Repair and Replacement Capital Planning

”An Ounce of Prevention is Worth a Pound of Cure.”

FACILITY HEALTH INC.
Asset Life Cycle Care

Mark Mochel, MBA, PMP, CSM, FCT
Vice-President

Thursday October 24, 2019

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As a systemic perspective, most organizations underestimate the investment and effort required to maintain a facility over the full life cycle of the structure.

It is important that we document the true status of our aging infrastructure with objective data, expertise and technology so we can have confidence in the prioritization of capital and operational spend.

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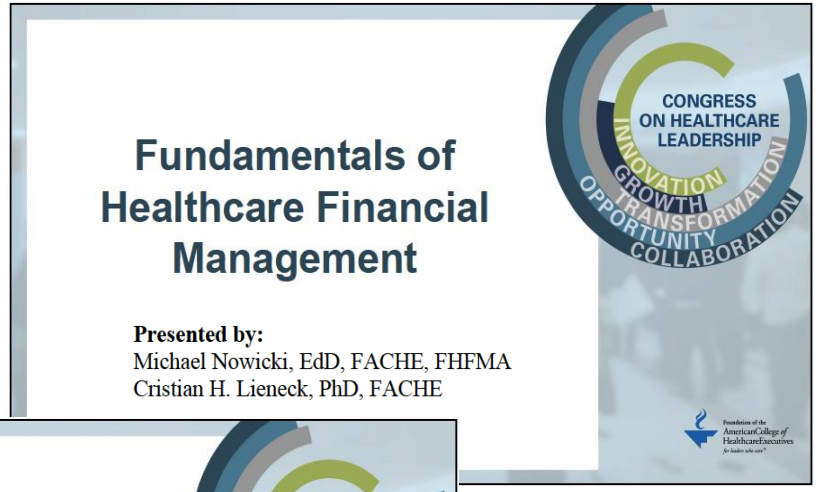

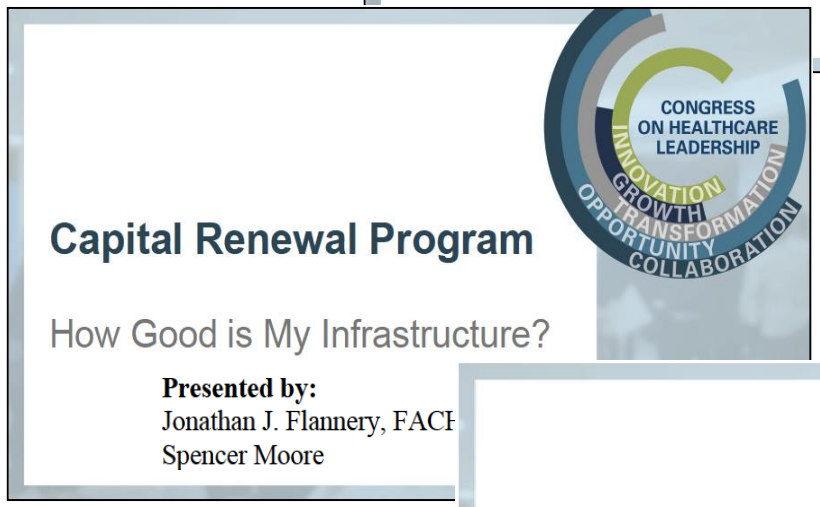

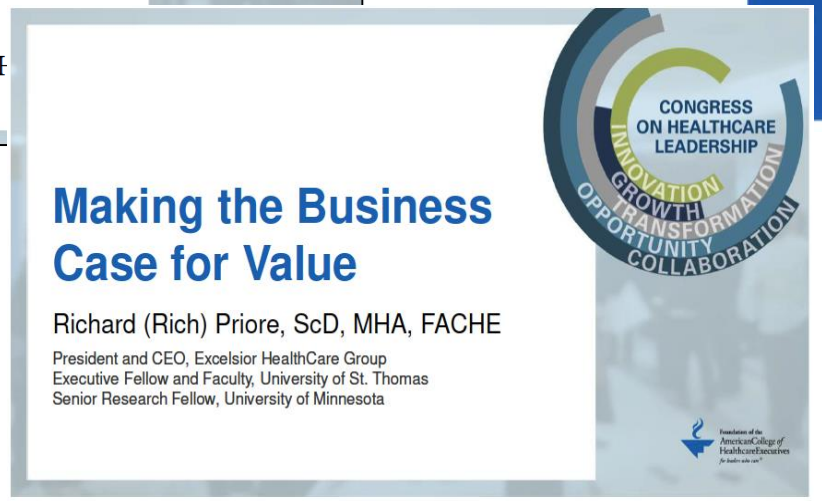

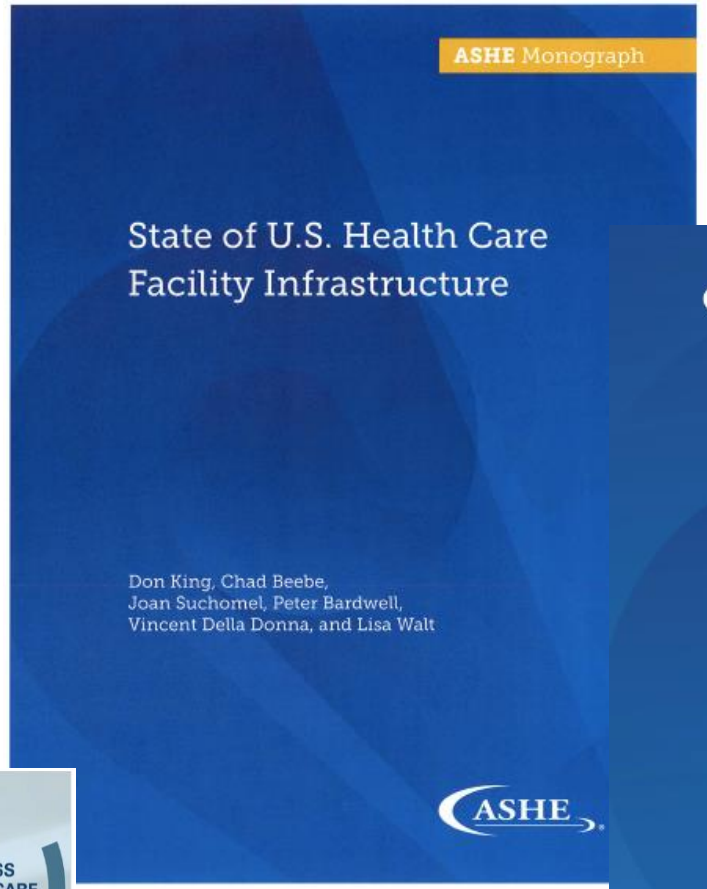

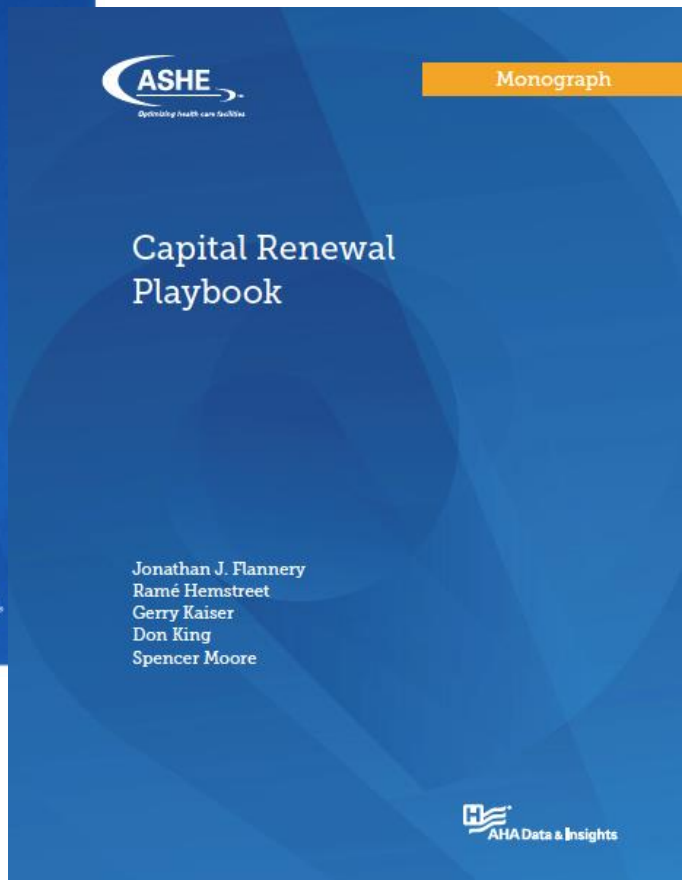

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Part One: Macro Economics and the C-Suite

The C-Suite….

They Don't Get It!

Summary: It's a fact, the C-Suite doesn't speak the same language as the facility management team. They don't understand Air Handlers, Boilers, Chillers etc. But what language do they speak? They speak in financial terms, they understand and monitor the economics of healthcare and will always seek to mitigate financial risks to the institution in any way possible.

It is their fiduciary responsibility to do so.

Therefore, it is our responsibility to teach them about the RISK associated with improper funding of infrastructure maintenance, repair and replacement.

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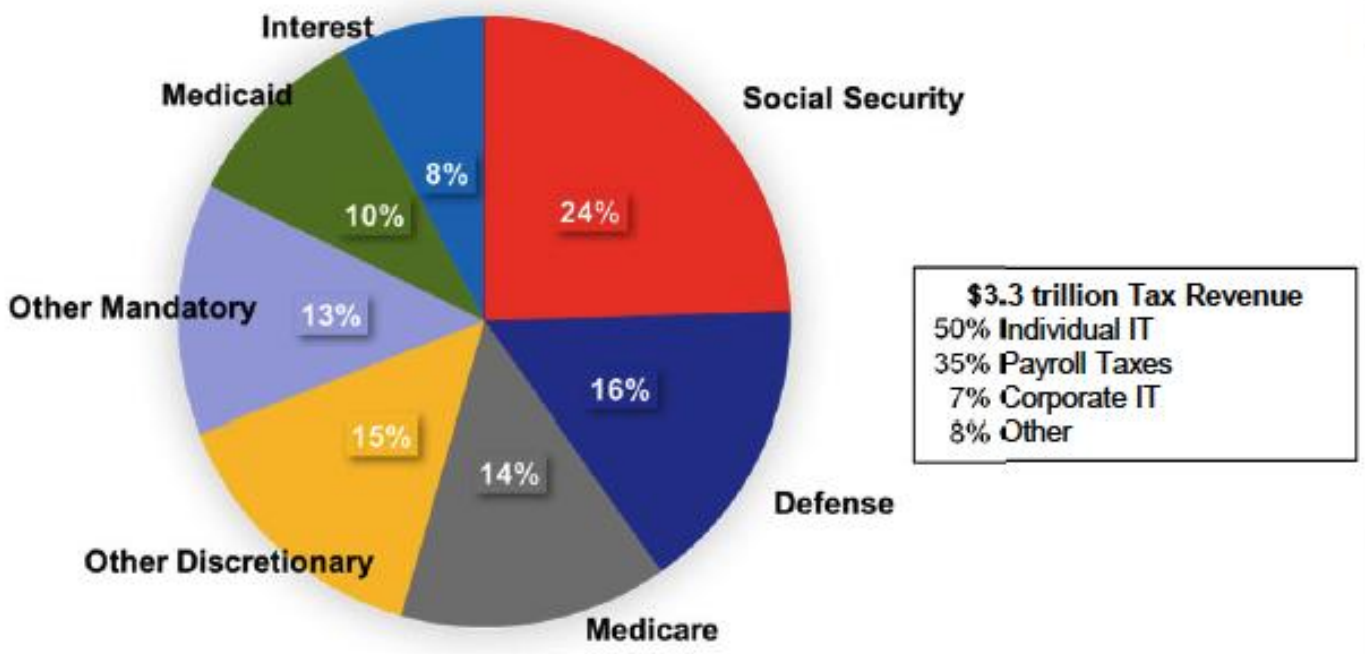
Federal Expenditures 2018
$4.1 trillion



$3.3 trillion Tax Revenue
50% Individual IT
35% Payroll Taxes
7% Corporate IT
8% Other

Office of Management and Budget data

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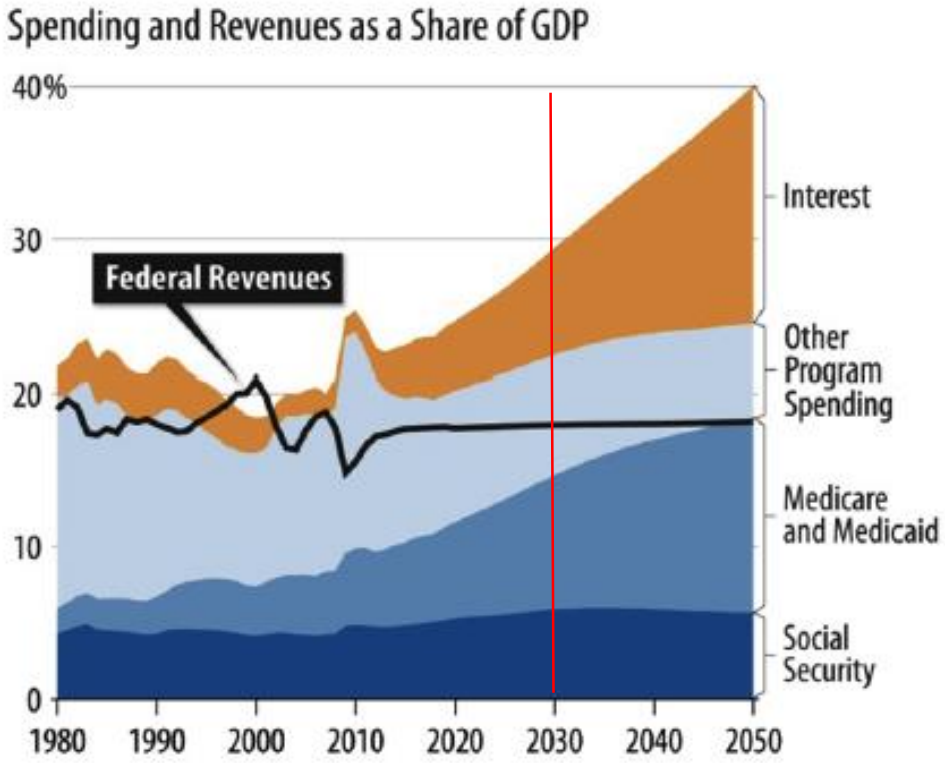
Federal Budget as % of GDP



CBPP projections based on CBO data

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Current Fiscal Policy is Unsustainable

- The "status quo" is not an option
  - We face large and growing structural deficits largely due to known demographic trends and rising healthcare costs.
  - GAO's simulations show that balancing the budget in 2040 would require actions as large as
    - Cutting total federal government spending by as much as 60% or
    - Raising federal taxes to 2.5 times today's level.

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Why is Strategic Financial Planning Important?

- The real pressures on the the healthcare system are substantially financial:
  - Significant payer changes
  - Real cost pressures
  - Continuing pressure from the for-profit sector
  - The relationship and balance of these issues to the organization's mission
  - The ongoing ***capital crisis***

What does the C-Suite conclude from this message?

"We need to Cut Costs!"

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Resource Allocation

Payback period	Discounted payback period
Net present value (NPV)	Internal rate of return (IRR)

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Capital Budgeting Process –
Identify Non-Financial Benefits

- Identify non-financial benefits:
  - Community Health
  - Facility Quality
  - Image and Reputation
  - Information and Decision Support
  - Market Share
  - Patient Safety
  - Patient / Family Satisfaction
  - Patient Outcomes
  - Physician Satisfaction
  - ***Can you think of any others?***

RISK

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Conclusions – Part One

- **Without Strategic Planning**, there will be less money available for repair & replacement of infrastructure, not more.
- There will be more need for project requests to be quantified, objective and defensible not less.
- In most cases, the C-Suite will not “get it” in the traditional terms and language of facility management.
- We all have a fiduciary responsibility to communicate these needs in terms the C-Suite can understand. **Because aging infrastructure = RISK.**

What can you do? **Follow the Data.**

Look out 5-10 Years, Not Just 1

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Part Two: ASHE Position & Recommendations

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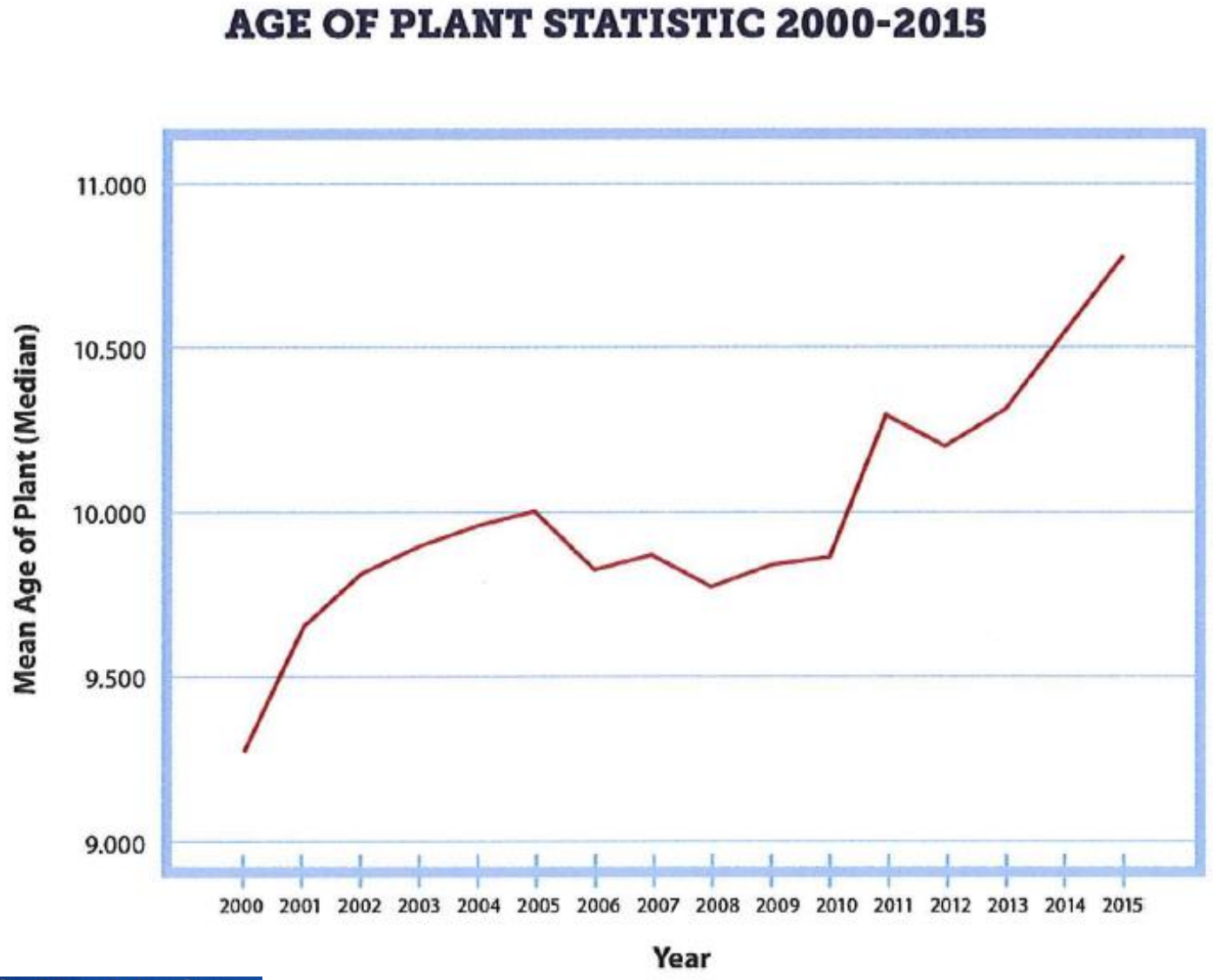
What is the overall condition of the U.S. health care facilities portfolio?

The overall condition of America's health care infrastructure varies widely. Hospitals with strong market positioning and forward-looking leadership have invested in maintenance and modernization, while some hospitals in struggling communities have been unable to keep up.



FCI Statistics

"Given that there are many factors that influence FCI (e.g., geographical and demand-based differences in market costs for repairs, subjective assessments of when repairs should be made), this metric…is not compared across facilities from different regions."

Critical Building Target: FCI <0.05
Other Building Target: FCI < 0.15

Two Key Metrics

$$\text{Age of Plant, AOP} = \frac{\text{Accumulated Depreciation}}{\text{Depreciation Expense}}$$

$$\text{Facility Condition Index (FCI)} = \frac{\text{Cost of Repairing a Facility}}{\text{Cost of Facility Replacement}}$$

Challenges:

- Top down perspective
- Works well in aggregate, but little or no connection to the actual asset portfolio
- Subjective analysis. How do you truly estimate cost of facility replacement?

Additional Metrics

Projected Requirement Index (PRI) – Four Year FCI Projection

Facility Maintenance Renewal Index (FMRI) = FCI + PRI

Sustainment Percentage = Avg. % of Current Replacement Value necessary to sustain current condition each year within a 10 year window.

Challenges:

- Same as before. Top Down. Aggregate. “Big Number Estimates”
- Not directly linked to the asset portfolio.

Conclusion – Part Two

The metrics you really need are…

- What assets do you have?
- How old are they?
- How are they performing?
- What is the RISK if they fail?
- What is the financial or other impact of a failure?
- How much will it cost to replace them PROACTIVELY vs. REACTIVELY?

Objective Data Inputs

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5. KEY ELEMENTS FOR PROGRAM SUCCESS

ASHE's Health Care Executive Leadership Council conducted a study of successful capital renewal programs in large health care facility portfolios. Their study identified 12 key elements of a successful capital renewal program:

1. Facility inventory
2. Facility condition assessment program
3. Metrics
4. Alignment with organization vision, mission, and strategy
5. Integration with other strategies
6. Funding allocated specifically for capital maintenance
7. Agreed-on targets, goals, and/or outcomes
8. Risk assessment/prioritization scheme
9. Multi-year assessment
10. Multi-disciplinary team
11. Communications plan (almost a marketing plan)
12. Monitoring (tied to goals, objectives, and incentives)

Objective Data Inputs

Trust & Cultural Impact

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Part Three: Dollars & Cents

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Repair and Replacement – By The Numbers

For Hospital Sites Older Than 20 years

500,000 K SQFT
Average size of accredited sites surveyed by FHI to date.

Baseline

$59 Million
Replacement value of the infrastructure assets for the average accredited site

45%
Assets aged beyond industry recommended expected useful life

Problem
Impact of Historical Deferred Maintenance

$27 Million
Immediate investment need to offset **ACCUMULATED RISK**

$1.6 Million per Year
10-year investment model to MAINTAIN aged assets at 45% through year 10

Solution
Sustained and Prioritized Investment over time will Reduce Risk

$3.3 Million per Year
10-year investment model to REDUCE aged assets to ~10% in year 10

Conclusion: The typical 500K SQFT facility requires a $16-33 Million, 10-Year plan to offset and improve historical lack of replacement capital investment.

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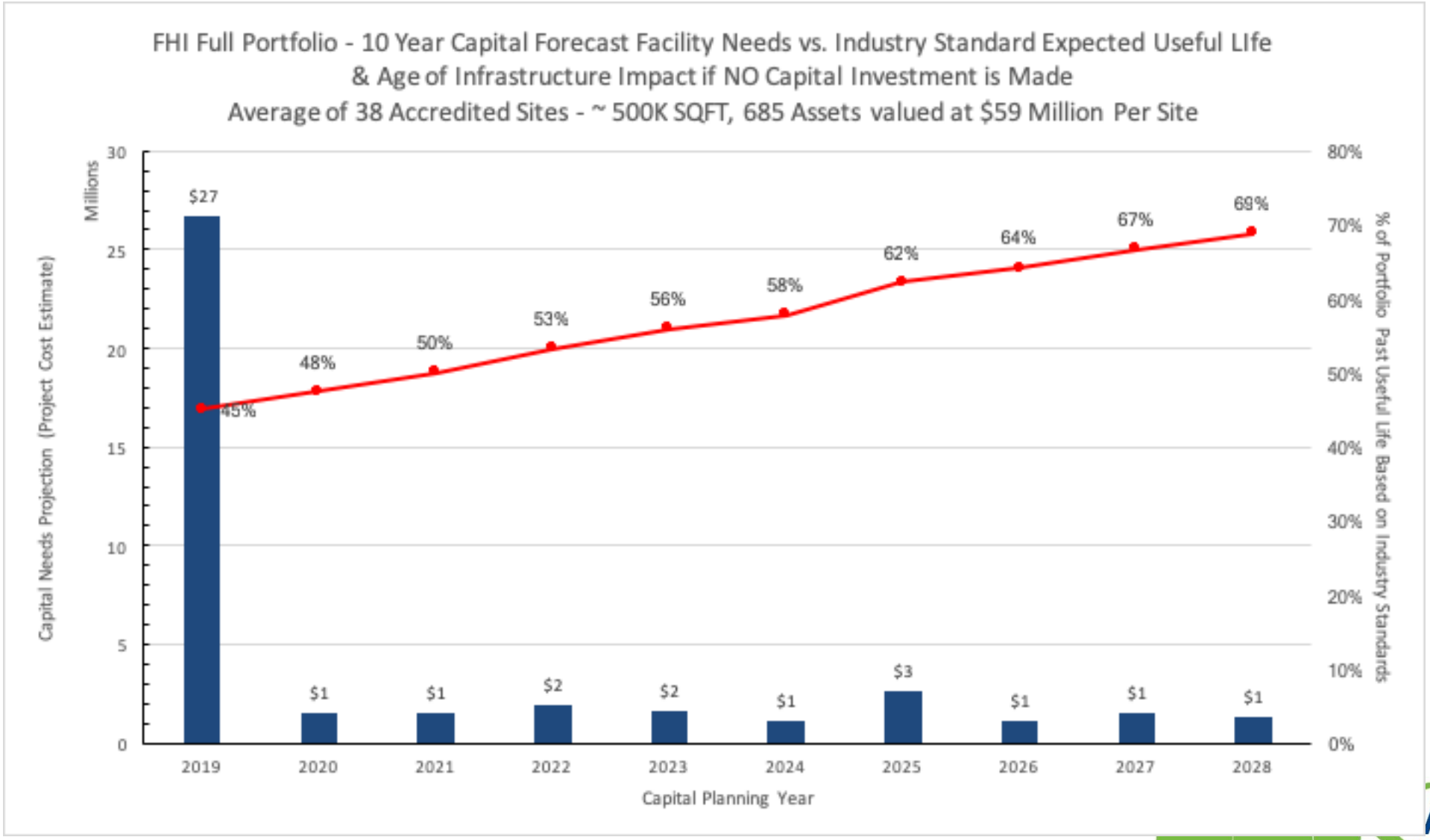
Complete FHI Origin Data Summary – "Average" of All Customer Sites Surveyed

High 2019 Needs Represent Deferred Investment Backlog = Accumulated Risk



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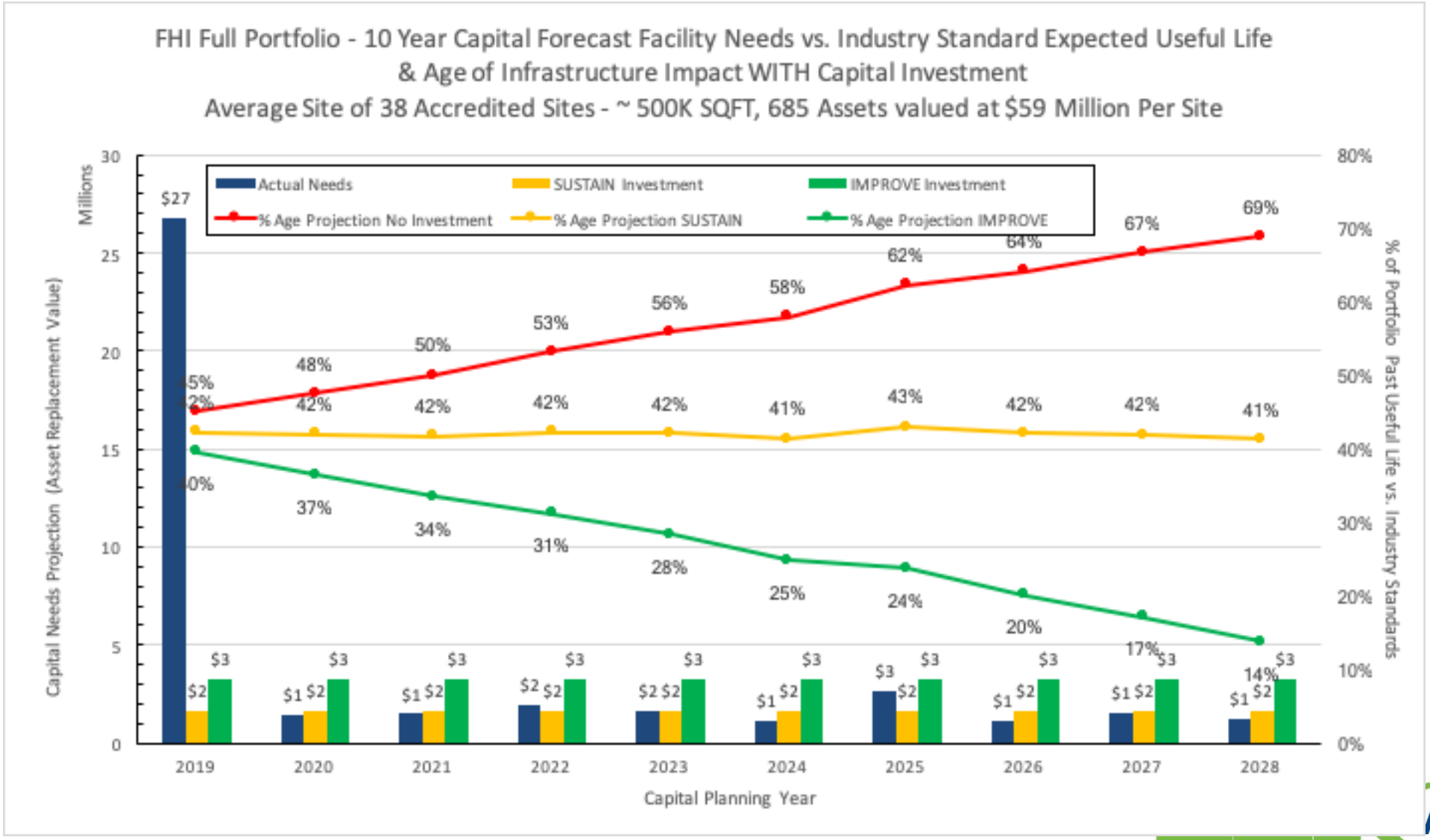
Forecast Spending Models Created Based on FHI Portfolio

Straight Line Investment Strategy Over 10 Years Prioritized By Asset Risk Ranking Can Reduce Overall Age Of Assets



SUSTAIN Is 40% of Total 10 Year Needs Divided By 10 Years

IMPROVE Is 75% of Total 10 Year Needs Divided By 10 Years

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Projection for ABC Health – 29 Accredited Sites*

Assumes Hospital Sites on Average are Older than 20 Years for Purposes of Demonstration

*As reported by American Hospital Directory: www. ahd.com

18.04 M SQFT
Projected total size of the ABC hospital portfolio (not including other buildings)

Baseline

$1.7 Billion
Projected total replacement value of the ABC infrastructure assets

45%
Projected assets aged beyond industry recommended expected useful life

Problem
Impact of Historical Deferred Maintenance

$769 Million
Immediate investment need to offset **ACCUMULATED RISK**

$46 Million per Year
10-year investment model to MAINTAIN aged assets at 45% through year 10

Solution
Sustained and Prioritized Investment over time will Reduce Risk

$84 Million per Year
10-year investment model to REDUCE aged assets to ~10% in year 10

~ $1.6 Million per Year, per Site

~ $2.9 Million per Year, per Site

Conclusion: At a macro level, ABC Health should be investing between $46-84 Million per year in replacement of infrastructure assets throughout the portfolio.

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Part Four: How to Get a Seat at the Big Table?

Enterprise Asset Management

Follow the Data

Lifestyle & Wellness

Capital Planning, Master Planning and Accreditation, AEM Program

1. Leverage inventory, data standards and performance data to drive forecasts.
2. **Prioritize investments based on risk.** Objective vs. subjective planning.
3. Reduce accreditation risk with ONE Enterprise approach to compliance.

End Here

Stabilization & Prescription

Enterprise FM Process and Performance Management

1. **Validate and Deploy FM Strategy, FM Policies and Procedures, Risk Ranking.**
2. Maintain Inventory and Standards: Conduct Staff Training.
3. Introduce Culture of Compliance: Peer Reviews and Documentation Standardization.

Data Flow

Triage & Diagnosis

SSOT – Enterprise Single Source of Truth – CMMS

1. Validate Inventory, Facility Condition Assessment, Mock Surveys, Document Reviews.
2. Correct Immediate Deficiencies – Compliance or Infrastructure Assets.
3. **Leverage Capability of Standardized CMMS Platform.** Build Foundation.

Start Here

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Utility Risk Classification Examples

Utility Classification (UC)

1. Non Clinical Other
2. Clinical Other
3. Transport
4. Diagnostic
5. Equipment Support
6. Environmental Support
7. Infection Control
8. Life Safety

Risk Application (RA)

1. No Risk (NFPA 99 4.1.4)
2. Loss of Redundancy
3. Disruption of Comfort (NFPA 99 4.1.3)
4. Disruption of Service
5. Loss of Revenue
6. Misdiagnosis
7. Injury (NFPA 99 4.1.2)
8. Death (NFPA 99 4.1.1)

Documented. Defensible.

Total Risk Value Equals
UC + RA + MR + EI

Maintenance Requirement (MR)

1. None
2. Minimal
3. Average
4. Extensive

Asset Redundancy

1. Redundancy Available < 1 Hour
2. Redundancy Available < 24 Hours
3. Redundancy Available < 1 Week
4. Redundancy Unavailable Without Significant Effort/Capital > 1 Week

Consistency in Risk Classifications Across Multiple Facilities is Key!

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Risk Ranking Mapping of NFPA Requirements

A change in NFPA 99 (2012) is the requirement to risk rank assets based upon impact of failure. The requirements are as follows:

NFPA 99 4.1 Building System Categories. Building systems in health care facilities shall be designed to meet system Categories 1 through 4 requirements as detailed in this code.

4.1.1 Category 1 Facility systems in which failure of such equipment or system is likely to cause major injury or death of patients or caregivers…

4.1.2 Category 2 Facility systems in which failure of such equipment is likely to cause minor injury to patients or caregivers…

4.1.3 Category 3 Facility systems in which failure of such equipment is not likely to cause injury to patients or caregivers, but can cause patient discomfort…

4.1.4 Category 4 Facility systems in which failure of such equipment would have no impact on patient care…

NFPA 99 4.2 Risk Assessment. Categories shall be determined by following and documenting a defined risk assessment procedure.

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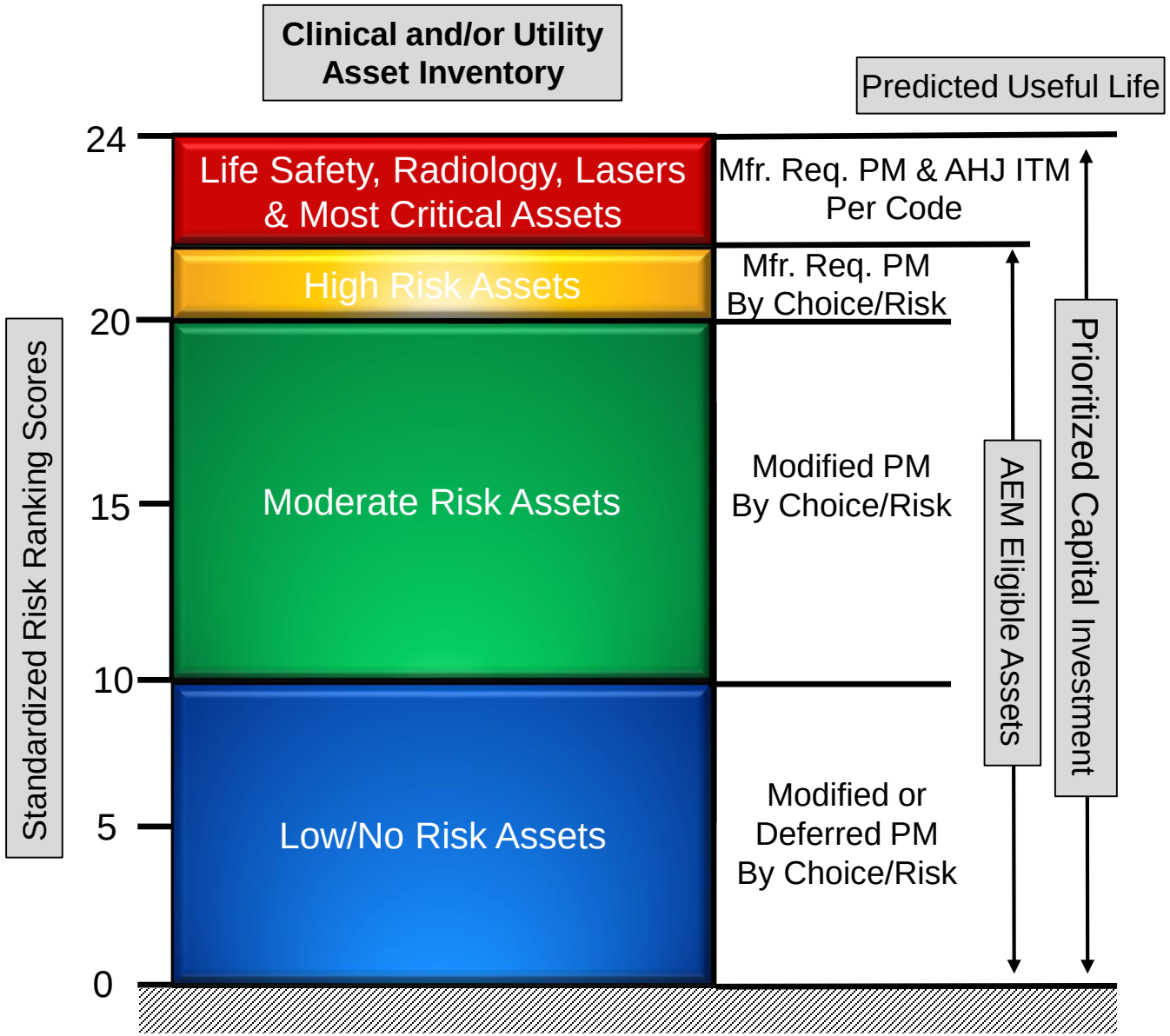
Type	Chapter 5 Med Gas							Chapter 6 Electrical Systems				Chapter 8 Plumbing Systems									Chapter 9 HVAC Systems		
	Oxygen	Medical Air	Nitrous Oxide	Nitrogen	Medical/Surgical Vaccuum	Instrument Air	HeliOx	Normal Power	Critical	Life Safety	Equipment	Potable Water-Cold	Potable Water-Hot	Non-Potable Water	Water Heating	Water Cooling	Steam	Non-Med.Compressed Air	Waste Water	Storm Water	Heating	Cooling	Ventilation
Patient Care - NFPA 99-2012 1.3.4 & 3.3.138																							
Critical Care - NFPA 99-12 1.3.4.1(1), 3.3.31 & 3.3.138.2*																							
Respiratory/ Ventilator	2	1	1	3	1	4	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1
Recovery/PACU	1	1	1	3	1	4	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1
PICU	1	1	1	3	1	4	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1
SICU	1	1	1	3	1	4	1																
MICU	1	1	1	3	1	4	1																
NICU	1	1	1	3	1	4	1																
ER	1	1	1	3	1	4	1																
ICU	1	1	1	3	1	4	1																
General Care - NFPA 99-12 1.3.4.1(2), 3.3.64, & 3.3.138.3*																							
Rehabilitation	2	2	2	4	2	2	4																
Custodial Care	2	2	2	4	2	2	4																
Behavioral/ Mental Health	2	2	2	4	2	2	4																
Medical	2	2	2	4	2	2	4																
Surgical	2	2	2	4	2	2	4																
Step Down	2	2	2	4	2	2	4																
Basic Care - NFPA 99-12 1.3.4.1(3) & 3.3.138.1*																							
Physical Therapy	2	2	2	4	2	2	4	2	2	4	4	2	2	2	2	2	2	2	2	2	2	2	2
Occupational Therapy	2	2	2	4	2	2	4	2	2	4	4	2	2	2	2	2	2	2	2	2	2	2	2
Speech Therapy	2	2	2	4	2	2	4	2	2	4	4	2	2	2	2	2	2	2	2	2	2	2	2
Wound Care	2	2	2	4	2	2	4	2	2	4	4	2	2	2	2	2	2	2	2	2	2	2	2
Respiratory Therapy	2	2	2	4	2	2	4	2	2	4	4	2	2	2	2	2	2	2	2	2	2	2	2
Anesthesia - NFPA 99-12 1.3.4.2																							
Deep Sedation NFPA 99-12 1.3.4.2 & 3.3.63.1	1	1	2	3	2	3	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1
General Anesthesia NFPA 99-12 1.3.4.2 & 3.3.63.2	1	1	1	3	1	4	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1
Minimal Sedation (Anxiolysis) NFPA 99-12 1.3.4.2 & 3.3.63.3	3	3	3	4	4	4	1	3	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Moderate Sedation/Analgesia (Conscious Sedation). NFPA 99-12 1.3.4.2 & 3.3.63.4	3	3	3	4	4	4	1	3	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Procedure Room - NFPA 99-12 3.3.149																							
Bronchoscopy	3	3	3	4	4	4	1	3	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Interventional Radiology	1	2	1	3	3	3	1	3	1	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Endoscopy	3	3	3	4	4	4	1	3	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Wet Procedure - NFPA 99-12 1.3.4.3 & 3.3.184* See Wet Location Risk Assessment to determine applicability																							
	1	1	1	3	1	4	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	3	1	4	1	3	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1

Focus on linking asset risk rankings to critical space risk rankings!

AEM and PM Policy Documentation

CULTURE OF COMPLIANCE



COMPLIANCE and CAPITAL INVESTMENT – Linked by RISK

Budgeting and Forecasting Policy Documentation

PRIORITIZED CAPITAL INVESTMENT

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What Assets do I have?

Item Details

ID 635

GEN-GENERATOR-2

Generator (Fixed)

200kw, 480V diesel generator

Number	**EQ-2000259**	Manufacturer	
Installation Date	**May 30, 2004**	Date Entered	**Feb 28, 2017**
Location	**Mercy Regional**	Building	**Building 2**
Floor	**First Level**	Zone	**Building 2**
Room	**Boiler Room**		
Quantity	**200.0**	Units	**kW**
Group	**Generator**	Subgroup	**Generator**
Type	**Generator (Fixed)**	Class	**Facility**
Compliance	**Yes**	Trade	**Electrician**
Specialty	**Electrical**		

Baseline - Sample Asset

Onsite Assessment Results:

Validation of Asset Inventory,
Collection of Baseline Information,
Synchronization with CMMS Database

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How Old, How Performing? What is the RISK?

Budget Level Replacement Cost

- Expected Useful Life Information

- Risk Ranking Based on Criticality

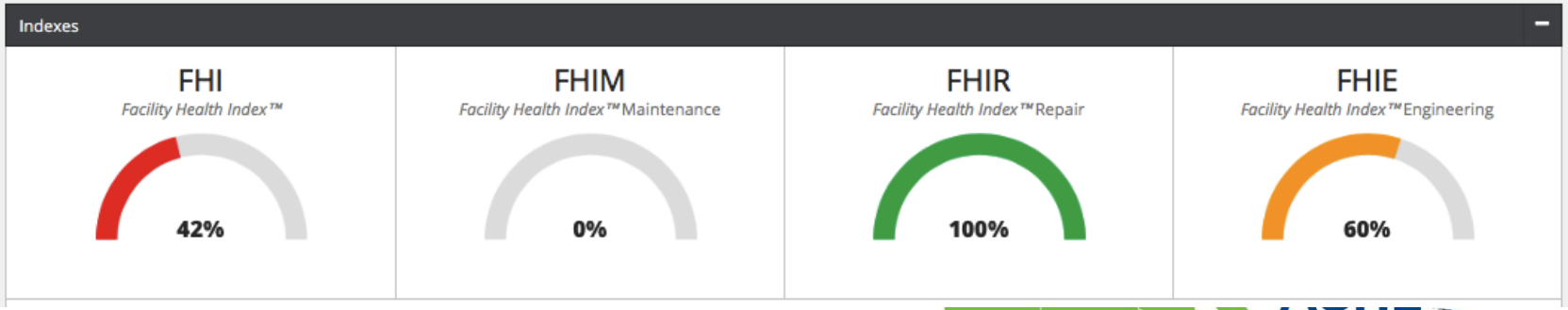
Assessment Information

- Engineering Assessment
- Preventative Maintenance Performance
- Work Order History

Asset Cost ($)	78,506.50	FHI Useful Life	21 years, 8 months
Asset Remaining Life (Straightline)	7 years, 2 months (Jan 27, 2026)	Asset Remaining Life (Adjusted)	5 years, 11 months (Oct 10, 2024)
FHI PM Frequency (hrs/month)	7.8133333333		
Maint. Requirement	4	Redundancy	3
Risk Application	8	Utility Classification	8
Total Risk Score	23		
Model Number	DGFC-5748572	Serial Number	A060879256
Barcode Number	2000259		
Last Assessment	★★★☆☆ (3) Brian Crum, Jun 26 2016		

High Risk Score Indicates Life Safety Asset

Indexes



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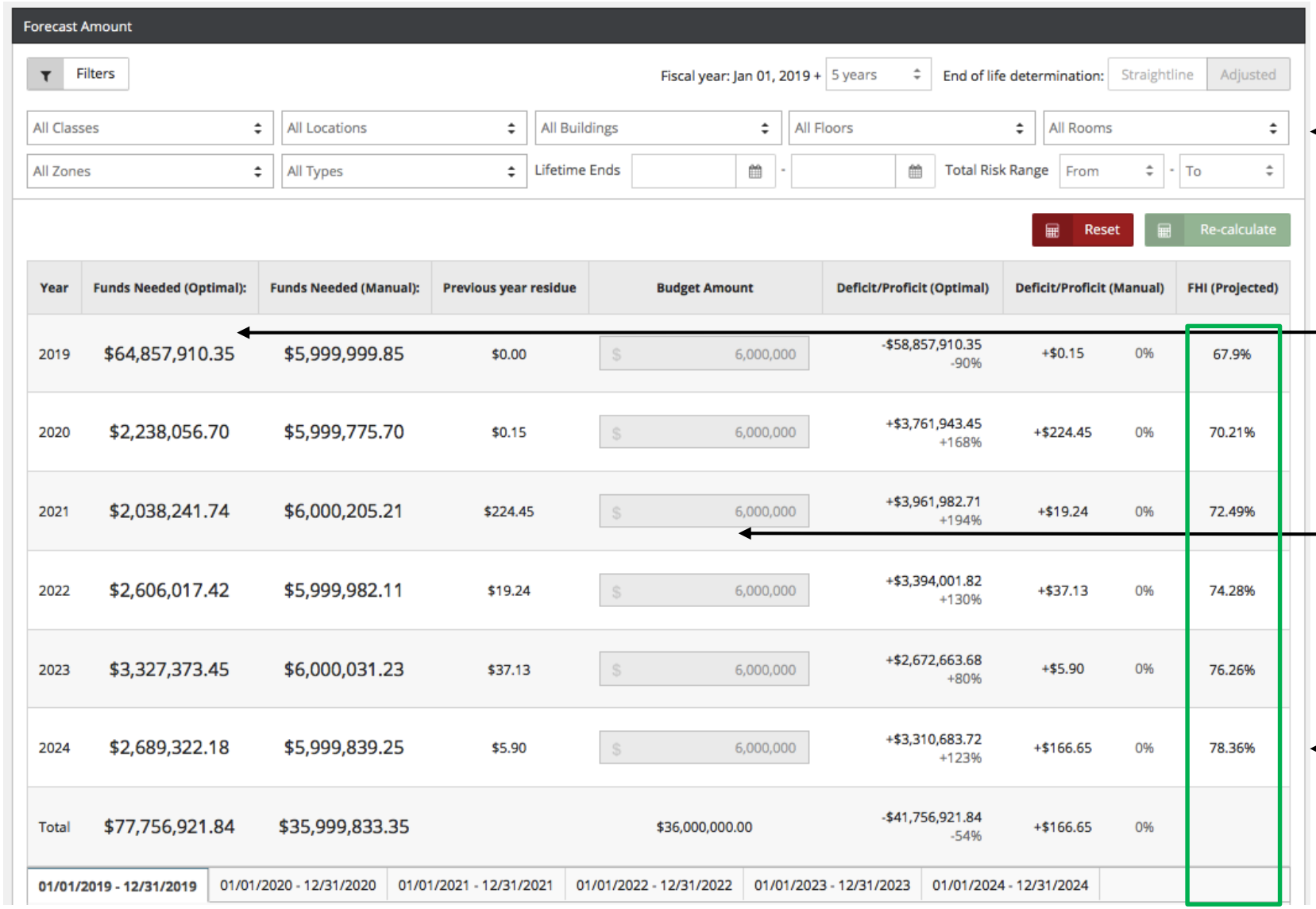
How Much to Replace? 5 Year Strategic Plan



Forecast Amount

Filters | Fiscal year: Jan 01, 2019 + 5 years | End of life determination: Straightline / Adjusted

All Classes | All Locations | All Buildings | All Floors | All Rooms

All Zones | All Types | Lifetime Ends | Total Risk Range From - To

Reset | Re-calculate

Year	Funds Needed (Optimal):	Funds Needed (Manual):	Previous year residue	Budget Amount	Deficit/Proficit (Optimal)	Deficit/Proficit (Manual)		FHI (Projected)
2019	$64,857,910.35	$5,999,999.85	$0.00	$ 6,000,000	-$58,857,910.35 -90%	+$0.15	0%	67.9%
2020	$2,238,056.70	$5,999,775.70	$0.15	$ 6,000,000	+$3,761,943.45 +168%	+$224.45	0%	70.21%
2021	$2,038,241.74	$6,000,205.21	$224.45	$ 6,000,000	+$3,961,982.71 +194%	+$19.24	0%	72.49%
2022	$2,606,017.42	$5,999,982.11	$19.24	$ 6,000,000	+$3,394,001.82 +130%	+$37.13	0%	74.28%
2023	$3,327,373.45	$6,000,031.23	$37.13	$ 6,000,000	+$2,672,663.68 +80%	+$5.90	0%	76.26%
2024	$2,689,322.18	$5,999,839.25	$5.90	$ 6,000,000	+$3,310,683.72 +123%	+$166.65	0%	78.36%
Total	$77,756,921.84	$35,999,833.35		$36,000,000.00	-$41,756,921.84 -54%	+$166.65	0%	

01/01/2019 - 12/31/2019 | 01/01/2020 - 12/31/2020 | 01/01/2021 - 12/31/2021 | 01/01/2022 - 12/31/2022 | 01/01/2023 - 12/31/2023 | 01/01/2024 - 12/31/2024

Long-Term Planning, All In, or By Campus, Zone, Building, or even by Asset Types

Year over Year Capital Forecast, 2019 Shows Current Load of Past Deferred Investments

Modeling of a Controlled Investment Strategy, $6 M / Year

Ability to Smooth Capital Investments over Multiple Years, With Objective Projection of **Health Index Improvement**

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Risk Based Allocation of Funds

4 Factors of Capital Planning – Follow the Data

- **Asset Age -** (vs. Industry Standards)
- **Asset Performance -** (Facility Heath Index including assessment scores and CMMS PM and WO data.)
- **Asset Risk Ranking -** (based on function and area served)
- **Impact of Unplanned Failure –** (patient impact and financial)

Common data standards and risk criteria allow for objective comparison of all assets and sites in the portfolio.

Model different investment plans to deal with deferred maintenance backlog.

Prioritize investments at the individual asset and project level for maximum benefit.

Invest based on objective needs, prioritized by RISK to the organization.

Itemized Reporting Output

Example: Subset of Overall Plan, AHU Assets Only in 2019

FISCAL YEAR: JAN 01, 2019 - DEC 31, 2019

BUDGETING CALCULATIONS FOR:

Asset Types:
Air Handling Unit (Indoor)
Air Handling Unit (Rooftop)

For assets replacement, end of life date was calculated taking FHI index into account.

Funds needed for replacements (optimal): $13,869,359.53
Funds budgeted for replacements: $2,994,461.02 (21.59% of optimal)
Number of assets to be replaced: 8 out of 129

FHI index (current/projected): 43.82% / 66.43%

REPLACEMENTS LIST

ASSET NUMBER	ASSET NAME	BUILDING, LOCATION	RISK	FHI CURR./PROJ. (%)	ESTIMATED COST ($)	END OF LIFE DATE
EQ-18000137	AHU-4	Professional Building Independence Professional Building	15	42.0 / 100.0	$654,431.43	10-10-2014
EQ-18000138	AHU5	Professional Building Independence Professional Building	15	42.0 / 100.0	$654,431.43	10-10-2014
EQ-19000064	AHU-1	MAB Medical Arts Building	15	70.0 / 100.0	$405,343.93	07-16-1988
EQ-100023	AHU-14	Independence Tower Independence Hospital	15	56.0 / 100.0	$295,745.43	05-29-2019
EQ-100014	AHU-15	Independence Tower Independence Hospital	15	56.0 / 100.0	$295,745.43	05-29-2019
EQ-100024	AHU-13	Independence Tower Independence Hospital	15	56.0 / 100.0	$295,745.43	03-16-2019
EQ-100013	AHU-16	Independence Tower Independence Hospital	15	56.0 / 100.0	$295,745.43	08-10-2019
EQ-2000029	AHU-AC-3	Building 3 Mercy Regional	15	56.0 / 100.0	$97,272.51	01-03-1981

Conclusions – Part One

- **Without Strategic Planning**, there will be less money available for repair & replacement of infrastructure, not more.
- The will be more need for project requests to be quantified, objective and defensible not less.
- In most cases, the C-Suite will not “get it” in the traditional terms and language of facility management.
- We all have a fiduciary responsibility to communicate these needs in terms the C-Suite can understand. Because aging infrastructure = RISK.

What can you do? **Follow the Data.**

Look out 5-10 Years, Not Just 1

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Conclusion – Part Two

The metrics you really need are…

- What assets do you have?
- How old are they?
- How are they performing?
- What is the RISK if they fail?
- What is the financial or other impact of a failure?
- How much will it cost to replace them PROACTIVELY vs. REACTIVELY?

Objective Data Inputs

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Asset Life Cycle Care

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