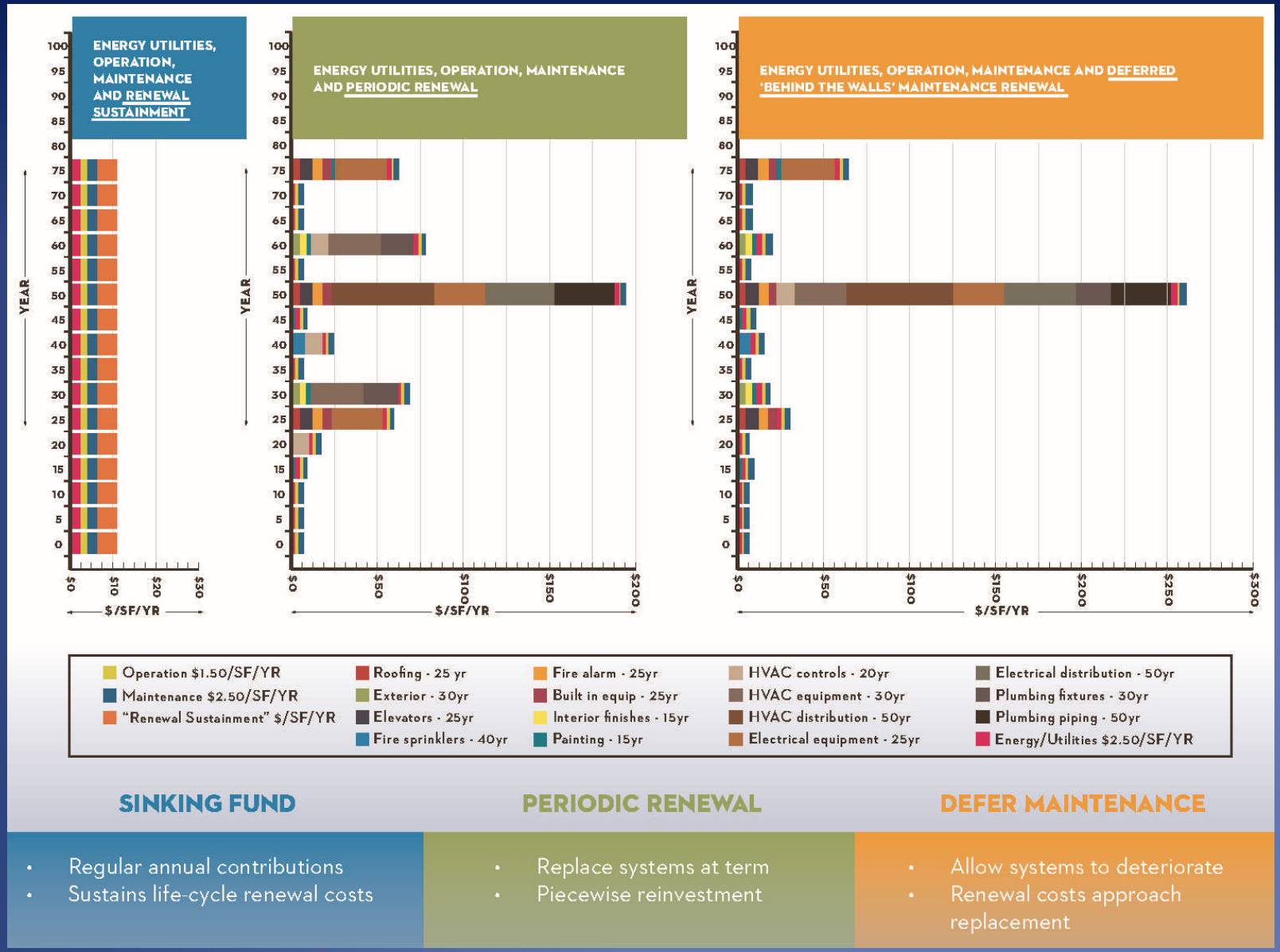
BEYOND BUILDING 90: CAMPUS WIDE FUNDING NEEDS

- Campus systems have different renewal needs
- Labs and Research Buildings often have highest needs



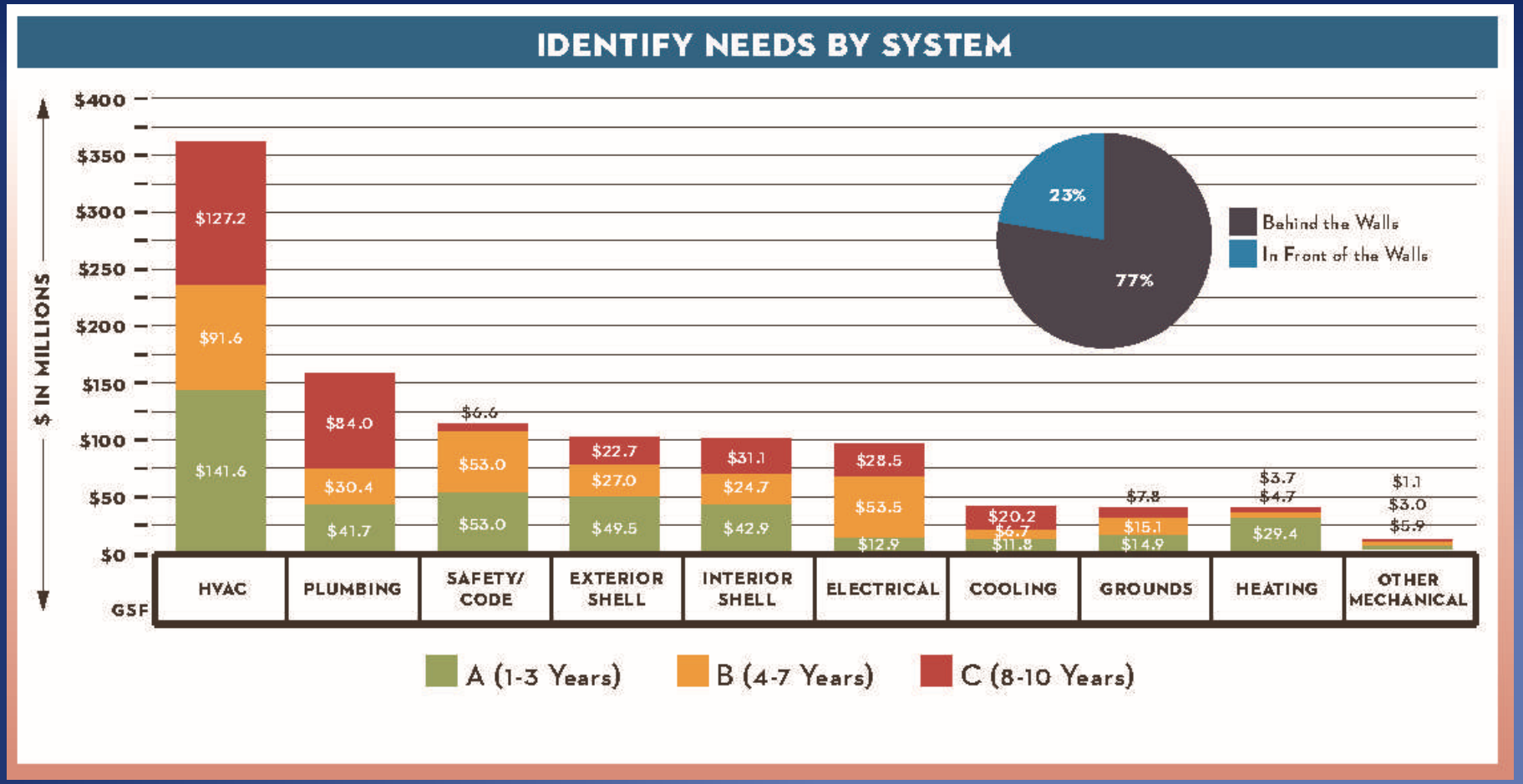
BEYOND BUILDING 90 – FUNDING APPROACH

- Continue to advocate for deferred maintenance funding

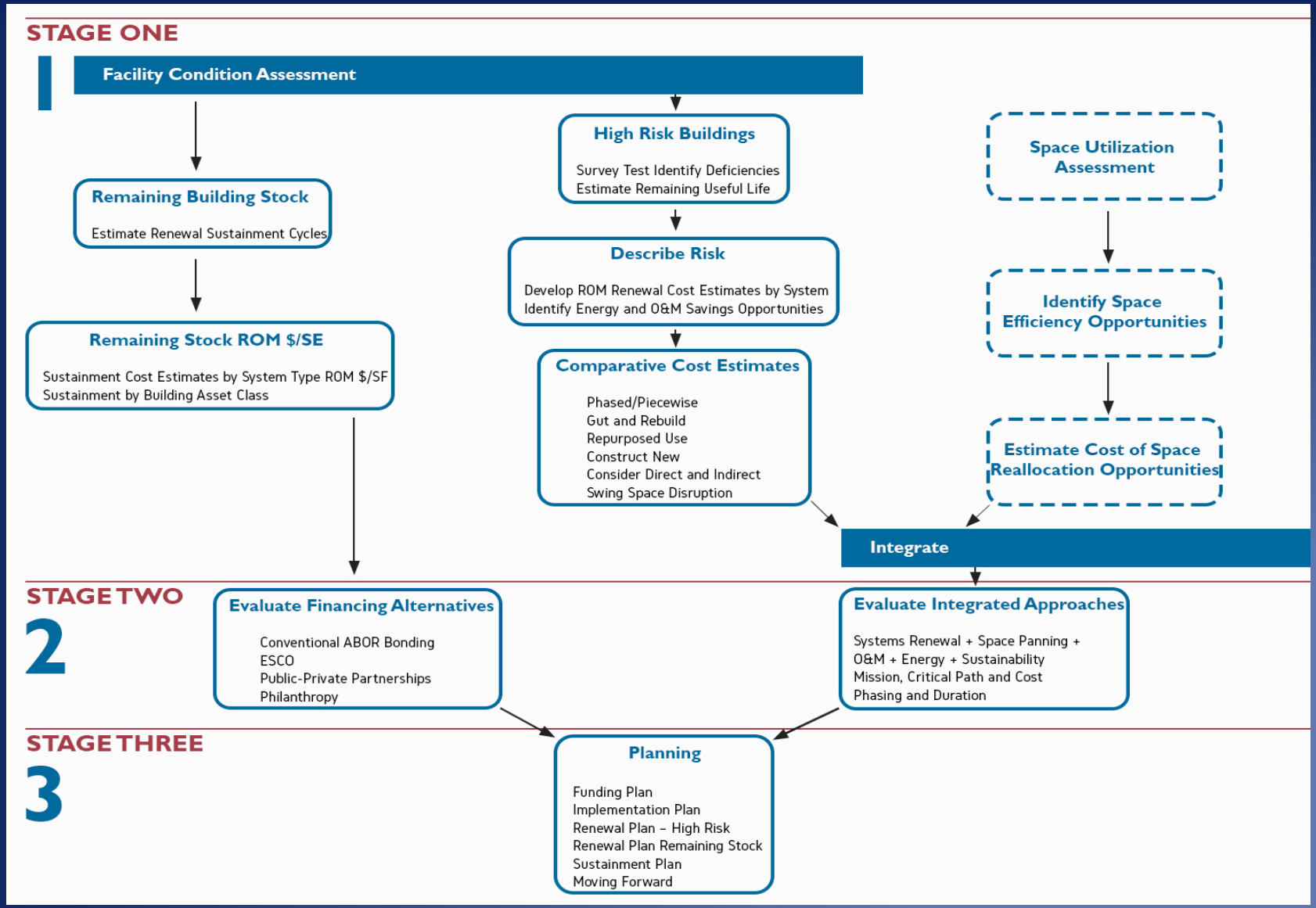


CAMPUS WIDE FUNDING NEEDS

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



BEYOND BUILDING 90 – INCLUDE DEFERRED MAINTENANCE IN STRATEGIC PLANNING



Thank You

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