

From the Boiler Room to the Board Room

Communicating the VALUE of Infrastructure Investment with Non-Facility Leadership

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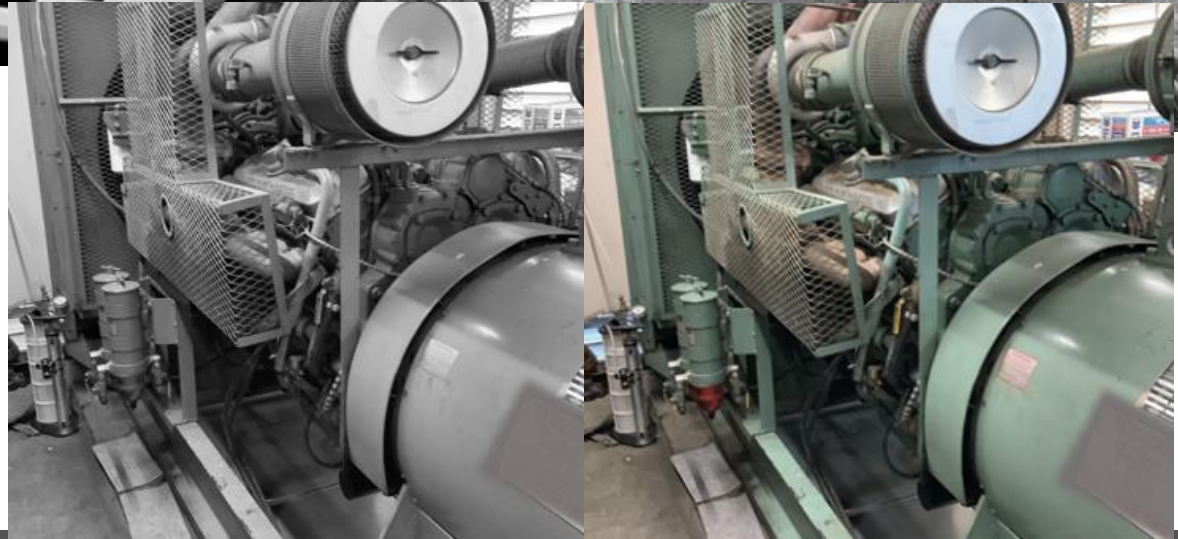
**Advisory Board Associate Member Representative
(Board Member-Elect)**

Disclaimer

The content and recommendations made in this presentation are based on the subject matter expertise of the author. Case study information has been generated based on experience gained in the deployment of asset management solutions with Brightly Software, A Siemens Company, and formerly with Facility Health Inc.

Any opinions expressed in this presentation are limited to that perspective, and do not reflect an official position or endorsement by The American Society of Healthcare Engineering (ASHE), The ASHE National Advisory Board, or the American Hospital Association.

Perspective...



Learning Objectives (Condensed)

1. Understand the differences between discretionary & non-discretionary infrastructure investment.
2. Demonstrate the negative impacts of increasing deferred maintenance levels on operational efficiency. Define asset driven budgeting and forecasting.
3. Discuss six key steps required for asset management optimization and how to measure progress. Data, Information, Knowledge, Wisdom.
4. **Align investment needs larger ESG, Master Planning and other strategic initiatives already endorsed by your organizational leadership.**

Learning Objectives (Condensed)

1. Understand the differences between discretionary & non-discretionary infrastructure investment.
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4. **Align investment needs larger ESG, Master Planning and other strategic initiatives already endorsed by your organizational leadership.**

MAINTENANCE

Best practices to deal with deferred maintenance

Facilities leader at Novant Health breaks down the basics of deferred maintenance and gives strategies for managing infrastructure

January 21, 2022 | Jamie Morgan



From left to right: Jonathan Flannery, Mark Mochel and Matthew Stiene present a conference session on deferred maintenance at the 2021 ASHE Annual Conference.

Image courtesy of ASHE

Summer 2021

- Early Impacts of Pandemic
 - Decrease in Operating Margins
 - Historic Underinvestment in Infrastructure
 - Focused on Capital Investment and the Impact on Deferred Maintenance
- Bucket Concept Goals:
 - Understanding how facility management money flows through the organization.
 - Defining the relationship between operational and capital expenditures.
 - Clearly communicating deferred maintenance as a key measure of facility performance.

Photo Source: ASHE Annual Conference 2021; ASHE Health Facilities Management Magazine (January 21, 2022)

Conclusions - 2021



- Infrastructure investment has been lagging actual needs for over 2 decades. Critical infrastructure continues to age.



- Financial projections indicate that securing and/or allocating needed funds will be more difficult going forward, not easier.



- Therefore, we must transform our thinking and work to promote the strategic importance of properly funding our facilities.



- **However, we underestimate the impact of reduced operational spend on our facility infrastructure.**

DISCRETIONARY

NON-DISCRETIONARY

**VARIABLE COST
Proactive/Planned**

FIXED COST

**VARIABLE COST
Reactive/Unplanned**

Planned Replacement

- New Assets
- Asset Upgrades
- Efficient Spend (Supply Chain)

CAPEX

Preventive Maintenance (RCM)

- Inspections, Calibrations, Service
- Planned Administration

OPEX

Investment to Protect and/or Enhance Operations

Compliance

- Rounding
- Inspection, Testing & Maintenance (Mandatory)
- Administration

OPEX

General Operations

- Energy
- Asset Operation
- System Monitoring
- Administration

OPEX

Basic Cost of Doing Business

Break/Fix

- Repair
- Remediation
- Disruptive Administration

OPEX

Asset Failure

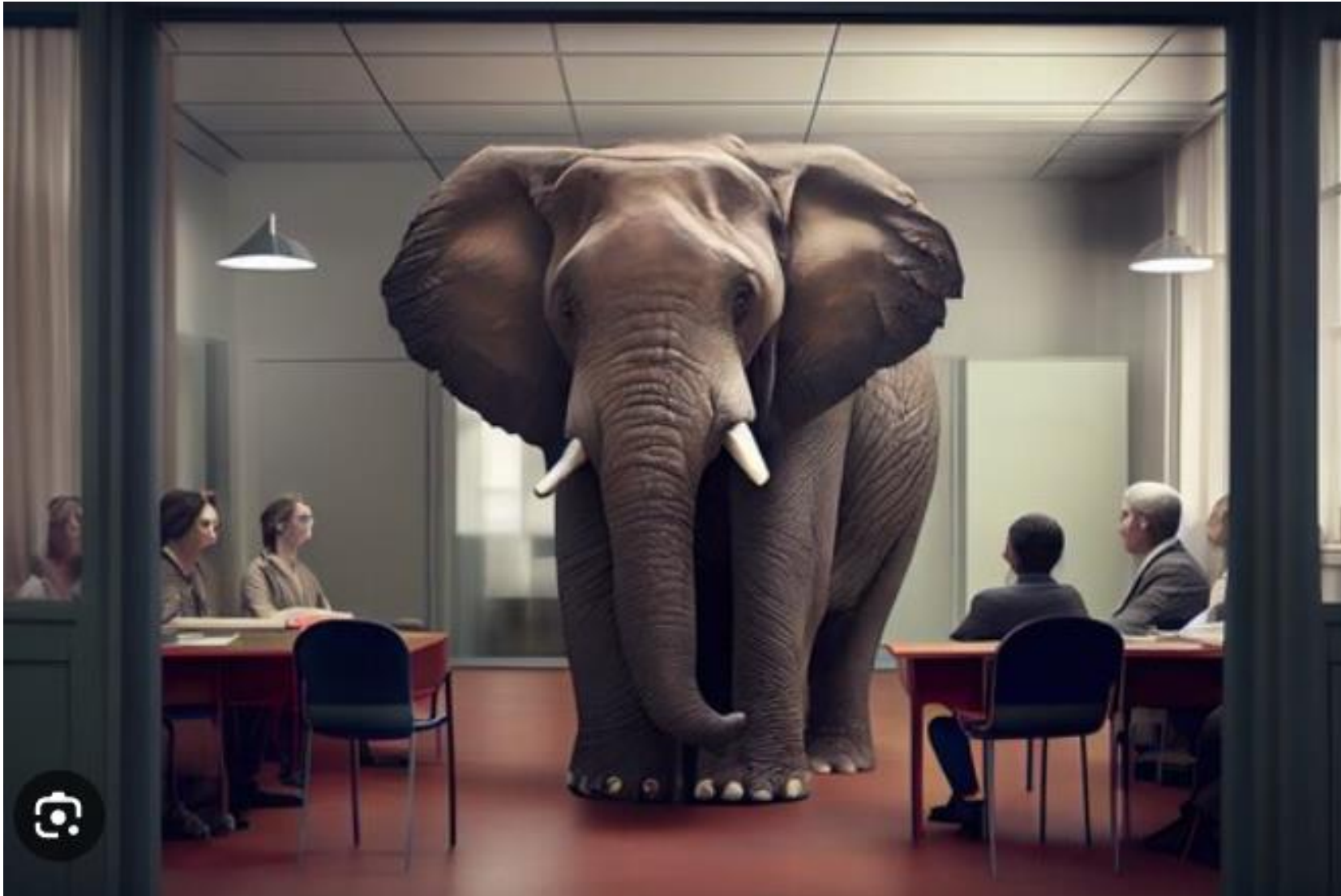
- Restoration
- Replacement
- Inefficient Spend

CAPEX

Cost of Restoring Operations

**“If you don’t know where you’re going,
you’ll end up someplace else.”**

~Yogi Berra



ESG



ESG

Environmental

Carbon – Own
Operations

Resource Use

Emissions, Effluents
and Waste

Environmental and
Social Impact of
Products and Services

Social

Human Rights

Occupational Health
and Safety

Community Relations

Governance

Corporate Governance

Business Ethics

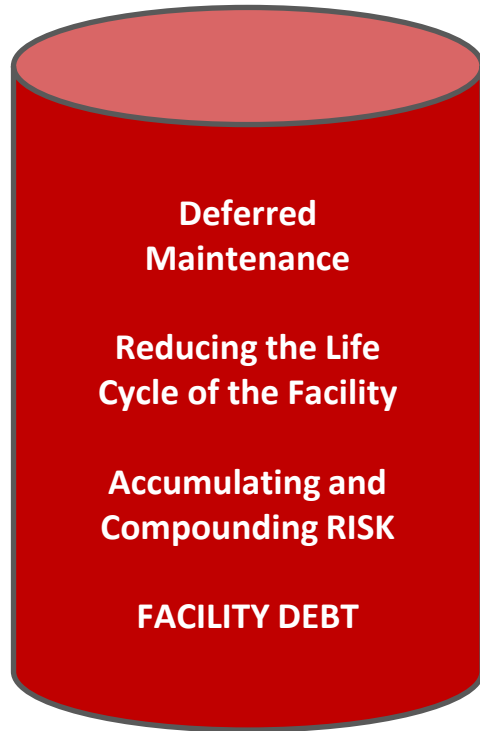
Human Capital







Deferred Maintenance Defined



AKA
Deferred Investment

- Infrastructure assets that have exceeded industry expected useful life based on age and/or condition.
- These assets are not in imminent failure mode, but indicate an accumulation of risk, and should be evaluated carefully for renovation and/or replacement.
- Communicating the objective reality of deferred maintenance is not to be feared. It is a continuous reality in any facility.



National Benchmarks (Confidential)

Organization (ghosted) (All) Group Type (All) Build Cost/SF \$800

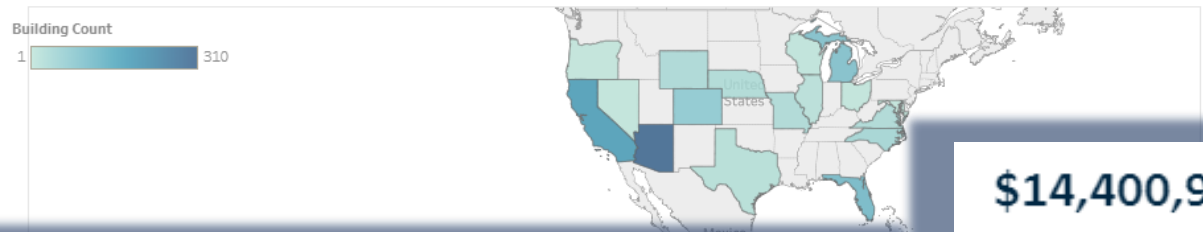
Preventative Maintenance Scenarios
 Actual PM (Adjusted)
 Optimum PM (100%, SL)
 Worst Case PM (0%, SL)

\$14,400,912,904
Total Portfolio Replacement Cost

114,156
Assets

\$7,654,878,761
53% Deferred Replacement Cost

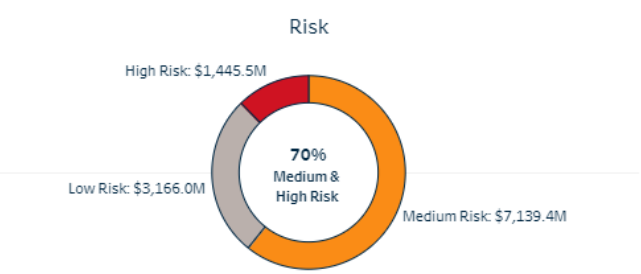
97,302,192
Square Feet



58%
FHI (Facility Health Index™)

78%
FHIE (Facility Health Index™ Engineering)

Annual Investment	Per SF	Deferred % in 10 Years	Total Portfolio Replacement Cost	Assets
Sustain Annual Investment	\$409,607,749	\$4.21	53.2%	\$14,400,912,904
Average Annual Investment	\$648,342,558	\$6.66	36.6%	114,156
Benchmark Annual Investment	\$887,077,367	\$9.12	20.0%	\$7,654,878,761
			53% Deferred Replacement Cost	97,302,192
				Square Feet



Preventative Maintenance ROI

Annual Full-PM Cost (Capital Assets)

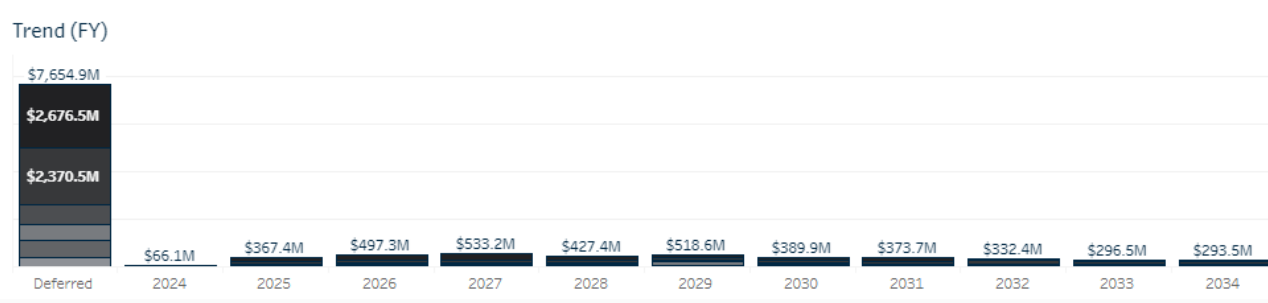
\$0

Annual Avg Full-PM Capital Benefit

\$0

10 Year Full-PM Net ROI (%)

0%



Origin - Current Healthcare Customers – National Averages as of 7/19/24



National Benchmarks (Confidential)

\$1,718,406,531
Total Portfolio Replacement Cost

12,233
Assets

\$847,420,537
49% Deferred Replacement Cost

97,302,192
Square Feet

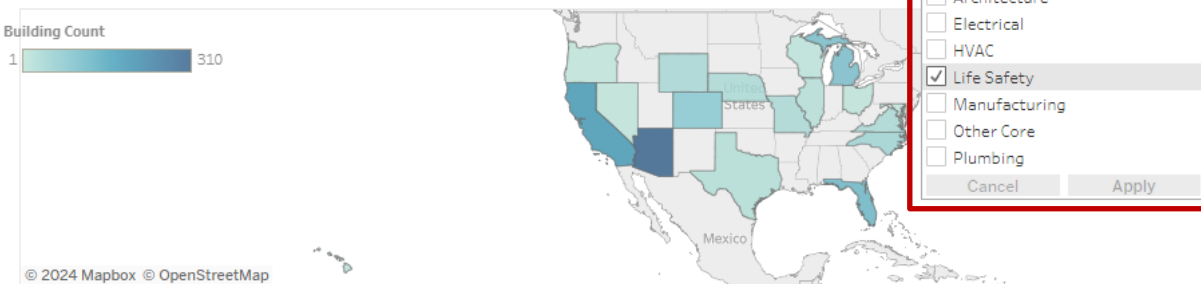
Organization (ghosted): (All)

Group Type: Life Safety

Build Cost/SF: \$800

Preventative Maintenance Scenarios:
 Actual PM (Adjusted)
 Optimum PM (100%, SL)
 Worst Case PM (0%, SL)

MAP IS UNRESPONSIVE TO FILTERS TO PROTECT CLIENT CONFIDENTIALITY.



60% FHI (Facility Health Index™)	81% FHIE (Facility Health Index™ Engineering)
10% FCI (Facility Condition Index)	15% EFCI (Extended Facility Condition Index)

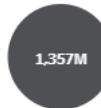
\$1,356.89M

10 Year Total

Annual Investment	
Sustain Annual Investment	\$50,947,343
Average Annual Investment	\$76,134,305
Benchmark Annual Investment	\$101,321,266

Infrastructure

Life Safety



Per SF

\$0.59

Deferred % in 10 Years

49.3%

\$0.88

34.7%

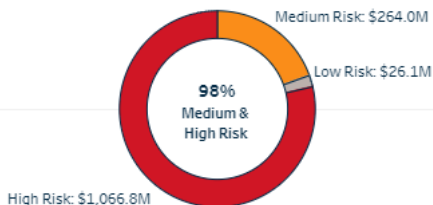
\$1.18

20.0%

10 Year Replacement Cost



Risk



Preventative Maintenance ROI

Annual Full-PM Cost (Capital Assets)

\$0

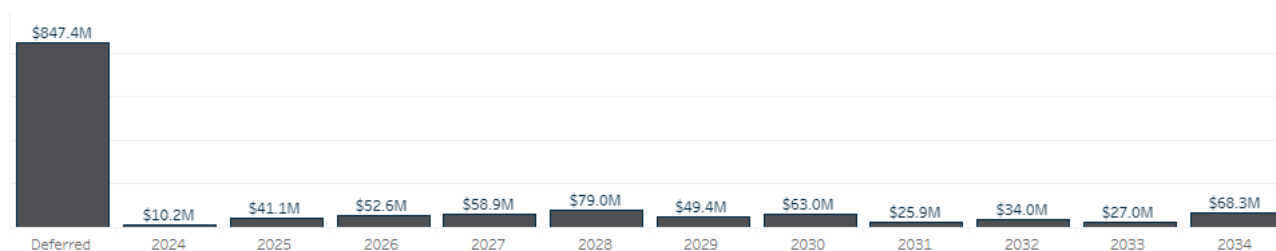
Annual Avg Full-PM Capital Benefit

\$0

10 Year Full-PM Net ROI (%)

0%

Trend (FY)





National Benchmarks (Confidential)

\$4,155,724,088
Total Portfolio Replacement Cost

19,435
Assets

\$2,370,529,347
57% Deferred Replacement Cost

97,302,192
Square Feet

Organization (ghosted): (All)

Group Type: Architecture

Build Cost/SF: \$800

Preventative Maintenance Scenarios:
 Actual PM (Adjusted)
 Optimum PM (100%, SL)
 Worst Case PM (0%, SL)

MAP IS UNRESPONSIVE TO FILTERS TO PROTECT CLIENT CONFIDENTIALITY.

© 2024 Mapbox © OpenStreetMap

56%
FHI (Facility Health Index™)

76%
FHIE (Facility Health Index™ Engineering)

10%
FCI (Facility Condition Index)

15%
EFCI (Extended Facility Condition Index)

\$3,496.59M
10 Year Total

Annual Investment

Sustain Annual Investment	\$112,605,883
Average Annual Investment	\$189,575,109
Benchmark Annual Investment	\$266,544,336

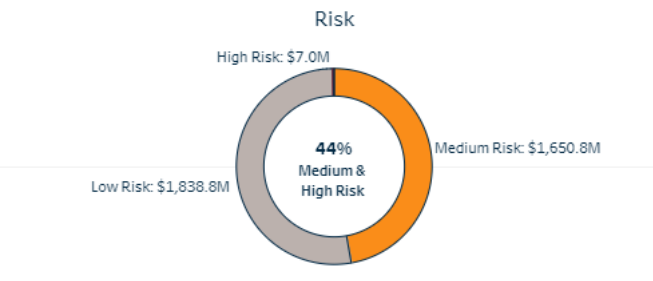
Infrastructure: Architecture

3,497M

Per SF	Deferred % in 10 Years
\$1.27	57.0%
\$2.14	38.5%
\$3.01	20.0%

10 Year Replacement Cost

Location \$183.4M	Location \$89.3M	Location \$69.4M	Location \$51.9M	Location \$104.9M	Location \$102.2M	Location \$85.7M	Location \$68.3M	Location \$80.7M	Location \$67.9M	Location \$74.2M	Location \$63.7M	Location \$50.3M	Location \$45.1M	Location \$38.9M	Location \$32.7M	Location \$26.5M	Location \$20.3M	Location \$14.1M	Location \$8.9M	Location \$3.7M
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Preventative Maintenance ROI

Annual Full-PM Cost (Capital Assets): \$0

Annual Avg Full-PM Capital Benefit: \$0

10 Year Full-PM Net ROI (%): 0%





National Benchmarks (Confidential)

Organization (ghosted)

(All)

Group Type

- (Multiple values)
- (All)
- Architecture
- Electrical
- HVAC
- Life Safety
- Manufacturing
- Other Core
- Plumbing

Build Cost/SF
\$800

Preventative Maintenance Scenarios

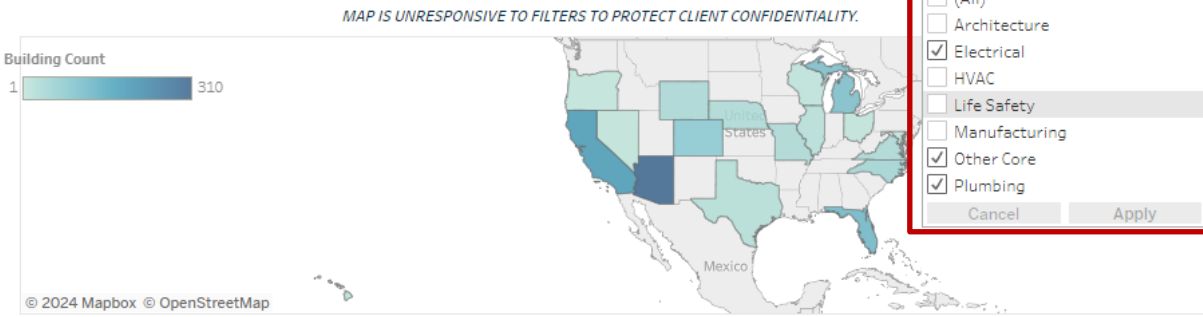
- Actual PM (Adjusted)
- Optimum PM (100%, SL)
- Worst Case PM (0%, SL)

\$3,887,635,400
Total Portfolio Replacement Cost

59,146
Assets

\$1,760,352,726
45% Deferred Replacement Cost

97,302,192
Square Feet



59%
FHI (Facility Health Index™)

79%
FHIE (Facility Health Index™ Engineering)

10%
FCI (Facility Condition Index)

15%
EFCI (Extended Facility Condition Index)

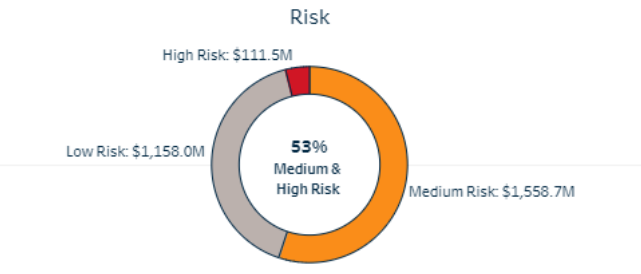
\$2,828.15M
10 Year Total

Annual Investment

Sustain Annual Investment	\$106,779,349	Per SF	\$1.13	Deferred % in 10 Years	45.3%
Average Annual Investment	\$155,920,631		\$1.66		32.6%
Benchmark Annual Investment	\$205,061,913		\$2.18		20.0%

10 Year Replacement Cost

Location \$154.2M	Location \$94.9M	Location \$54.5M	Location \$44.1M	Location \$38.1M																
Location \$141.4M	Location \$79.6M	Location \$54.1M	Location \$44.1M	Location \$37.5M																
Location \$118.6M	Location \$74.9M	Location \$54.0M	Location \$44.1M	Location \$37.5M																



Preventative Maintenance ROI

Annual Full-PM Cost (Capital Assets)

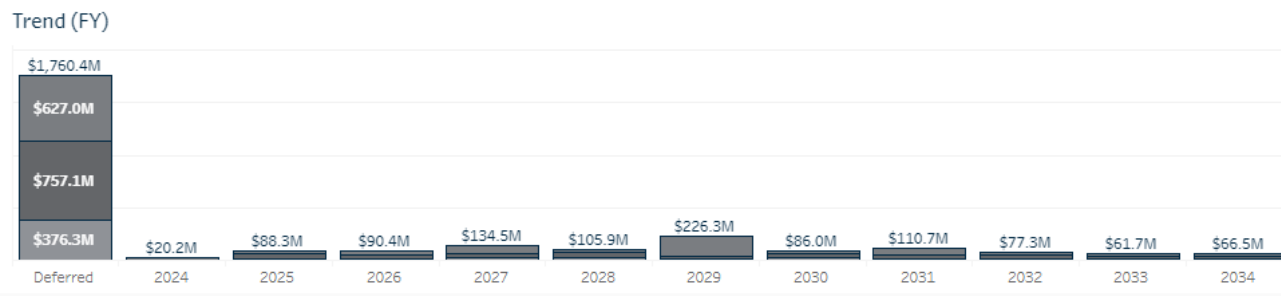
\$0

Annual Avg Full-PM Capital Benefit

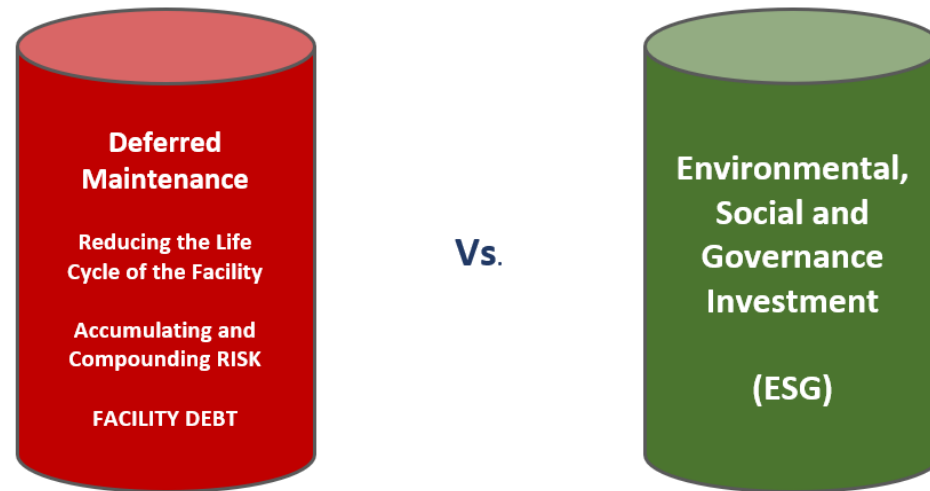
\$0

10 Year Full-PM Net ROI (%)

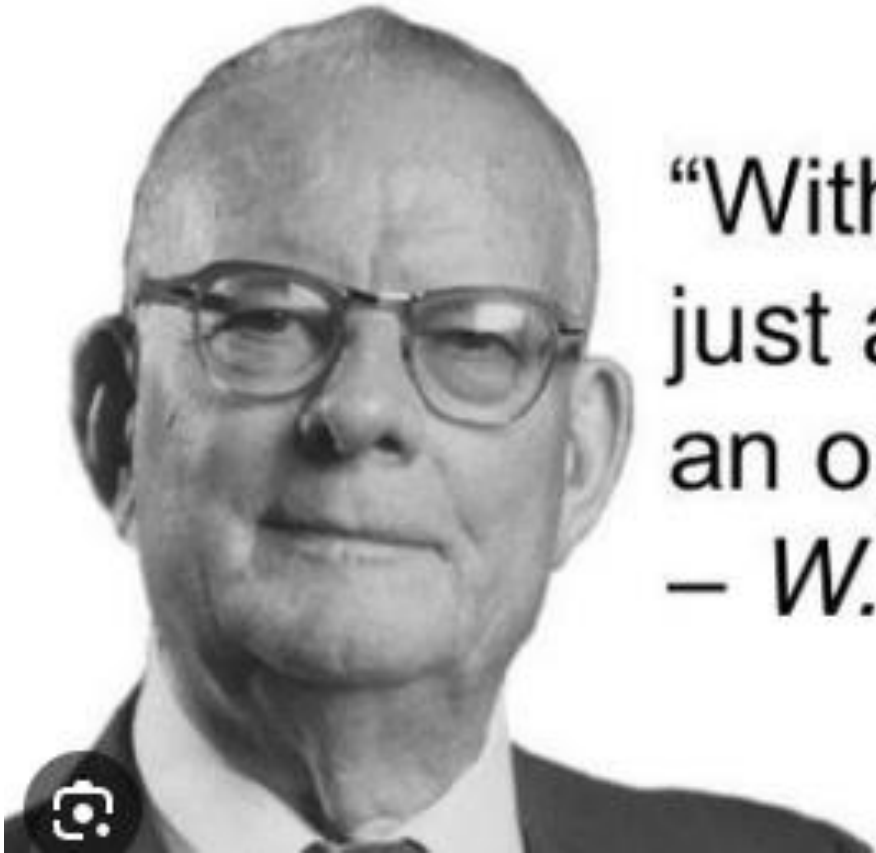
0%



Q: Where do you start?



A: Data



“Without data you’re
just another person with
an opinion.”
– *W. Edwards Deming*

Back to Basics



**Utility and/or Clinical
Asset Inventory**

**Where are you
today with your
Work Order
System?**

**Portfolio
Of Buildings,
Asset Types, Assets**

- **Centralized/Standardized?**
- **Decentralized/Customized?**
- **Inventory Accuracy?**
- **Work Order Accuracy?**
- **PM Performance?**
- **Compliance/AHJ Tracking?**
- **Optimize?**

CMMS is the Foundation

**Utility and/or Clinical
Asset Inventory**

**How do you want to
manage your
facility?**

**Portfolio
Of Buildings,
Asset Types, Assets**

- **Inventory Accuracy?**
- **Reactive?**
- **Preventive?**
- **Predictive?**
- **Centralized vs. Decentralized?**
- **Naming, Tagging?**
- **What is an Asset?**

CMMS Data and Process Standards

**Total
Asset Inventory**

**How does your
organization
approach different
asset types?**

Facility/Utility

Assets That
Indirectly
Support or
Enable the Core
Business
Functions

Major MEP,
HVAC, Life Safety,
Building
Envelope

MFG
Production

DATA
Information
Technology

HC
Clinical
Engineering

EDU
GOV/MUN
Public Facing
vs. Admin

No ROI?

ROI?

- **Separate Funding Strategies?**
- **Inventory Accuracy?**
- **Facility, Utility – Industry Agnostic**
- **ROI Metrics**
- **OPEX vs. CAPEX?**
- **Business Process**
- **How are Investment Decisions Prioritized?**

Asset Management Strategy

**Facility/Utility
Asset Inventory**

**Do you know what
assets you have and
how they are
performing?**

Facility/Utility

**Assets That Indirectly
Support or Enable
Core Business Functions**

Major MEP, HVAC, Life
Safety, Building Envelope

- **Inventory Validation?**
- **Facility Condition Assessment (FCA)?**
- **Location Hierarchy?**
- **Make/Model/SN & Engineering Capacity?**
- **Installation Date, Expected Useful Life?**
- **Situational Awareness?**

Operational Performance Baseline

MFG
Production

DATA
Information
Technology

HC
Clinical
Engineering

EDU
GOV/MUN
Public Facing
vs. Admin

**Validated
Asset Inventory**

**Have you applied
standardized risk
rankings for your
facility/utility
assets?**

Facility/Utility

**Assets That Indirectly
Support or Enable
Core Business Functions**

Major MEP, HVAC, Life
Safety, Building Envelope

- **Inventory Risk/Criticality**
- **Utility – What does it do?**
- **Risk – What if it fails?**
- **Maintenance – How much?**
- **Redundancy?**
- **End of Life – No Longer Supported?**



Compliance Note:
Risk Ranking of
Assets/Spaces is an
Accreditation Requirement

MFG
Production

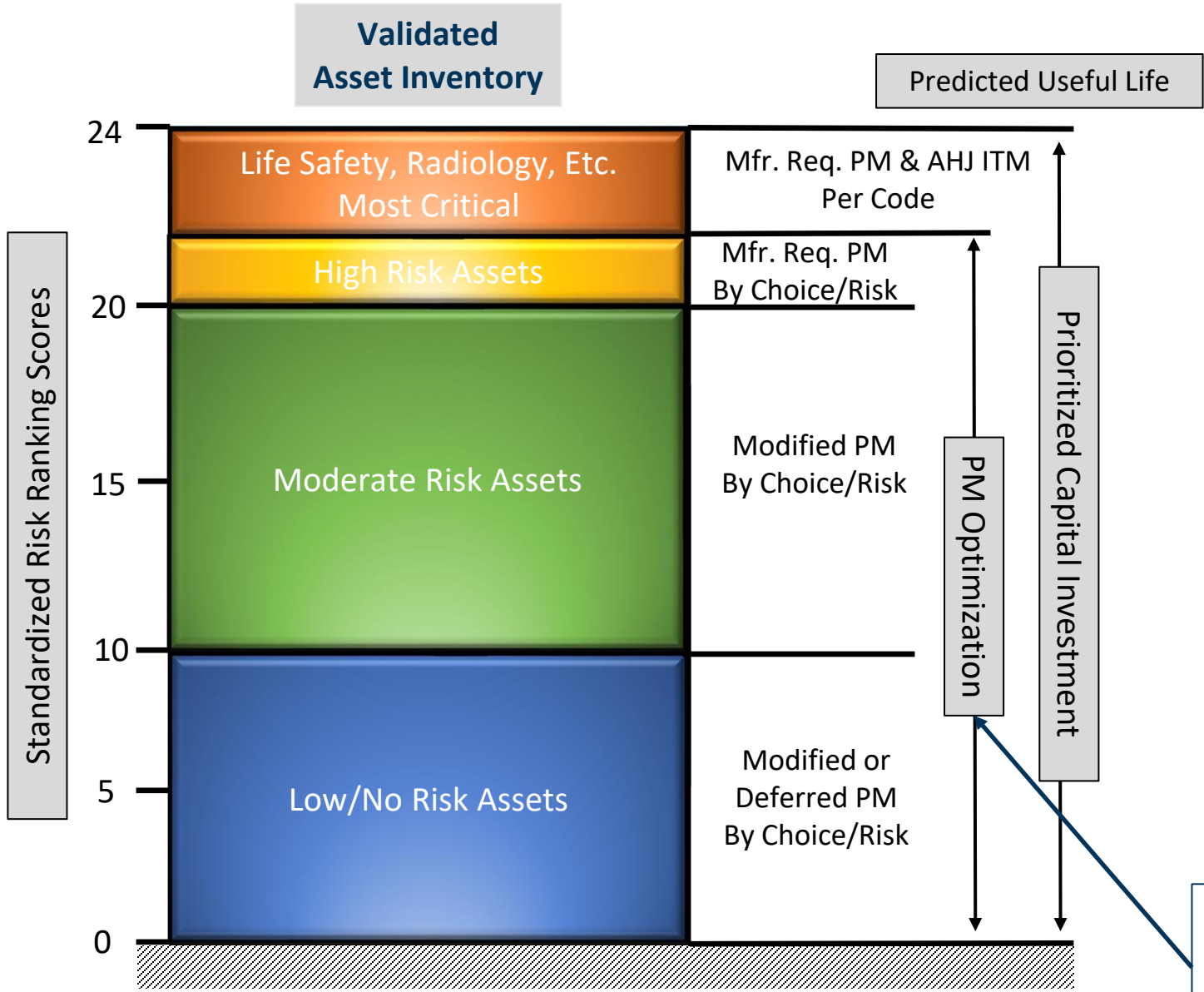
DATA
Information
Technology

HC
Clinical
Engineering

**EDU
GOV/MUN**
Public Facing
vs. Admin

CMMS Inventory Risk Assessment

Application of Risk Framework Provides Clarity and Objectivity in Competing OPEX and CAPEX Investment Decisions



Transforming Facility Management

Healthcare Compliance Note:
PM optimization must be documented in AEM Policy

The Best Risk Ranking Framework is the One that You Will Use, Deploy, and Follow.

Follow Industry Guidelines if Available/Required

**Engage Your Leadership
What is important to them?**

Case Study





JUNE 30, 2022

FACT SHEET: Health Sector Leaders Join Biden Administration's Pledge to Reduce Greenhouse Gas Emissions 50% by 2030

 [BRIEFING ROOM](#) [STATEMENTS AND RELEASES](#)

Health Sector Steps Up to Protect Public Health and Lower Costs

Today, the Biden-Harris Administration announced that 61 of the largest U.S. hospital and health sector companies responded to the Administration's [Health Sector Climate Pledge](#), committing to reduce greenhouse gas emissions 50% by 2030. The new commitments represent over 650 hospitals and thousands of other providers across the country, and include plans to strengthen resilience to climate change, protect public health, and lower costs. The health care sector accounts for 8.5% of U.S. emissions, so these bold commitments advance President Biden's goal to reduce nationwide greenhouse gas emissions 50-52% in 2030 and reach net-zero emissions in 2050.

Sample Health System

CFO to SVP Facilities...

Can we make this pledge?

Engineering Study & Results

1. Portfolio: Regional Health System – 17 Hospitals, All Sizes, Urban and Rural
 - ~10 M SQFT Acute and Non-Acute, Deferred Maintenance ~50%
2. Invested ~\$1.5 M in a Comprehensive Engineering Analysis to determine gap between existing infrastructure performance vs. white house goals.
3. **Results of Study: Could they meet the goals? Yes.**
 - Net capital investment need: \$50+ M in asset replacement and CUP reconfiguration – mostly to electrify assets and reduce Level 1 emissions.
 - Asset replacement recommendations only partially aligned with deferred maintenance needs already prioritized by other means (risk, criticality, etc.)
 - Energy costs would increase with electrification (~20% for electricity vs. gas - equivalent BTU)
 - Business Impact: Negative ROI. Objective, Data-Driven and Presented to Board for Decision.
 - Other Impact: Local grid incapable of supporting full electrification
 - **Intangible Benefit:**
 - **Increased awareness from the boiler room to the board room. The pledge was not signed, but ESG metrics (all 3 pillars) were incorporated into future strategic planning for consideration.**

Conclusion



Asset-Driven Budgeting and Forecasting

Plant Operating Cost Correlation Coefficients
Infrastructure Renewal Modeling and ROI

ACHE 2024
CONGRESS
on Healthcare Leadership



Correlation Coefficients – Large Hospitals

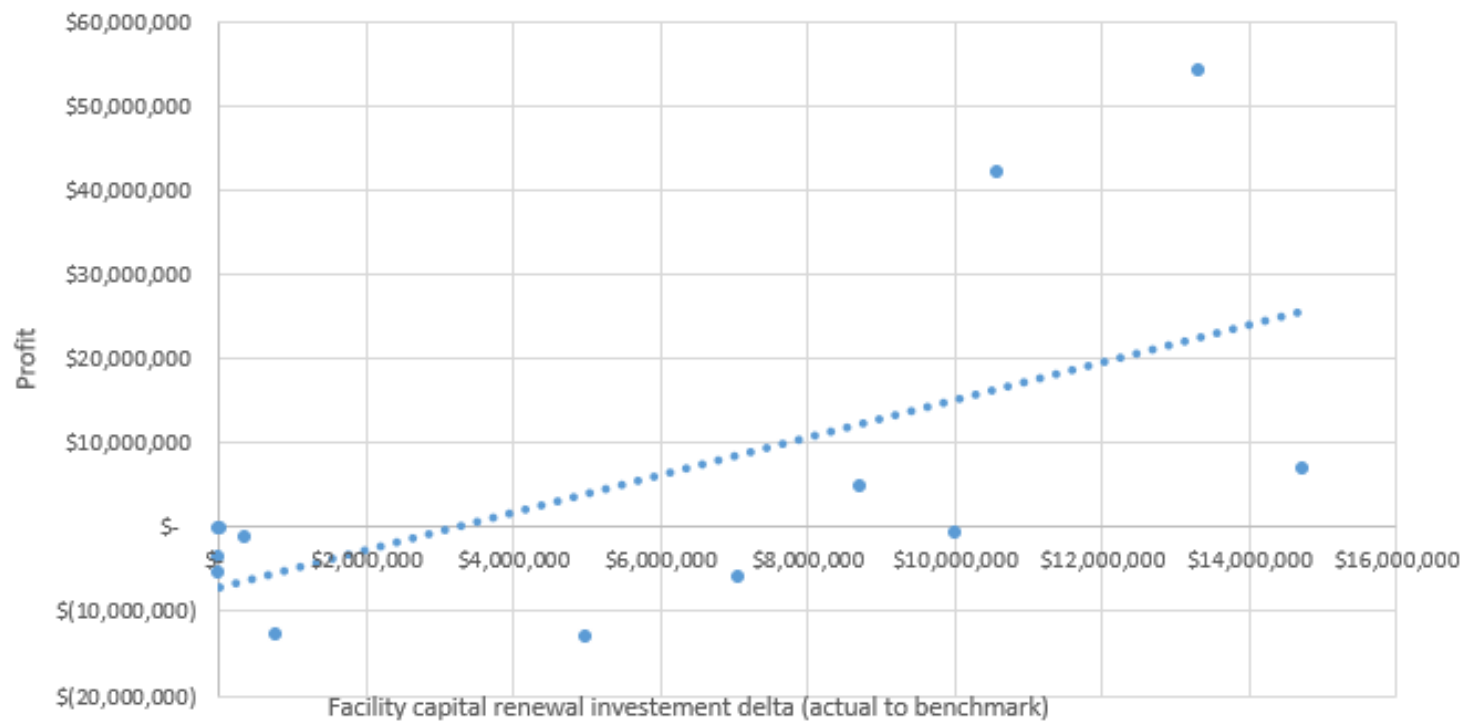


Cost account	Available beds	Patient days	Admissions	GSF	PP&E
Total plant operating expense	.777	.791	.758	.788	.829
Maintenance	.628	.656	.574	.456	.563
Utilities	.685	.736	.674	.849	.864
Salary, wages, and benefits	.699	.726	.636	.626	.850
Depreciation	.689	.522	.632	.725	.622
Other	.662	.700	.712	.494	.516
Total housekeeping operating expense	.868	.907	.837	.849	.831
Salary, wages, and benefits	.842	.870	.807	.772	.726
Supplies	.285	.325	.251	.323	.706
Other	.267	.283	.277	.431	.354

ROI to Reducing Deferred Maintenance



For every \$1 spent toward reducing deferred maintenance backlogs, hospital profit increases \$2.22



Source: Simplar, Dr. Steven Call

Deferred Maintenance Impact to Profits


- Key Factors:
 - Higher costs from crisis level responses to unplanned shutdowns
 - Increased energy costs, decreased efficiency
 - Greater revenue loss from longer stoppages of procedures/services from unplanned shutdowns
 - Revenue loss from damage to brand reputation (curb appeal, noise, cleanliness, news of sentinel events, etc.).

It's All About the Data...

- What assets do you have?
- How old are they?
- How are they performing over time?
- How costly to maintain?
- What is the RISK if they fail?
- What is the impact of a failure?
- How much will it cost to replace them proactively vs. reactively?
- How much energy are they consuming?




Industry NORM
"Static" Information




Strategic Asset Management
Understanding Asset Performance



“ IF WE HAVE DATA,
LET'S LOOK AT THE
DATA.
IF ALL WE HAVE ARE
OPINIONS
LET'S GO WITH MINE.”

A black and white portrait of a middle-aged man with glasses, wearing a dark suit, white shirt, and patterned tie. He is smiling slightly and looking towards the camera. The background is a blurred indoor setting.

 **BARKSDALE**
Sr-CEO Netscape

Questions?



Thank You!

