



35TH ANNUAL **AHA RURAL HEALTH CARE** | LEADERSHIP CONFERENCE

# ***A Discussion on the Principles of Infrastructure Capital Planning***

Jonathan Flannery, *Senior Associate Director of Advocacy, American Society for Healthcare Engineering*

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*Please note that the views expressed by the conference speakers do not necessarily reflect the views of the American Hospital Association.*

# Learning Objectives

- Recognize the state of healthcare infrastructure and explain the impact deferred maintenance has on the physical environment.
- Define four types of infrastructure expenditures, categorize these into discretionary and non-discretionary spend, and apply the principles of infrastructure capital planning.

# Agenda

- Introductions.
- Setting the Stage. What is infrastructure? Where are we now?
- The Macroeconomics of Healthcare. What is the impact on infrastructure?
- Infrastructure Investment Buckets. Where does the money go?
- By the Numbers. The true cost of deferred maintenance.
- Transformation. Redefining our approach to infrastructure investment.
- Q & A, Discussion, Conclusions.

# Setting The Stage

**What is infrastructure?  
Where are we now?**

# What is Infrastructure?

- “The basic equipment and structures (such as roads and bridges) that are needed for a country, region, or organization to function properly.” (www.merriam-webster.com)

- **Core Infrastructure**

- **Life Safety:** Fire Alarm, Fire Suppression, Generators, Automatic Transfer Switches, Fire Pump, etc.
- **HVAC, Plumbing & Major Mechanical:** Air Handlers and Conditioners, Exhaust Fans, Supply Fans, Chillers, Boilers, Compressors, Cooling Towers, Pumps, Domestic Hot Water, Steam Supply, Chilled Water Supply, etc.
- **Electrical:** Primary and Emergency Distribution System, Uninterrupted Power Supply, etc.
- **Building Integrity, Access and Mobility:** Façades, Windows, Roofing Systems, Security Systems, Elevators, Helipad, etc.
- **Critical Support Systems:** Medical Gas Inventory/Distribution, Building Automation (Climate Control), Pneumatic Tube, Nurse Call, etc.

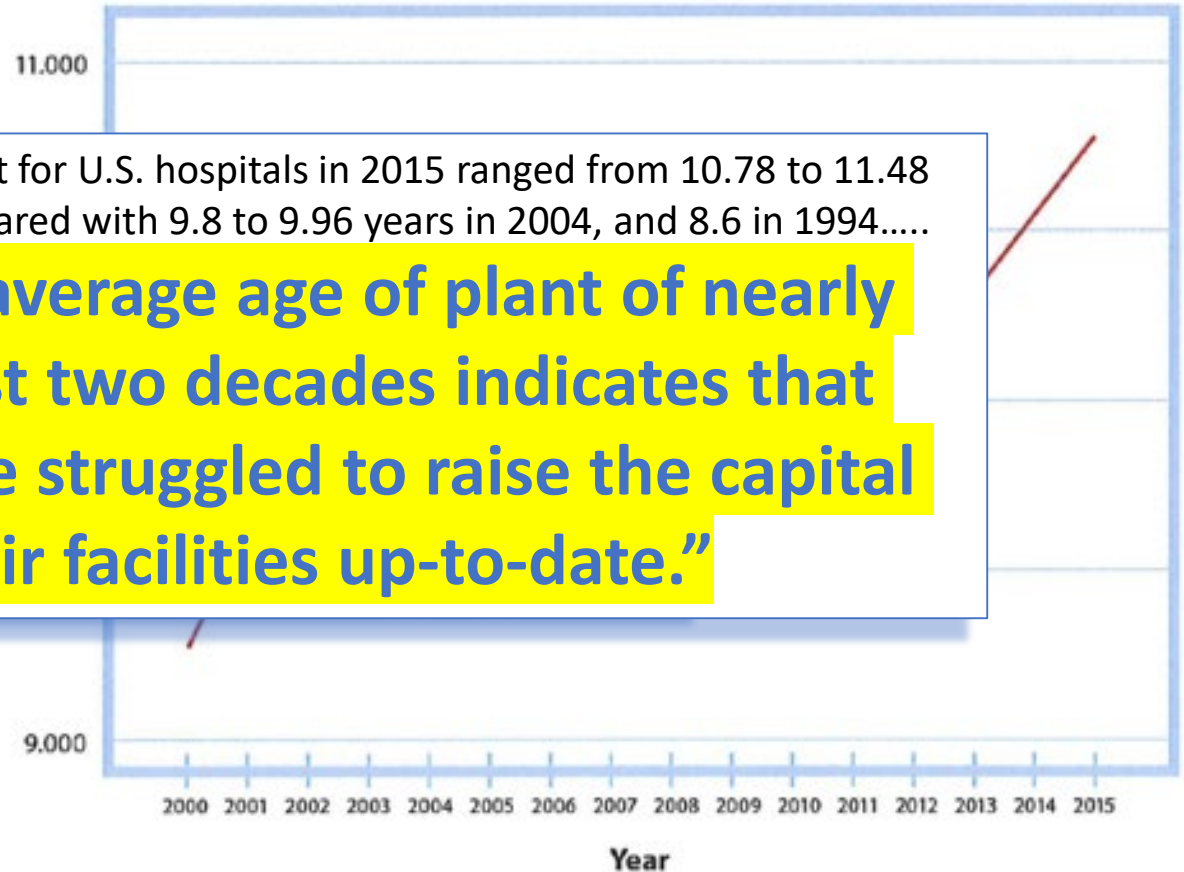
- **Other Major Asset Categories**

- Clinical Engineering Assets (Direct Patient Care), Civil Engineering Assets (Grounds, Structural Steel, Concrete, Parking Garages, etc.), Branding Assets (Interior Architecture, Signage), FFE (Furniture, Fixtures, Equipment)

## AGE OF PLANT STATISTIC 2000-2015

“For example, the median average age of plant for U.S. hospitals in 2015 ranged from 10.78 to 11.48 years (depending on publishing source), compared with 9.8 to 9.96 years in 2004, and 8.6 in 1994.....

**This increase in median average age of plant of nearly three years over the past two decades indicates that hospitals, in general, have struggled to raise the capital needed to keep their facilities up-to-date.”**



# The Macroeconomics of Healthcare

## What is the impact on infrastructure?

# The Financial Impact of COVID-19

“America’s hospitals face significant, ongoing financial instability as the ravages of the COVID-19 pandemic continue to fester.”

As of September 2021,

- Median Hospital Margins 11% Below Pre-pandemic Levels
- 35% of Hospitals Projected to have Negative Margins in 2021
- Expenses Continue to Escalate:
  - 24% Increase in Drug Costs per Adjusted Discharge
  - 17% Increase in Supply Expense per Adjusted Discharge
  - 17% Increase in Non-Labor Expense per Adjusted Discharge



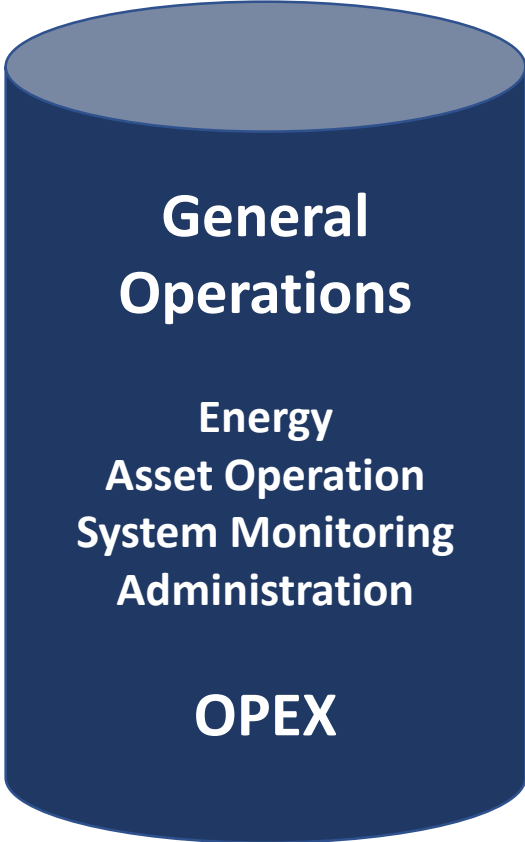
# Conclusions

- Infrastructure investment has been lagging actual needs for over 2 decades. Health care 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.**

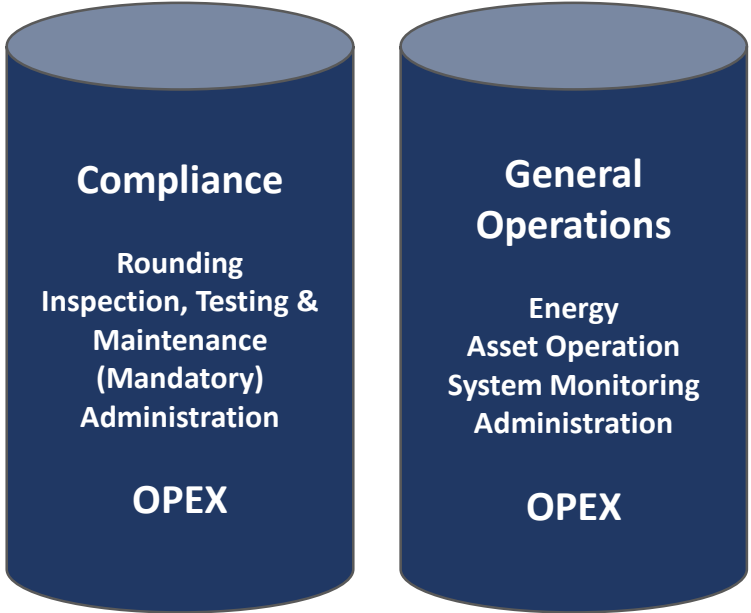
# Buckets

## Understanding Infrastructure Investment Where does the money go?

*Please note that the views expressed by the conference speakers do not necessarily reflect the views of the American Hospital Association.*



**FIXED COST**

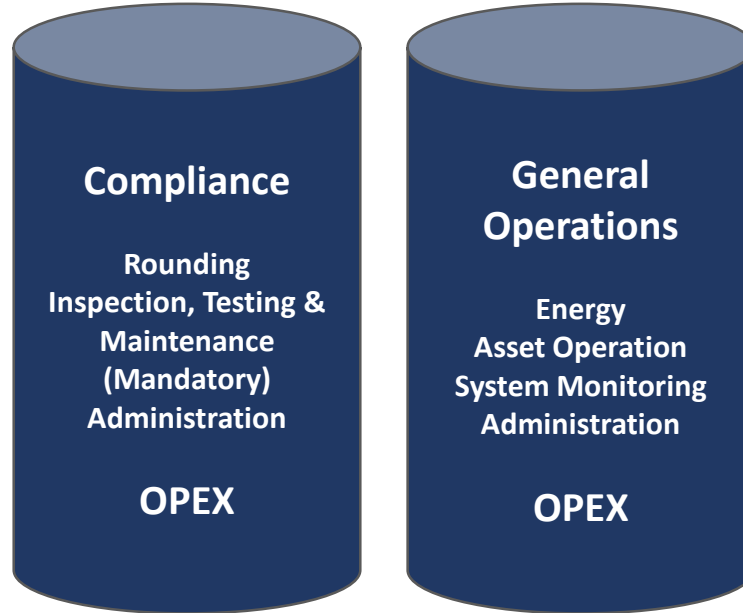


**Basic Cost of Doing Business**



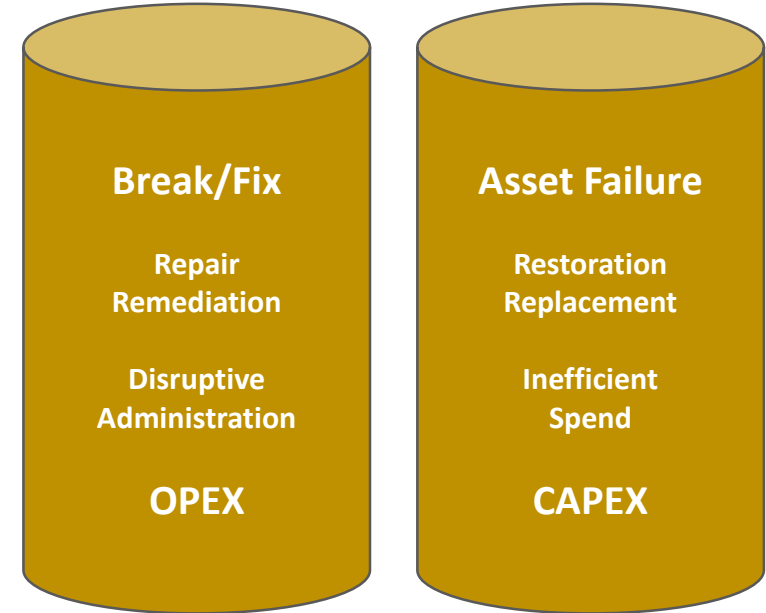
NON-DISCRETIONARY

FIXED COST



Basic Cost of Doing Business

VARIABLE COST  
Reactive/Unplanned

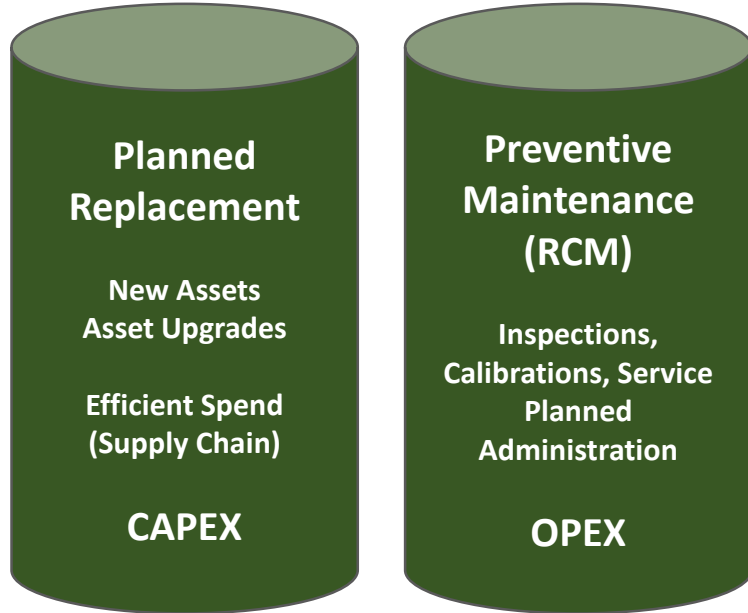


Cost of Restoring  
Operations



DISCRETIONARY

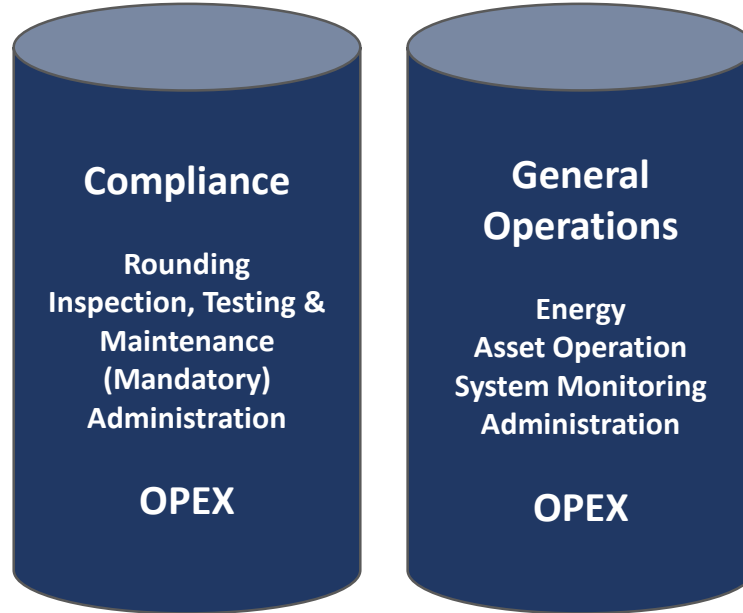
VARIABLE COST  
Proactive/Planned



Investment to Protect and/or Enhance Operations

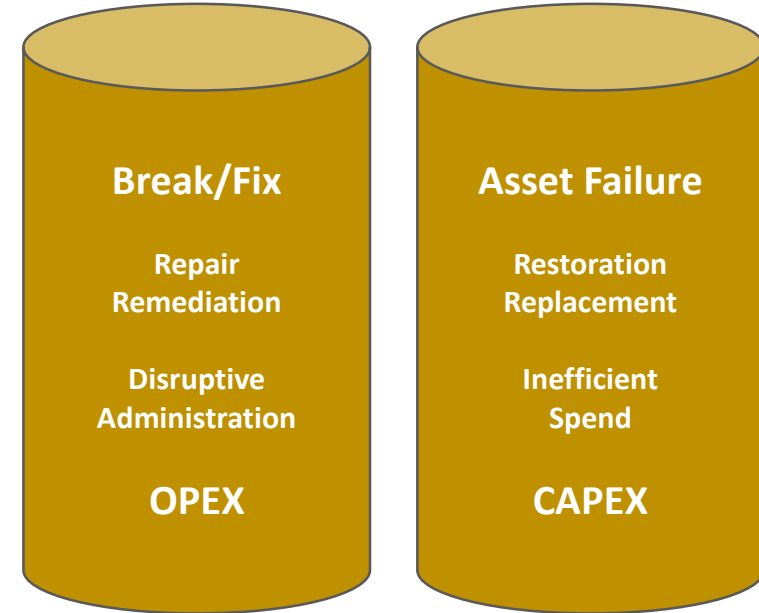
NON-DISCRETIONARY

FIXED COST



Basic Cost of Doing Business

VARIABLE COST  
Reactive/Unplanned



Cost of Restoring Operations



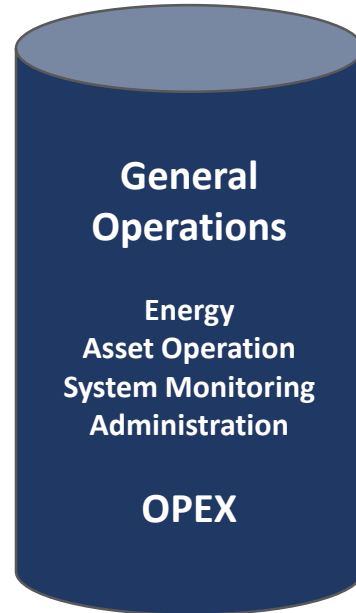
DISCRETIONARY

NON-DISCRETIONARY

Capital Request

Operational Budget Request

Emergency



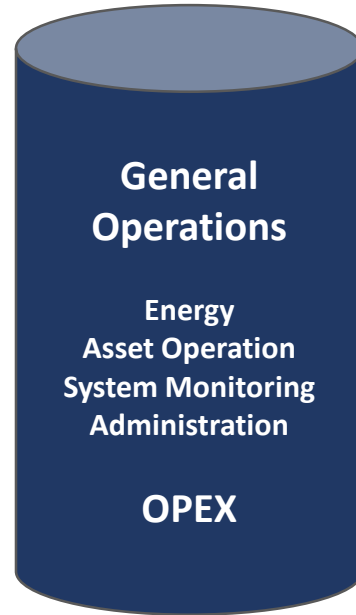
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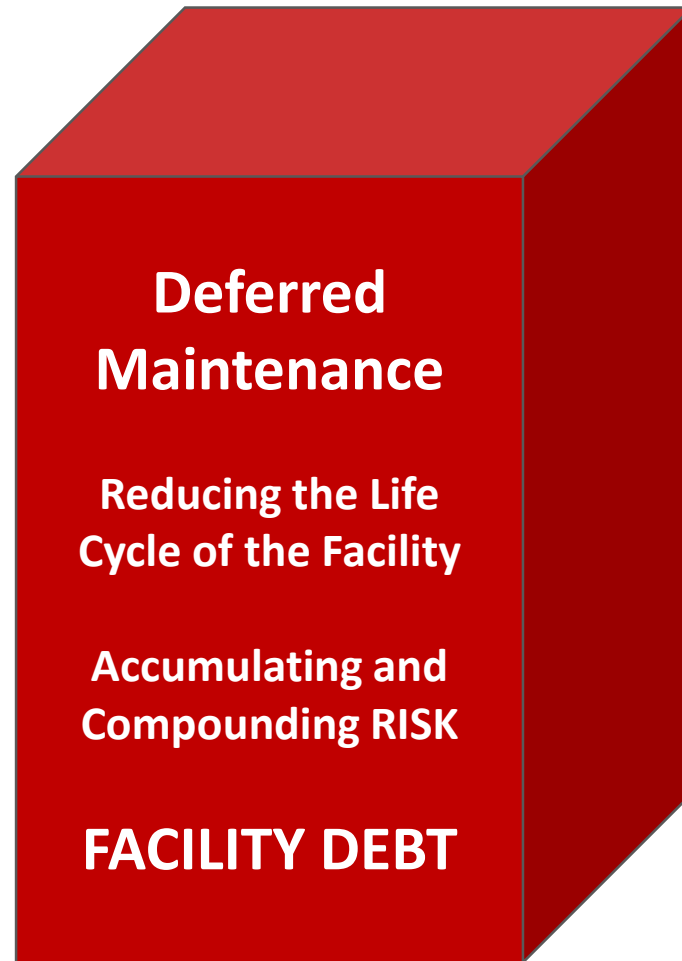
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Capital Request

Operational Budget Request

Emergency



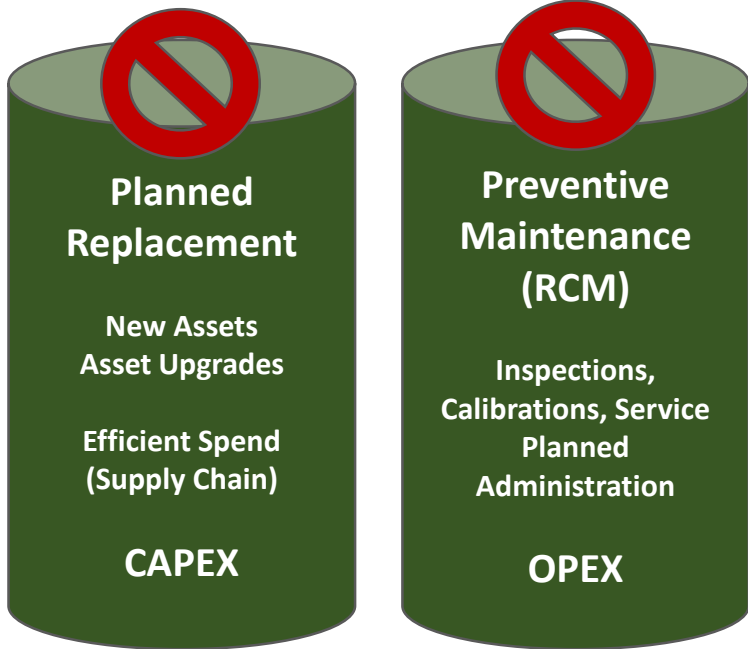


# Deferred Maintenance Defined

- 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.**

DISCRETIONARY

VARIABLE COST  
Proactive/Planned



Investment to Protect or  
Enhance Operations

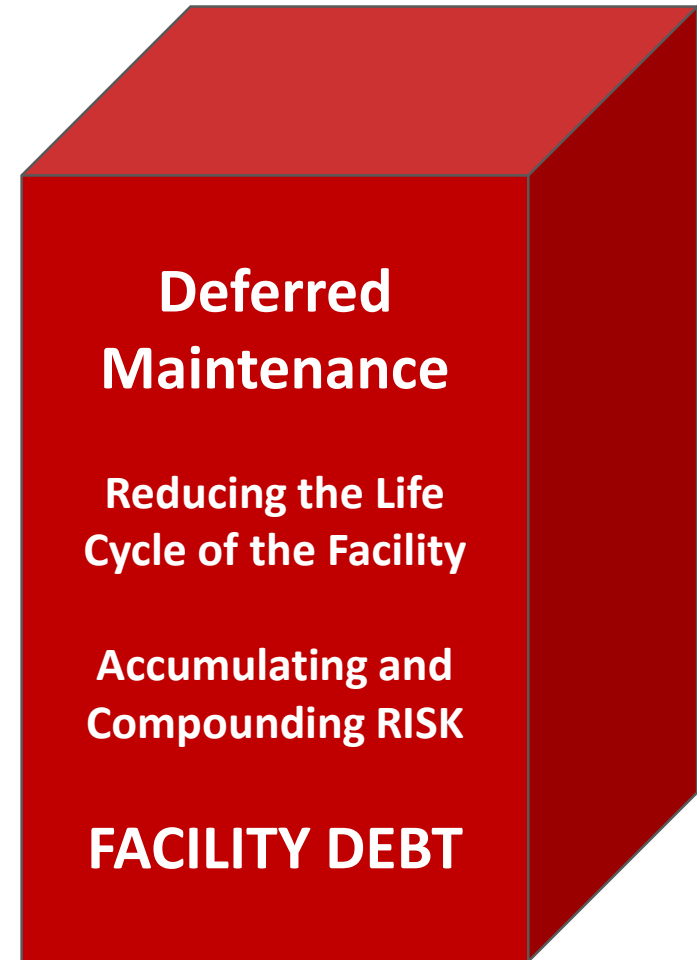
**\$0 in Green Buckets**

Q: Is this good or bad thing?  
A: Maybe.

This can be viewed as “saving money”. It can also be viewed as an opportunity to make other, better, investments. There is not a right or wrong answer.

Simply put, in either case, it is OUR fiduciary responsibility to inform the CFO as to the true cost of the decision.

That cost is measured as Deferred Maintenance.

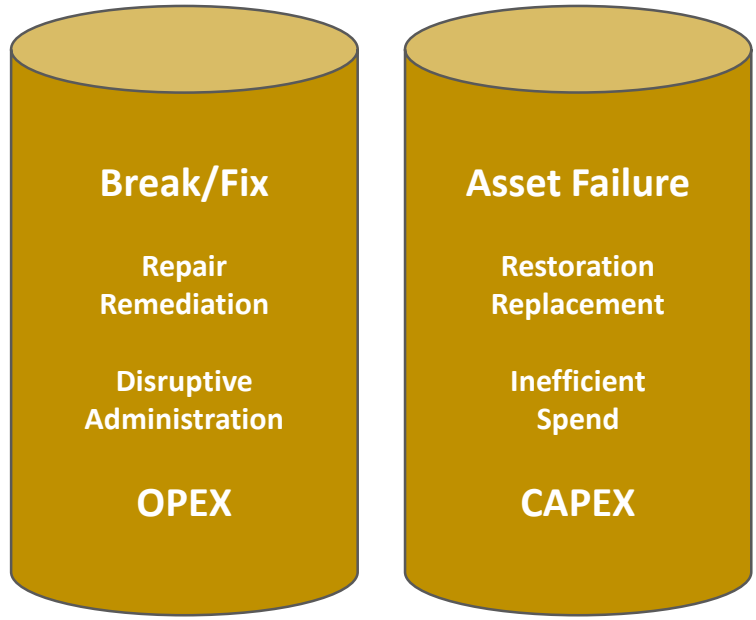
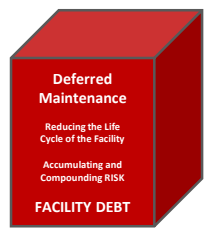
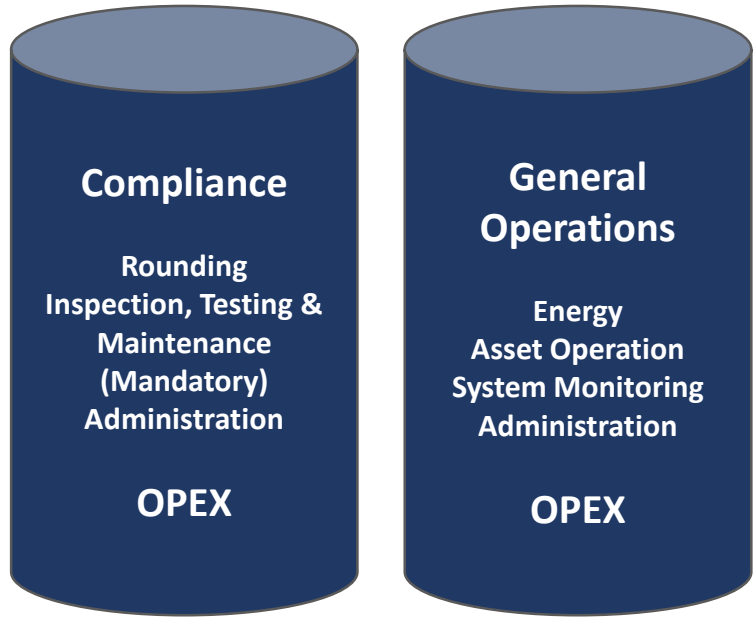
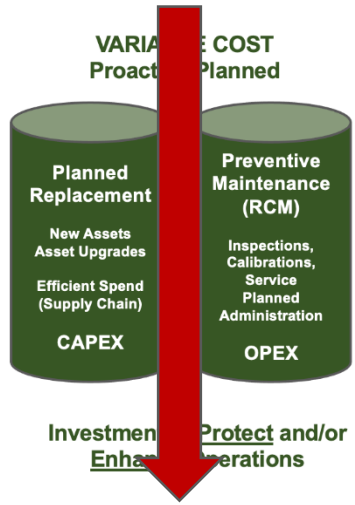


DISCRETIONARY

NON-DISCRETIONARY

FIXED COST

VARIABLE COST  
Reactive/Unplanned



Cost of Doing Business

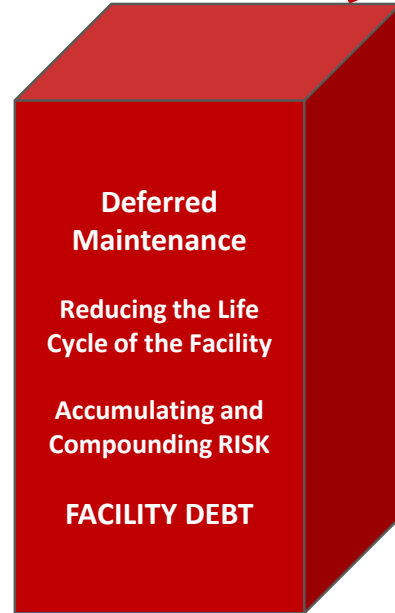
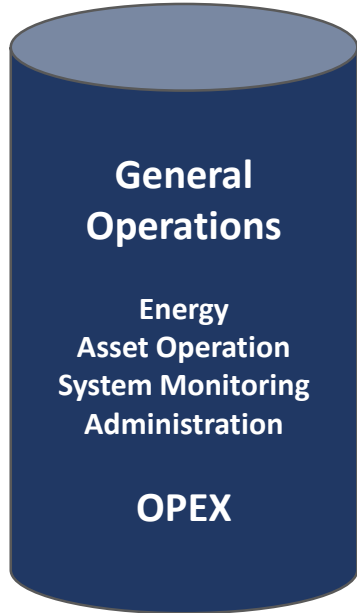
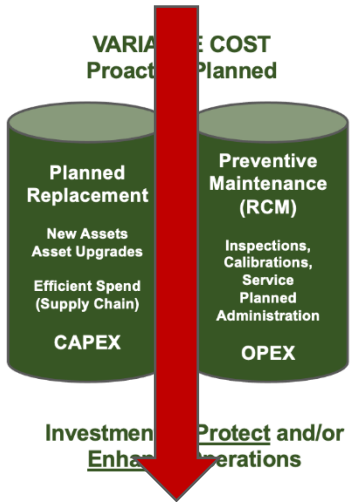
Cost of RESTORING Operations

DISCRETIONARY

NON-DISCRETIONARY

FIXED COST

VARIABLE COST  
Reactive/Unplanned

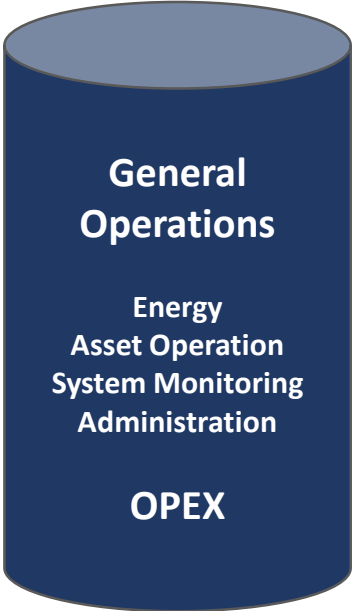


Cost of Doing Business

Cost of RESTORING Operations

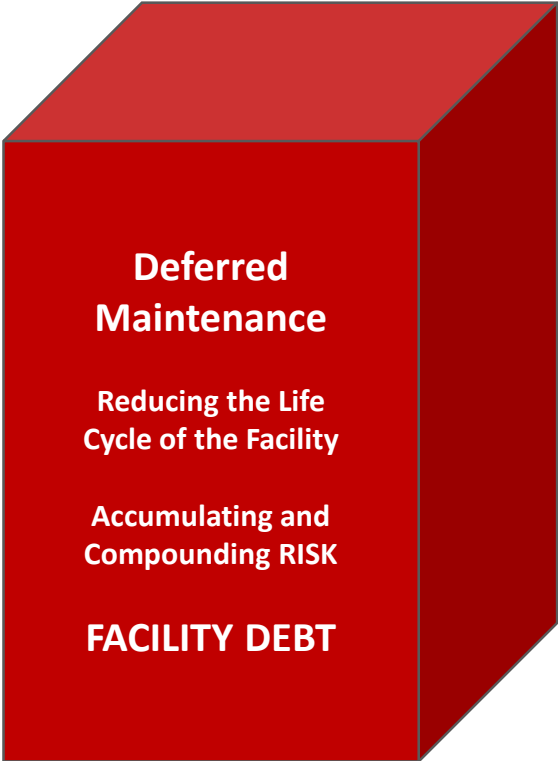
NON-DISCRETIONARY

FIXED COST



Cost of Doing Business

VARIABLE COST - Reactive/Unplanned



Cost to Stay Alive



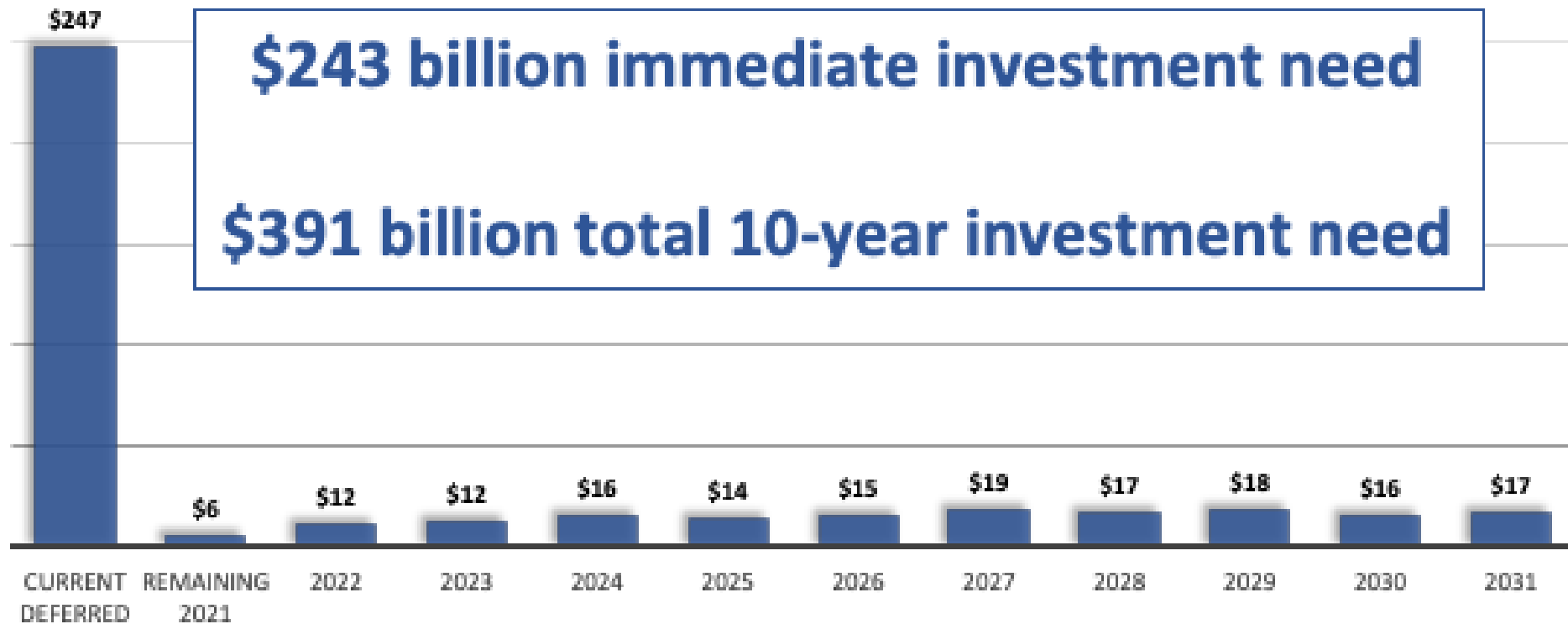


# By the Numbers

## The True Cost of Deferred Maintenance

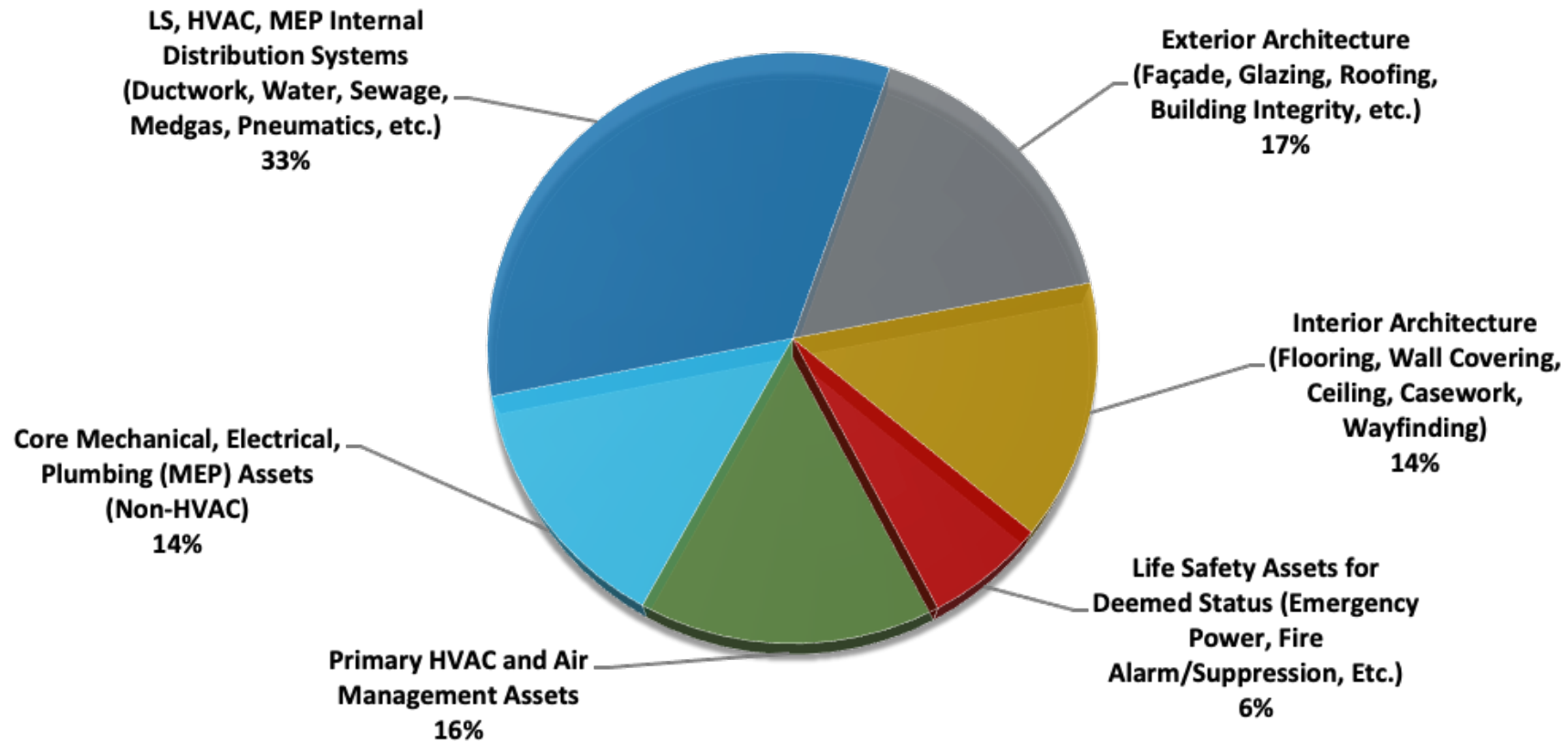
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## Forecast U.S. Health Care Investment Needs (deferred plus annual repair and replacement)



Source: FHI, ASHE/AHA, 2021

## 10-Year Total Forecast U.S. Healthcare Investment Needs by Major Asset Categories - \$391 Billion



Source: FHI, 2021

# Benchmark Data

- Sample Data Footprint

- Acute: ~37 Million SQFT, 218 Buildings
- Non-Acute: ~32 Million SQFT, 636 Buildings
- 92,052 Infrastructure Assets - Documents Age & Condition
- 2,621 Average Building SQFT per Bed
- 16 Different States, Rural and Urban Locations
- 300+ Infrastructure Asset Types
  
- \$9.6 Billion Total Replacement Value of Assets
- \$3.9 Billion Total Value: Deferred Status (41%)
- \$6.7 Billion Total Value: Deferred + 10 Years (69%)

## Benchmark Summary (Per 1 Million SQFT)

~ 1300 Assets

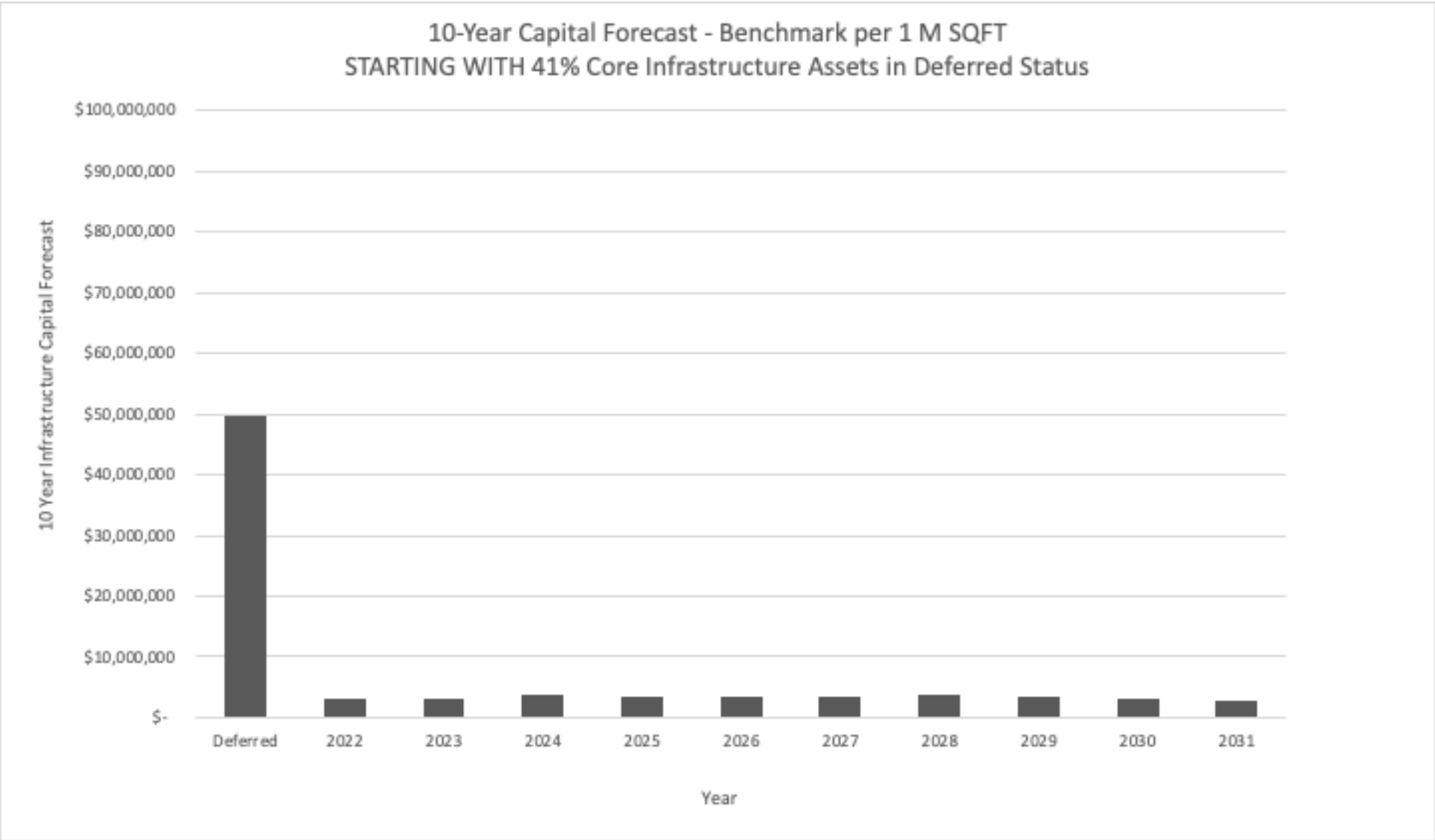
~ \$139 M

~ \$56 M Deferred

~ \$97 M Deferred + 10 Years

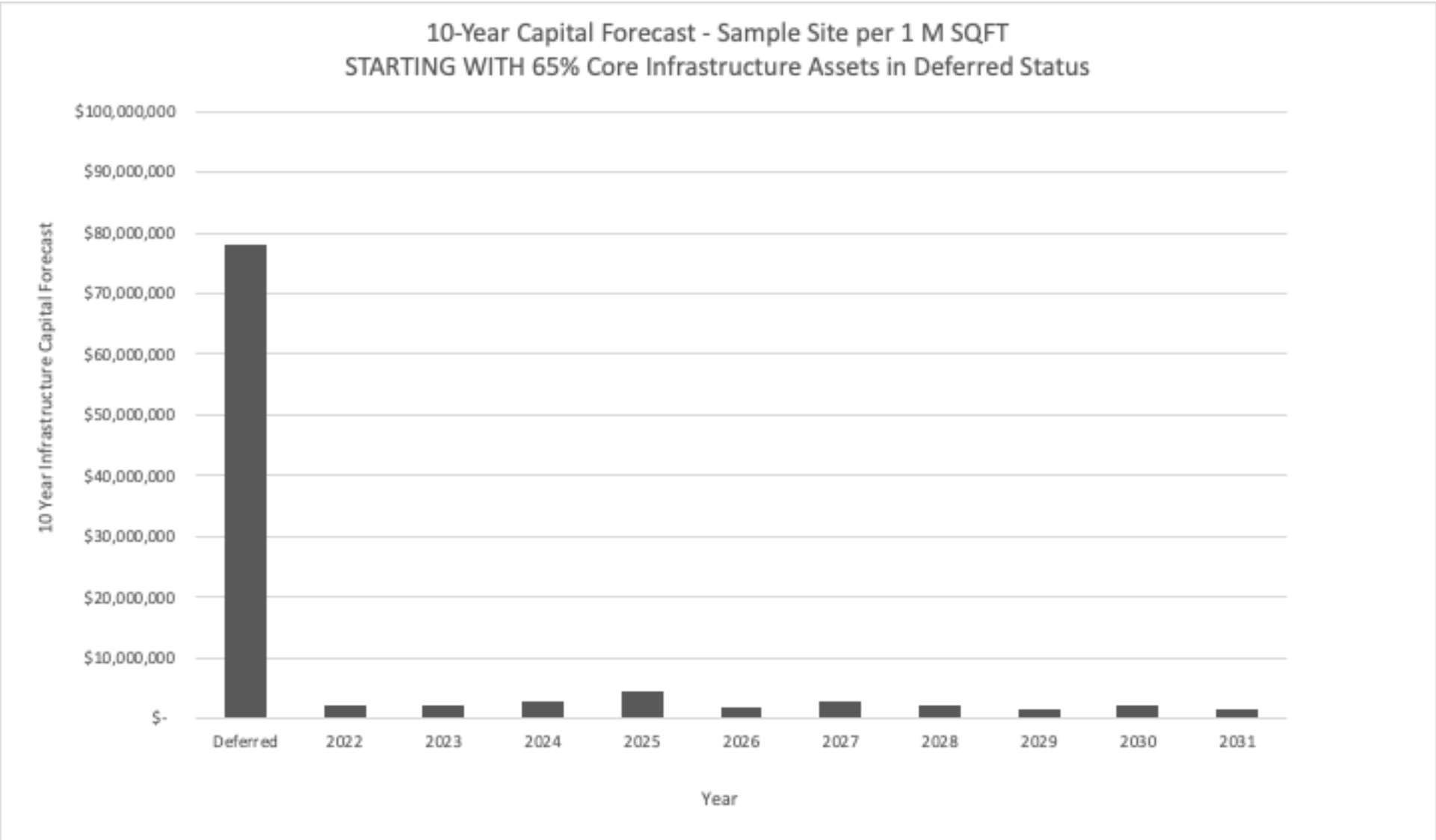
**Capital Investment Needs**  
**\$3-6 M Annually**

# 41% Deferred Start



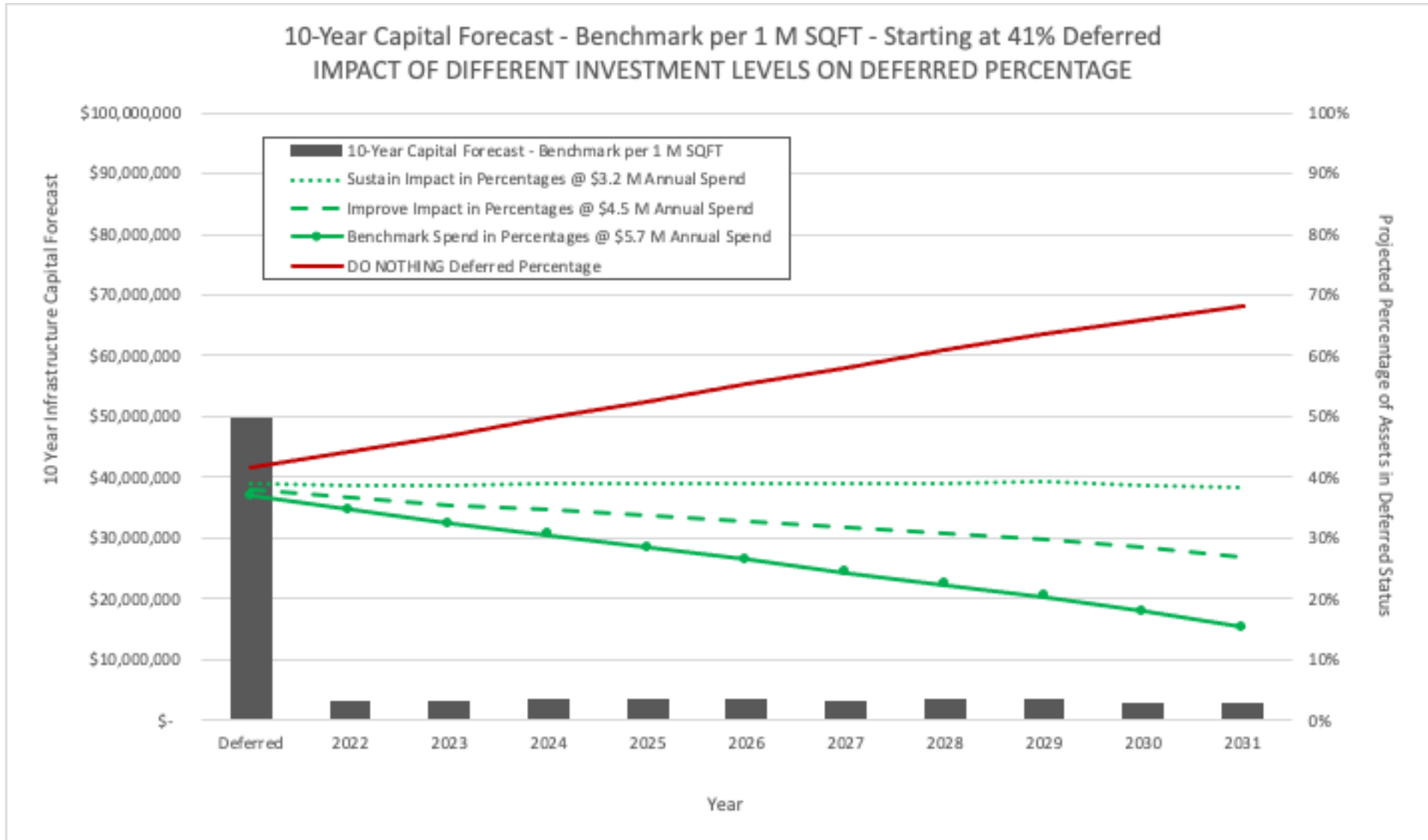
Source: FHI, 2021

# 65% Deferred Start



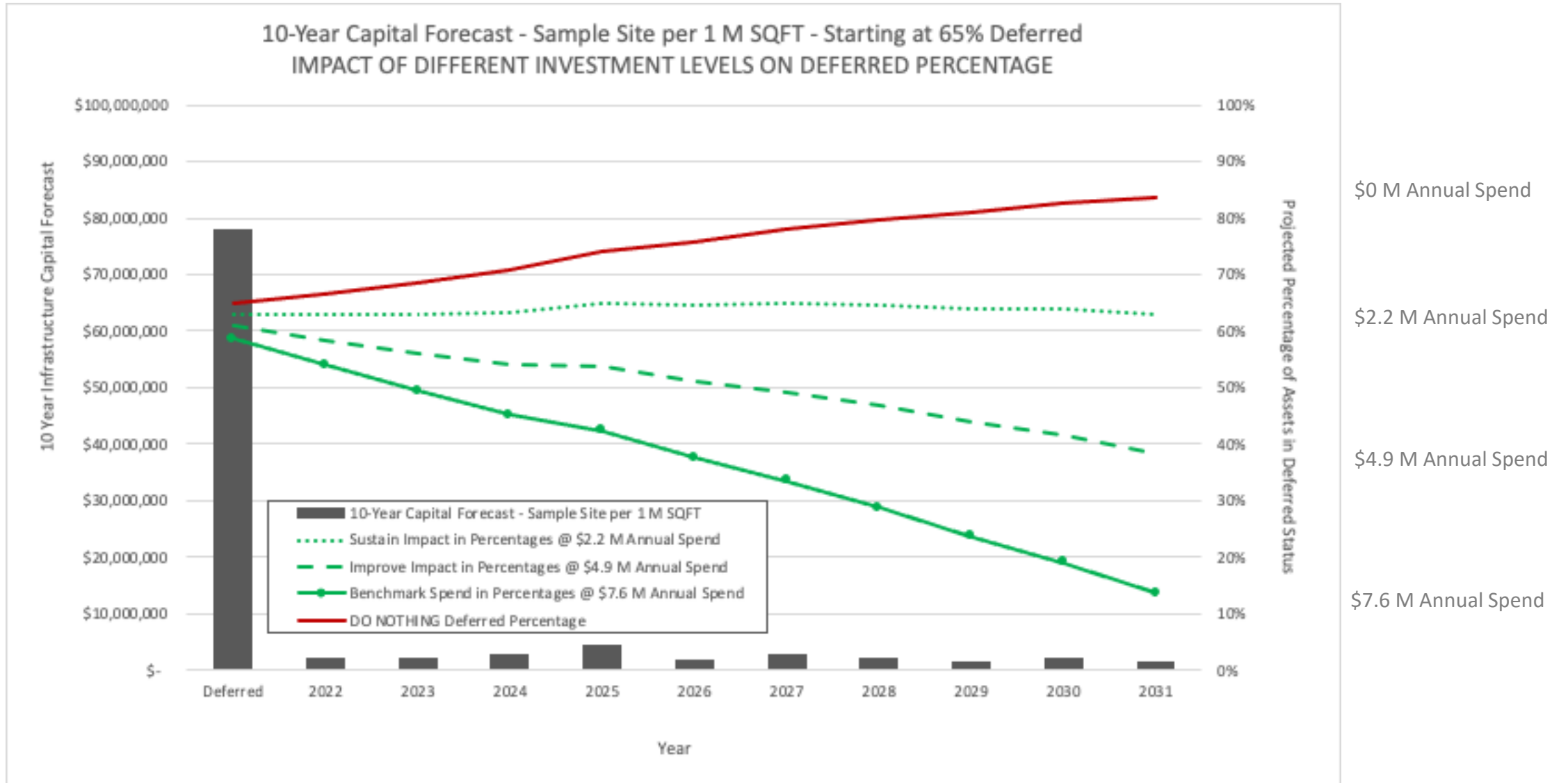
Source: FHI, 2021

# 41% Deferred Start



Source: FHI, 2021

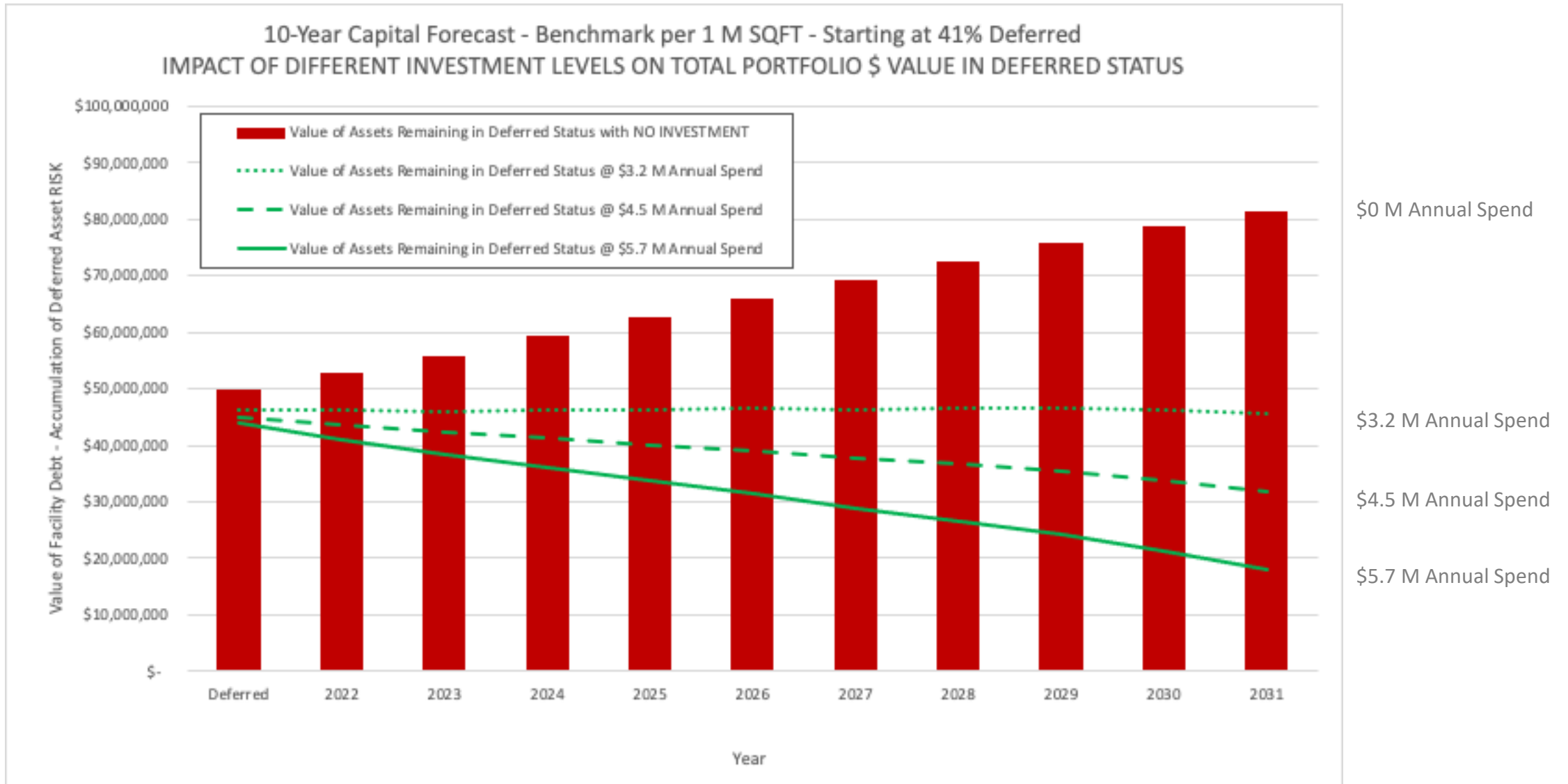
# 65% Deferred Start



Source: FHI, 2021

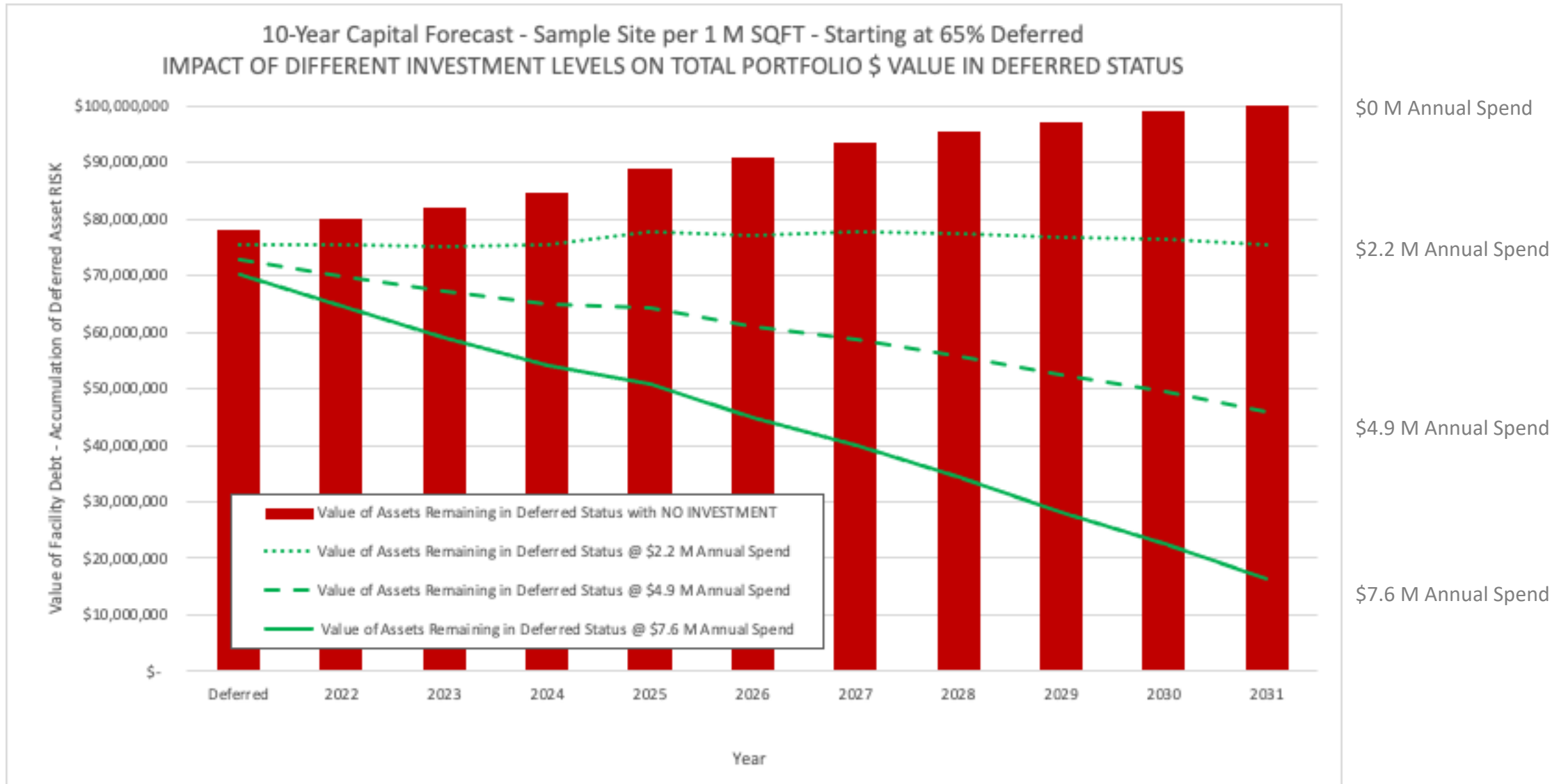


# 41% Deferred Start



Source: FHI, 2021

# 65% Deferred Start



Source: FHI, 2021

# Transformation

**Facility Teams:** How should you approach infrastructure budgeting and forecasting?

**Non-Facility Teams:** What information should you consider regarding infrastructure investment?

# 3 Questions

1. How much should be invested to properly maintain a facility?
2. Where should that investment be made in order to maximize the performance of the facility?
- 3. How do we demonstrate good stewardship of precious resources in order to secure ongoing investment?**

# Establish Your Foundation

- **Transparency Leads to Credibility**
  - Deferred maintenance is a strategy.
  - Leverage the work already being done. Don't start from scratch. Focus on equipment inventory as a starting point.
  - Understand YOUR buckets.
    - Understanding where the money is going today is the foundation of influencing where it goes tomorrow.
- **“You can't Manage what you can't Measure.”**

~ Peter Drucker

# Understand Tolerance for RISK

- **Credibility Leads to Value**
  - Meet your team where they are, not where you want them to be.
  - Deferred maintenance is an indication of RISK.
    - Understanding that risk and how your organization views that risk is key
  - Managing the facility is not the same as maintaining the facility.
- **“Seek First to Understand, then to be Understood”**

~ Steven Covey

# Partner With Your Team

- **Value Leads to Inclusion**
  - The information exists find the critical team members who know it
  - Enable the process of continuous improvement.
    - Use data objectively to add value to critical leadership decisions.
  - Document and communicate decisions and recommendations
    - Use objective data. Age, Condition, Risk, etc.
  - Communicate all options objectively.
- **“Give them Options, Not Problems or Ultimatums.”**

~ Matt Stiene

# Takeaways

- Infrastructure investment has been lagging actual needs for over 2 decades. Health care 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.**



# Learning Objectives - Questions?

- ✓ Recognize the state of healthcare infrastructure and explain the impact deferred maintenance has on the physical environment.
- ✓ Define four types of infrastructure expenditures, categorize these into discretionary and non-discretionary spend, and apply the principles of infrastructure capital planning.



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***Thank You***

Jonathan Flannery, *Senior Associate Director of Advocacy, American Society for Healthcare Engineering*

Mark Mochel, *Senior Vice President, Facility Health, Inc.*

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# Biographies Contact Information Bibliography/References

# Jonathan Flannery, MHSA, FASHE, FACHE



**Sr. Associate Director of Advocacy**  
**American Society for Health Care Engineering**  
**Phone: 312-422-3825**  
**Email: [jflannery@aha.org](mailto:jflannery@aha.org)**

- **Biography:** With over 30 years of health care engineering and administrative experience, Jonathan provides testimony, engages in deliberation, and develops public comments on proposed regulations to the benefit of ASHE and AHA members. Jonathan represents ASHE on professional advisory committees, oversight boards, technical committees, and issue specific task forces to influence regulations, standards, and guidance at the earliest and least burdensome level such as the International Code Council's Health Care Committee, ASHRAE/ASHE SSPC 170 Ventilation of Health Care Facilities, and NFPA AIC-AAA Committee for NFPA Standards 90A & B. Jonathan has a bachelor's degree in Architectural Studies from Ottawa University, and an MHSA from the University of Arkansas for Medical Sciences.
- **CEU Teaching Experience:** 53rd Annual Michigan Health Care Conference 2021; ASHE Annual Conferences 2019, (Virtual) 2020, 2021; International Summit & Exhibition on Health Facility Planning, Design & Construction 2018, 2020, 2021; AHE Health Care Leadership and Preparedness Symposium 2017, 2019, ACHE Congress 2019, 2018; ASHE Faculty member

# Mark Mochel, MBA, PMP, CSM, FCT, ACABE



**Co-Founder and Senior Vice President  
Facility Health Inc.**

**Phone: 616-914-2246**

**Email: [m.mochel@facilityhealthinc.com](mailto:m.mochel@facilityhealthinc.com)**

- **Biography:** With over 20 years of program management experience, Mark is passionate about the utilization of technology to drive capital and operational investments in health care to improve facility performance. That means creating an objective, data-driven communication link between the technicians, the engineers, the facilities management team, and the executive leadership where the capital investment decisions are made. Mark has a bachelor's degree in Mechanical Engineering from Purdue University, and an MBA from The University of Michigan.
- **CEU Teaching Experience:** ASHE Annual Conferences 2019, (Virtual) 2020, 2021; MiSHE Annual Conferences 2016, 2018; KHEA Annual Conference 2018; ISHE/MWHCEC Annual Conferences 2018, 2019; HESNI Annual Conferences 2018, 2019; ASHE Region 8 Annual Conference 2019; NSHE Annual Conference 2020; ACE Summit and Reverse Expo (Virtual) 2021; THEA Annual Conference 2021; WHEA Annual Conference 2021.

# Matthew Stiene, PE, CHFM, CHC



**Senior Vice President Construction and Facility Services**

**Novant Health**

**Phone: 704-774-7862**

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- **Biography:** Matthew Stiene, PE, is the Senior Vice President of Construction and Facility Services for Novant Health in Charlotte NC, where he oversees design and construction, plant operations, property management regulatory compliance, energy management, environmental affairs, infrastructure capital replacement, engineering design and construction, medical equipment planning, and manages several real estate initiatives. Matt has been involved in over \$750 million of acute care construction and renovation and oversees an operating budget of \$60 million with over 250 FTEs. Matt possesses a Master of Engineering degree in Fire Protection Engineering from the University of Maryland, and a Bachelor of Science degree in Mechanical Engineering from Clarkson University. He is a licensed professional engineer in New York, North Carolina, South Carolina, and Virginia and is a Certified Healthcare Facility Manager and a Certified Facility Manager.
- **CEU Teaching Experience:** ASHE Annual Conferences 2018, 2019, 2021; ACE Summit and Reverse Expo (Virtual) 2021; BOMA Medical Office Building Conference 2016.

# Bibliography/References

- King, Don, Beebe, Chad, Suchomal, Joan, Bardwell, Peter, Della Donna, Vincent & Walt, Lisa, 'State of U.S. Health Care Facility Infrastructure', ASHE Monograph, 2017, The American Society for Healthcare Engineering (ASHE), pp. 14-17.
- Mochel, Mark, 'An Estimate of U.S. Health Care Infrastructure Investment Needs', 2021, Facility Health Inc. (FHI), pp. 1-4.
- American Hospital Association (AHA) Kaufman Hall 'Financial Effects of Covid-19: Hospital Outlook for the Remainder of 2021', September 2021, Reference URL.
  - <https://www.aha.org/system/files/media/file/2021/09/AHA-KH-Ebook-Financial-Effects-of-COVID-Outlook-9-21-21.pdf>
- ASHE 2021 Annual Conference Presentation, 'Infrastructure Renewal - A Discussion on the True Cost of Deferred Maintenance', 11 August 2021, Nashville, TN - Live Presentation Audience Poll Results.
- Morgan, Jamie, 'AHA Advocates for Investments in Aging Health Care Infrastructure', *Health Facilities Management, The Official Magazine of the American Society for Health Care Engineering*, vol. 34, no. 6, June 2021, page 12.

# Communicating Infrastructure - Education

## What is included in infrastructure?

---

- All equipment required to operate the facilities ~ 47,000
- In 2019 Plant Engineering completed 196,168 preventive maintenance work requests
- **HVAC**
  - Chillers - 59
  - Boilers - 61
  - Air Handlers – 430
- **Electrical/Emergency Power**
  - Generators - 37
  - Automatic Transfer Switches -305
  - Distribution equipment
  - Emergency Generator Connection
- **Roofing**
  - Over 2,000,000 sqft and 515 discrete roofs
- **Underground Storage Tanks**
  - 14 installed between 1990 and 2006
- **Plumbing**
  - Piping
  - Medical Air pumps - 208
  - Medical Vacuum pumps- 57
- **Nurse Call**

Source: Novant Health, Matt Stiene Executive Presentation, 2020



# Strategic Investment Considerations

- Where should investments be targeted?
- Renovation
  - Hospital Modernization
  - Bed Modernization
  - Resilience
  - Life Safety Systems
- New Construction
  - Population Health Initiatives
  - Ambulatory Care
  - Mental Health
  - Safety-Net Clinics
- How do health care leaders decide how to allocate capital?
- Condition
- Mission
- Potential ROI
- Market Needs
- Brand Image

Source: ASHE, 2017

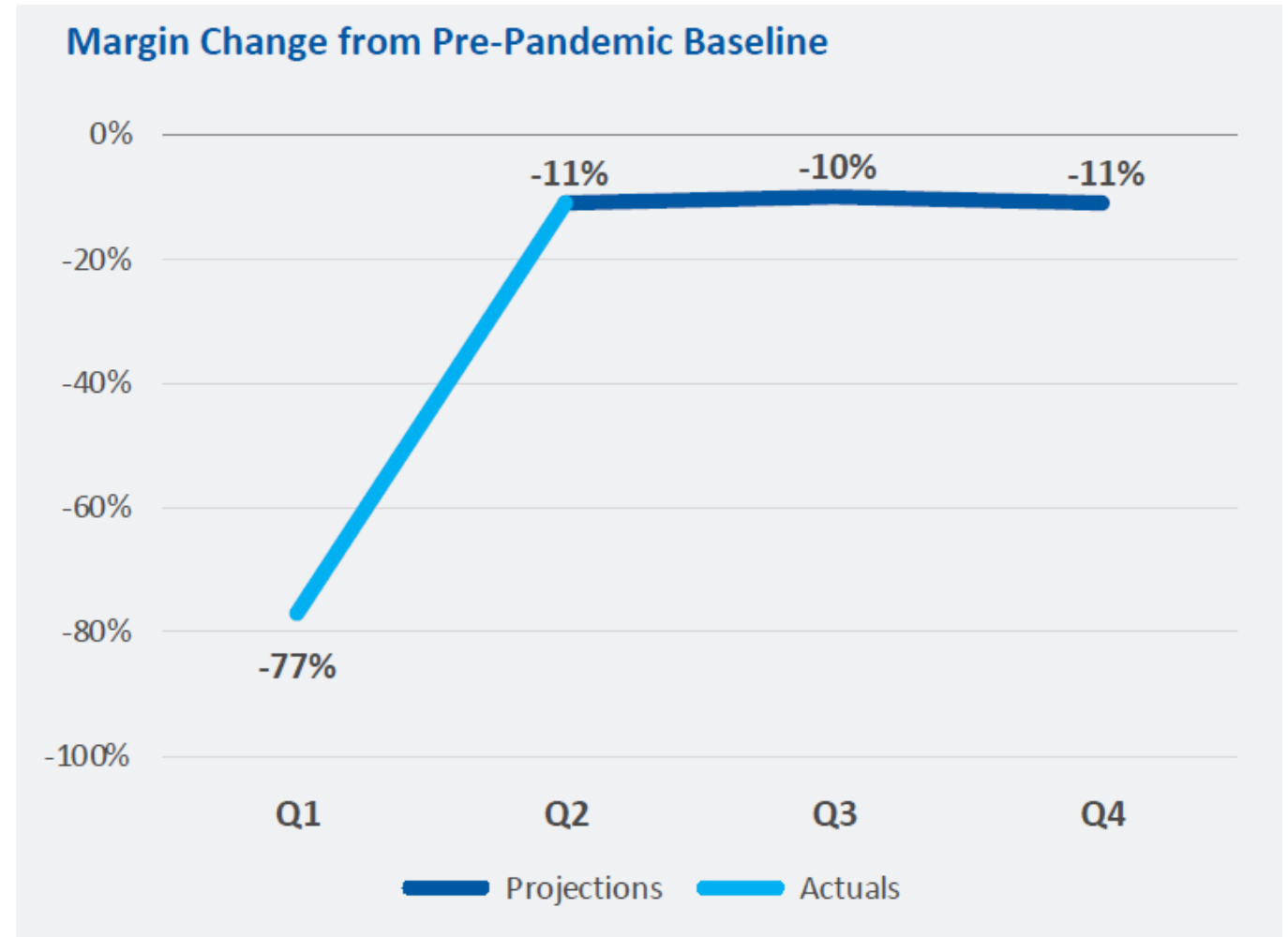
# Strategic Investment Considerations

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  - Bed Modernization
  - Resilience
  - Life Safety Systems
- **New Construction**
  - Population Health Initiatives
  - Ambulatory Care
  - Mental Health
  - Safety-Net Clinics
- How do health care leaders decide how to allocate capital?
- **Condition** (Age, Performance, Capacity, Expected Useful Life)
- **Mission**
- **Potential ROI** (Energy, OPEX, FTE, Risk, Risk Mitigation)
- **Market Needs**
- **Brand Image**

Source: ASHE, 2017

# Kaufman Hall Quarterly Median Operating Margin Projections

**“Our projections reflect margin deficits that will inhibit hospitals’ ability to invest in growth or additional community services throughout 2021.”**

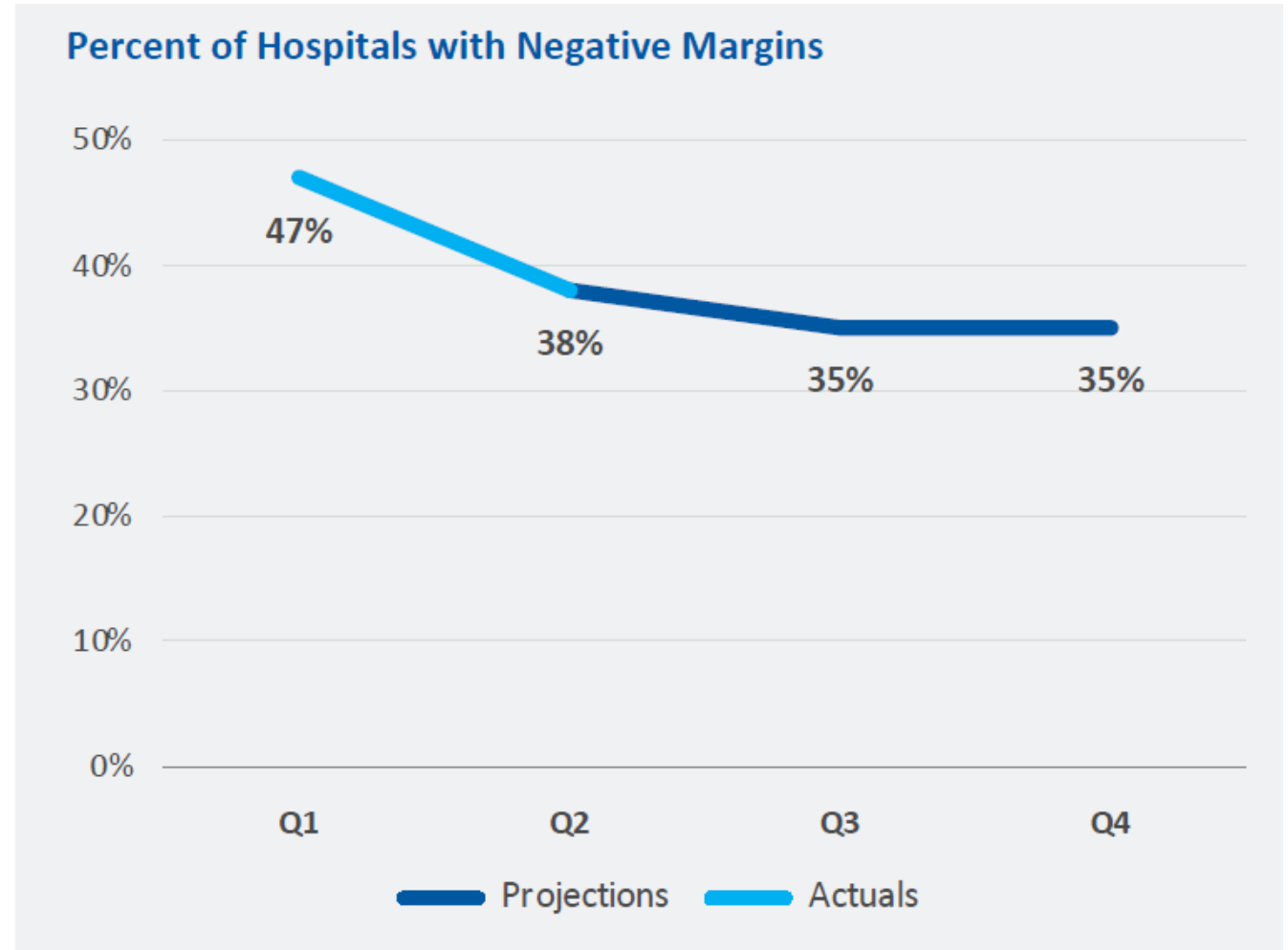


Source: AHA, KH, Sept. 2021

Source: Kaufman, Hall & Associates, LLC

# Kaufman Hall Percent of Hospitals with Negative Operating Margins

“the proportion of hospitals ending the year with negative margins will likely be higher than the 25% seen in 2019.”



Source: Kaufman, Hall & Associates, LLC

Source: AHA, KH, Sept. 2021

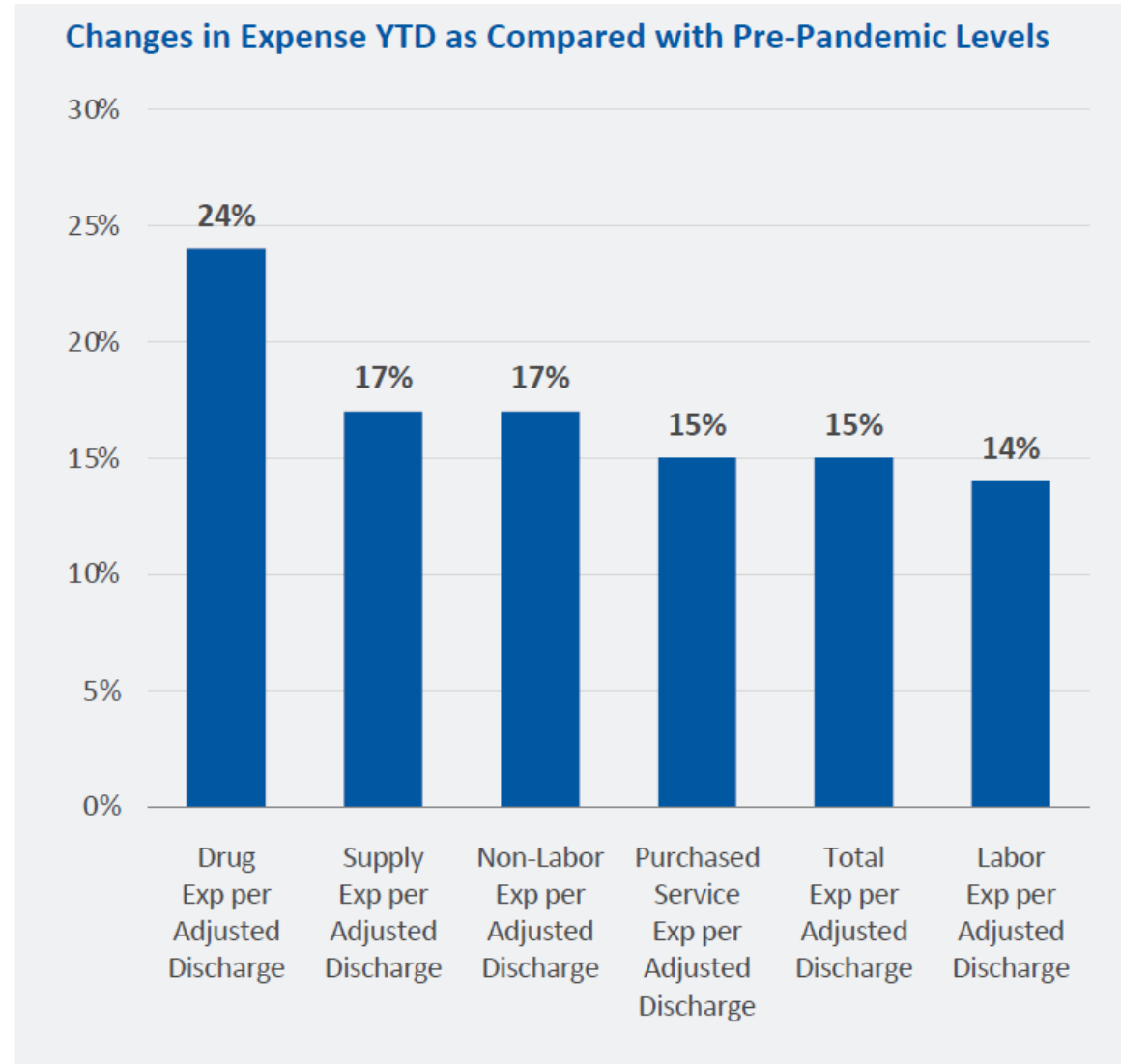
# Kaufman Hall Expenses YTD

“Total Expenses per Adjusted Discharge... are up 15% compared to before the pandemic for hospitals nationwide.”

**“Total Expense per Adjusted Discharge increased 24.7%, Labor Expense rose 26.4%, and Non-Labor Expense increased 20.5% relative to pre-pandemic levels in November 2019.”**

Dec 2021 National Hospital Flash Report Real Data. Real Insight. Real Time. KH

Source: AHA,KH, Sept 2021



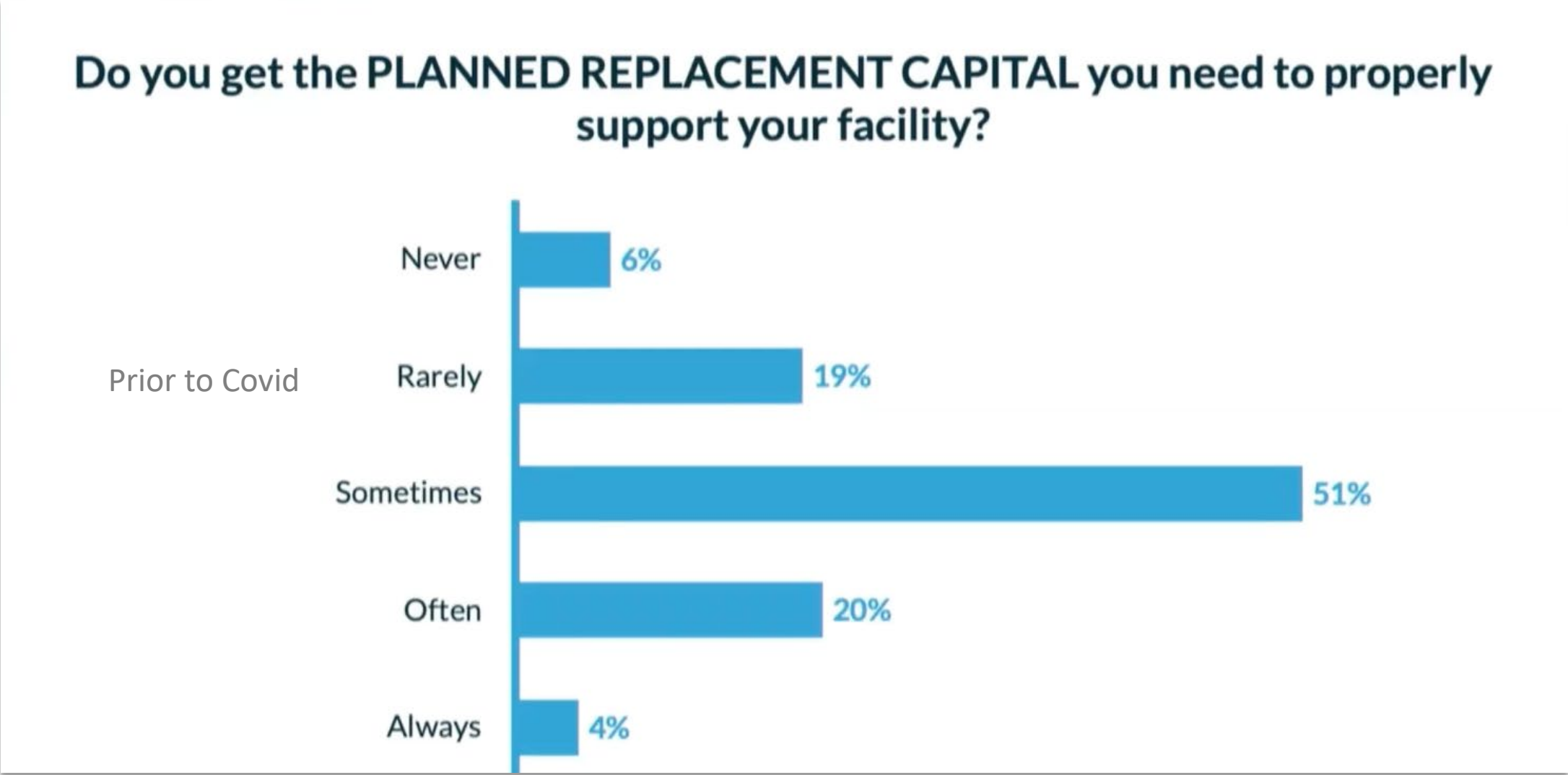
Source: Kaufman, Hall & Associates, LLC

# ASHE Annual Conference Poll Results

## Facility Professionals Perspective of Infrastructure Funding

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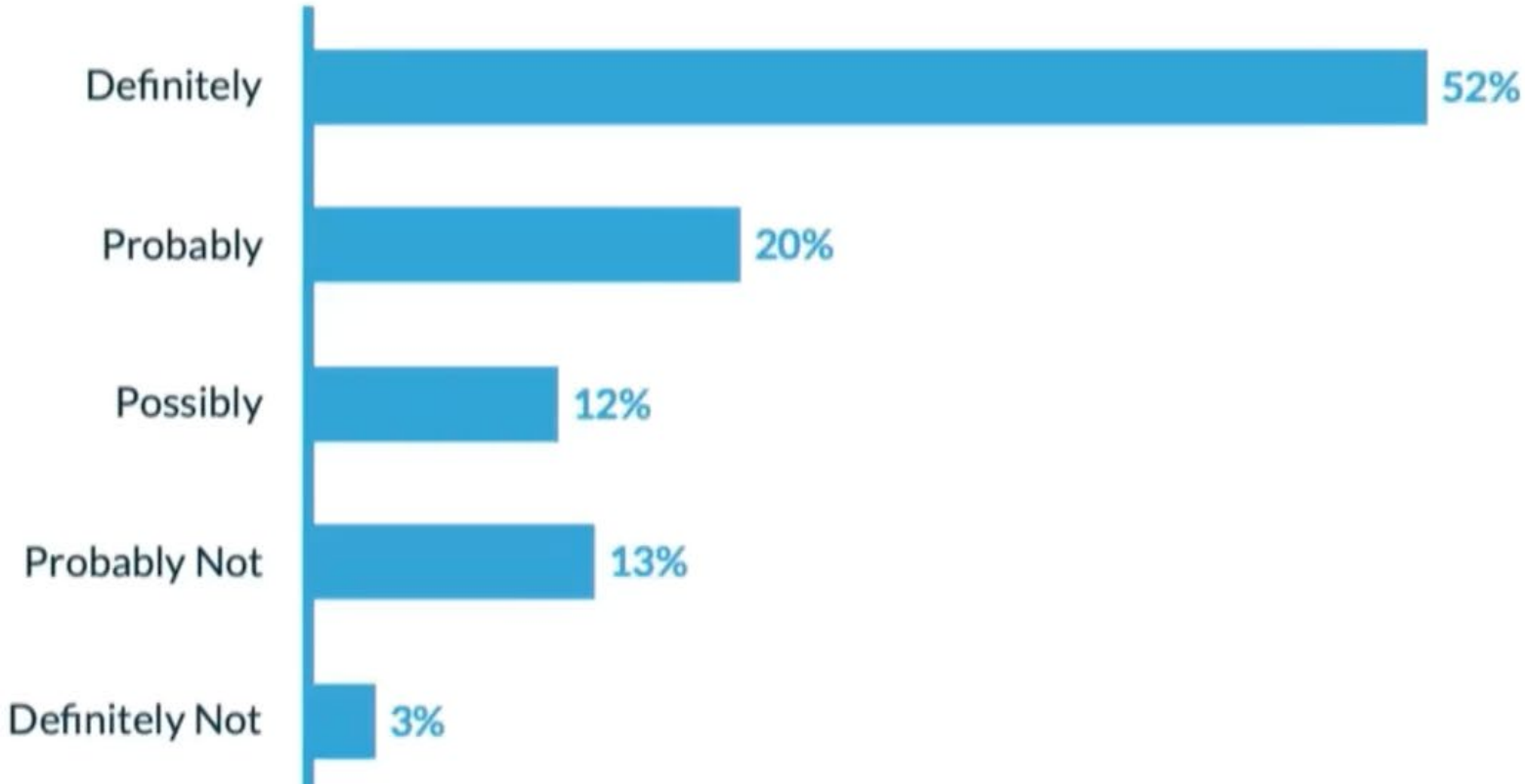
# ASHE Annual Conference Audience Poll - Q1



Source: ASHE 2021 Annual Conference Presentation Live Presentation Audience Poll Results

# ASHE Annual Conference Audience Poll - Q2

Has Covid negatively impacted the availability of **PLANNED REPLACEMENT CAPITAL** in your organization?

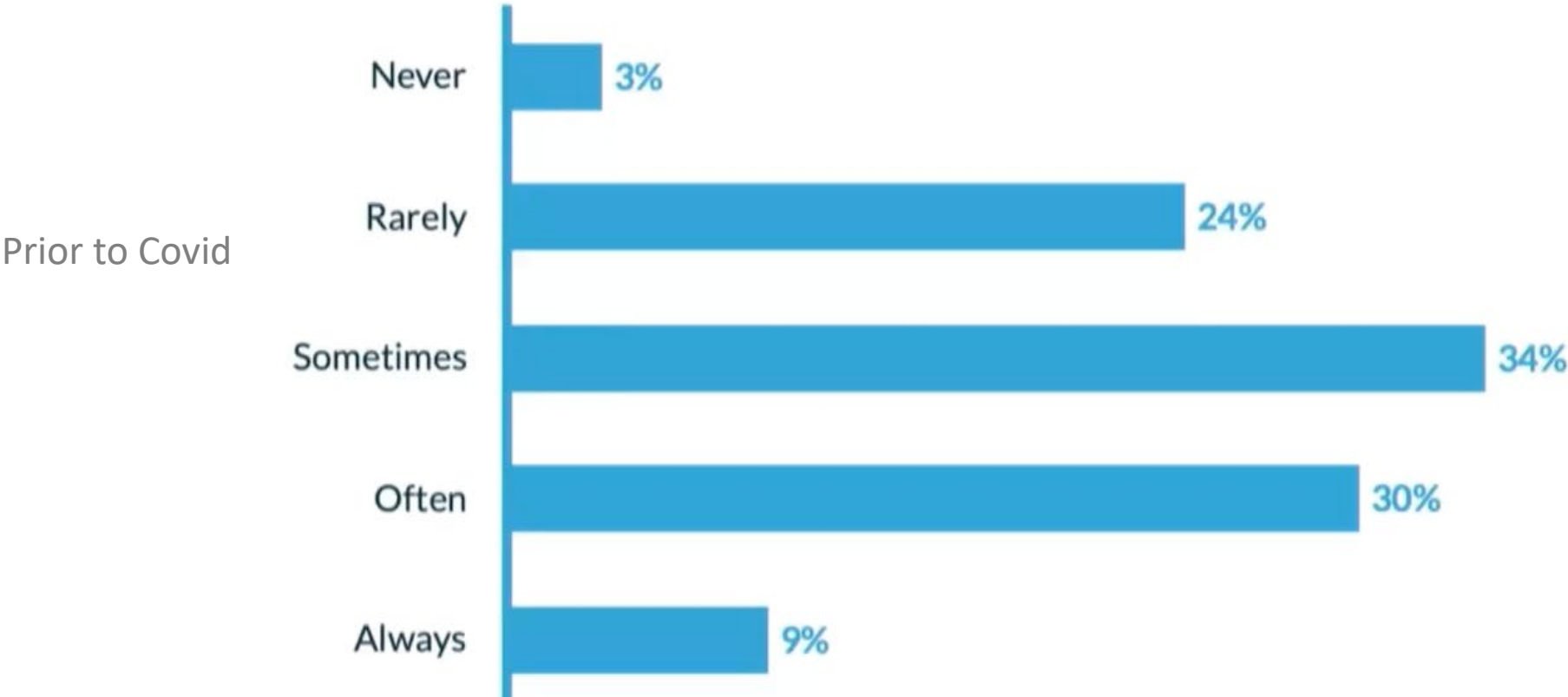


Source: ASHE 2021 Annual Conference Presentation Live Presentation Audience Poll Results



# ASHE Annual Conference Audience Poll - Q3

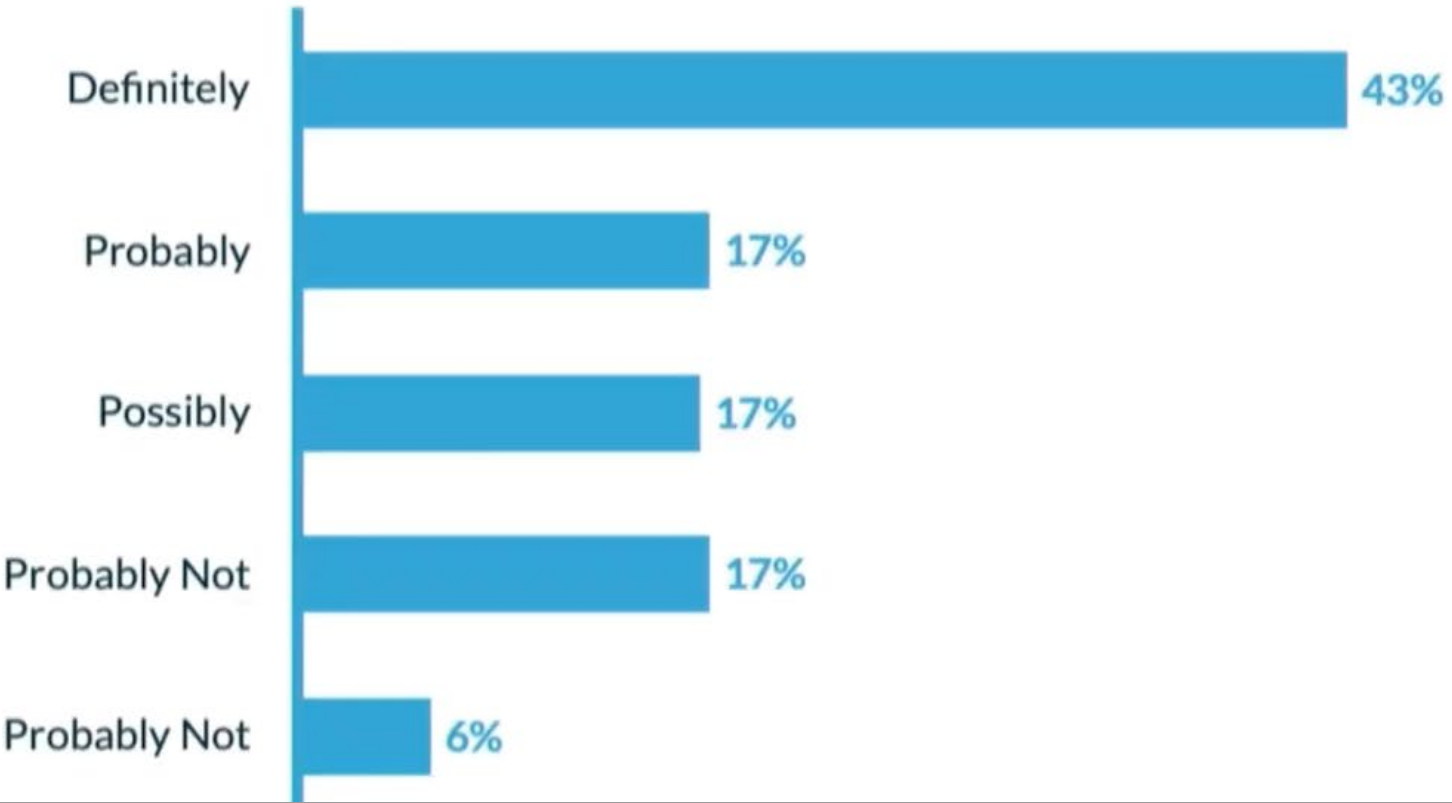
Do you get the OPERATIONAL budget you need to properly operate your facility? (FTE/Staffing, Service Contracts, etc.)



Source: ASHE 2021 Annual Conference Presentation Live Presentation Audience Poll Results

# ASHE Annual Conference Audience Poll - Q4

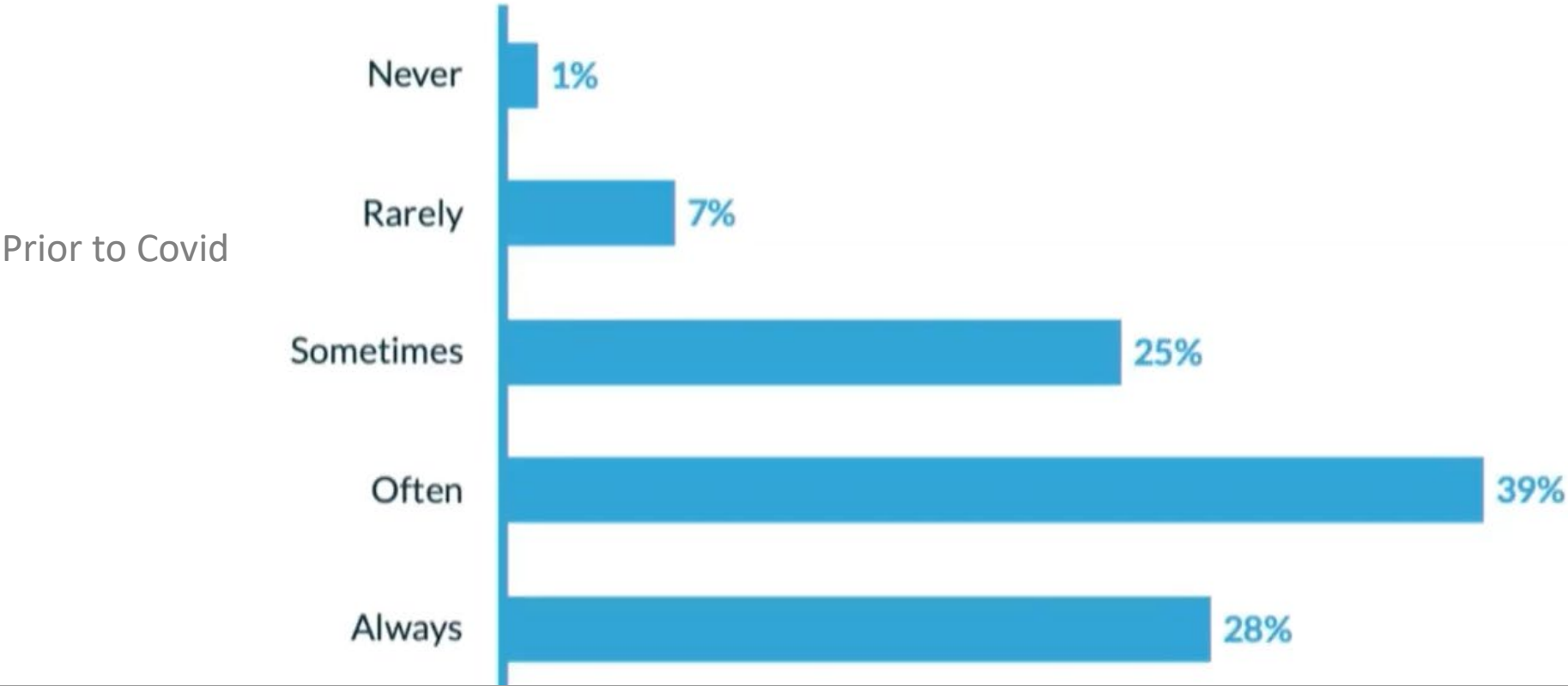
Has Covid negatively impacted the OPERATIONAL budget in your organization? (FTE/Staffing, Service Contracts, etc.)



Source: ASHE 2021 Annual Conference Presentation Live Presentation Audience Poll Results

# ASHE Annual Conference Audience Poll - Q5

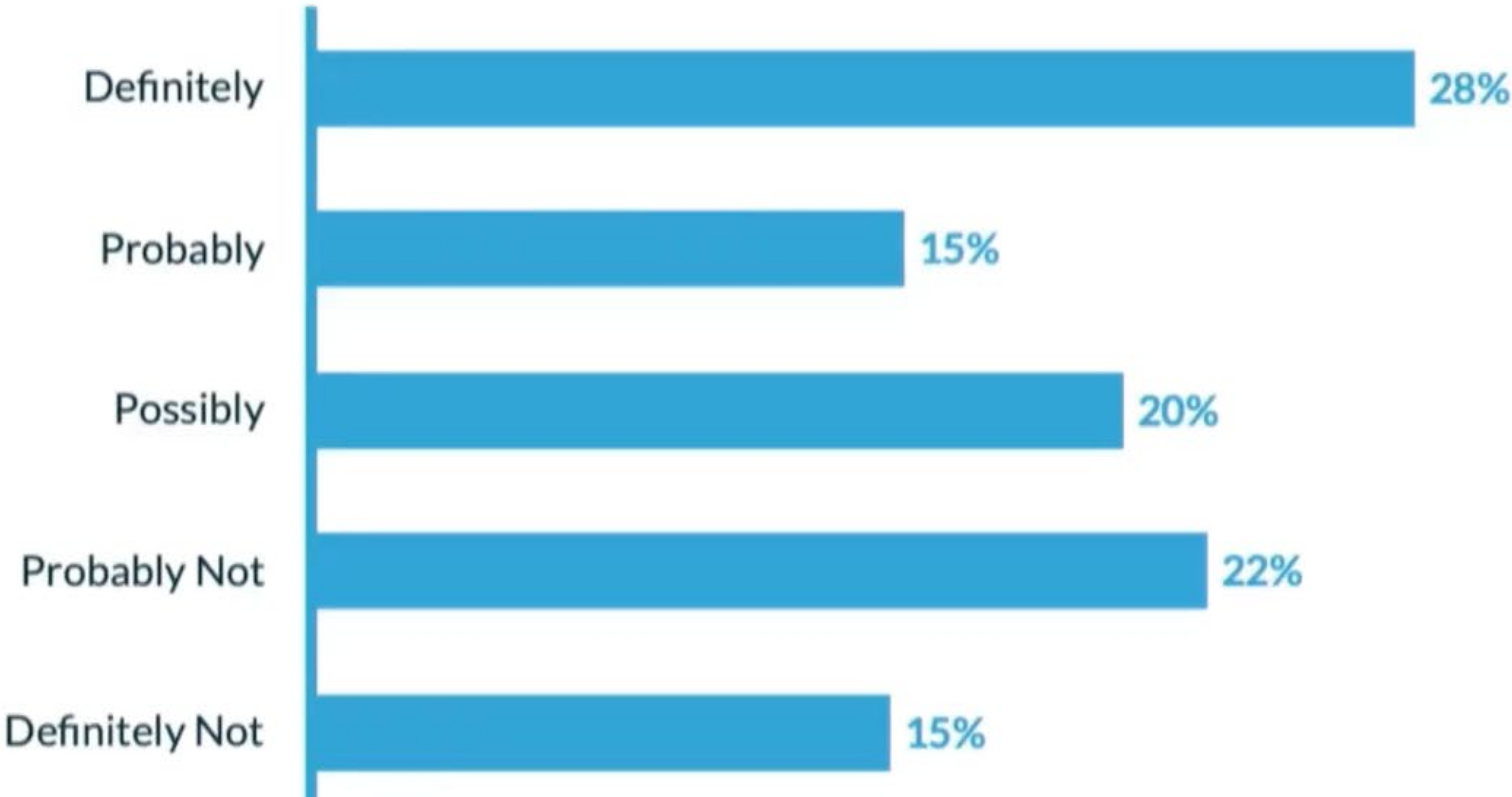
Do you get the EMERGENCY CAPITAL you need to properly support your facility?



Source: ASHE 2021 Annual Conference Presentation Live Presentation Audience Poll Results

# ASHE Annual Conference Audience Poll - Q6

Has Covid negatively impacted the availability of EMERGENCY CAPITAL in your organization?



Source: ASHE 2021 Annual Conference Presentation Live Presentation Audience Poll Results

# Disclosure of Relevant Financial Relationships

- The following faculty of this continuing education activity has no relevant financial relationships with commercial interests to disclose:
  - Jonathan Flannery, FACHE, FASHE
  - Mark Mochel, MBA, PMP, CSM, FCT, ACABE
  - Matthew Stiene, PE, CFM, CHFM