DYNAMIC UTILITY MASTER PLANNING: BEST PRACTICES

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Why master plan?

FUNDING

SUSTAINABILITY GOALS

OPERATION & MAINTENANCE

COMMUNICATION & REPORTING

RESILIENCY

TRANSITIONS

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WHY DO MASTER PLANS FAIL?

NO
PLAN

SEVERAL
POTENTIAL PLANS

CHANGES
TO PLAN

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WHY DO MASTER PLANS FAIL?

Changes or availability
of **technology**

CHANGING FACTORS

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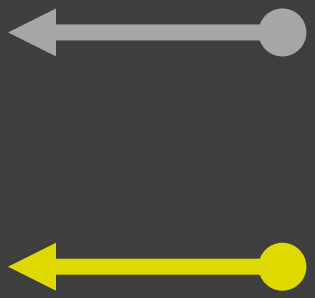
WHY DO MASTER PLANS FAIL?

Changes or availability of **technology**

Availability of **funding**



CHANGING FACTORS

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WHY DO MASTER PLANS FAIL?

Changes or availability of **technology**

Availability of **funding**

Changes in **growth**

CHANGING FACTORS

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WHY DO MASTER PLANS FAIL?

Changes or availability of **technology**

Availability of **funding**

Changes in **growth**

Proper **communication**

CHANGING FACTORS

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STATIC VS. DYNAMIC MASTER PLANS

How do we invest given the **current conditions**?

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STATIC VS. DYNAMIC MASTER PLANS

How do we plan to invest in the future given **unknown conditions**?

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GOING BEYOND TODAY

How do we support currently required utilities while **allowing flexibility** for future load additions?

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GOING BEYOND TODAY

Time capital expenditures to **maximize benefits and understand impacts**

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GOING BEYOND TODAY

Time capital expenditures to maximize benefits and understand impacts

Allows flexibility to incorporate new technology & goals

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GOING BEYOND TODAY

Time capital expenditures to maximize benefits and understand impacts

Allows flexibility to incorporate new technology & goals

Identifies planning for **supporting infrastructure**

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THE DYNAMIC DIFFERENCE

Comparing utility options while **providing flexibility** for changing factors.

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THE DYNAMIC DIFFERENCE

Allows for **active option analysis**

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THE DYNAMIC DIFFERENCE

Allows for active option analysis

Includes utility consumption & operation cost forecasting

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THE DYNAMIC DIFFERENCE

Allows for active option analysis

Includes utility consumption & operational cost forecasting

Adaptive to deviations from initial planning

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DYNAMIC PLANNING TOOLKIT

How to support projected demand while **allowing flexibility** for future changes?

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DYNAMIC PLANNING TOOLKIT

LOAD MODELING

DISTRIBUTION PLANNING

LIFE CYCLE COST ANALYSIS

COST ALLOCATION

SUSTAINABILITY

CAPITAL PLANNING

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LOAD MODELING

Boilers Located in CEP					Buildings on CEP Steam System			
Boiler	MBtuh	Date Installed	Life					
CEP#1	23,433	2009	40		☐	Armour Academic Facility	☑	Central Energy Plant (CEP)
CEP#2	23,433	2009	40		☑	Atrium Building	☑	Orthopedic Ambulatory Building
CEP#3	23,433	2009	40		☐	Chiller Plant (PPP)	☑	East Tower
CEP#4	13,390	2009	40		☐	Cohn Research	☑	AACC
CEP#5	70,000	2015	40		☐	Jelke	☑	Central HUB
CEP#6	70,000	2020	40		☐	Johnston R. Bowman	☐	New Research Building
					☐	Kellogg Pavilion	☑	Atrium Expansion
					☐	Pavilion	☑	Tunnel
					☐	Professional Bldg. 1		
					☐	Professional Bldg. 2		
					☐	Professional Bldg. 3		

RUSH UNIVERSITY MEDICAL CENTER
Central Energy Plant

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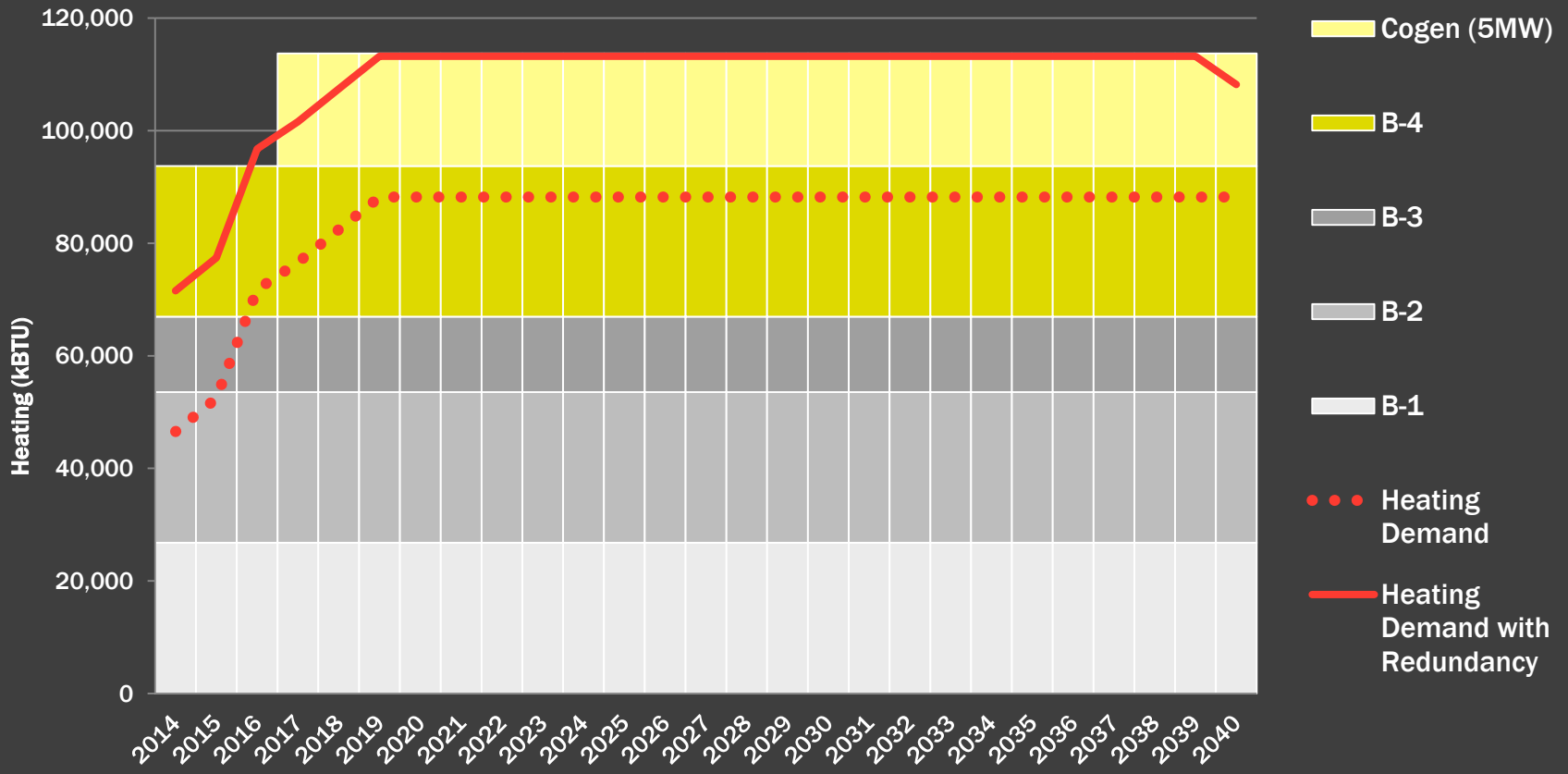
LOAD MODELING



University of Massachusetts – Boston
Central Energy Producing Facility
Heating and Load Capacity

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DISTRIBUTION PLANNING

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Chilled Water Distribution

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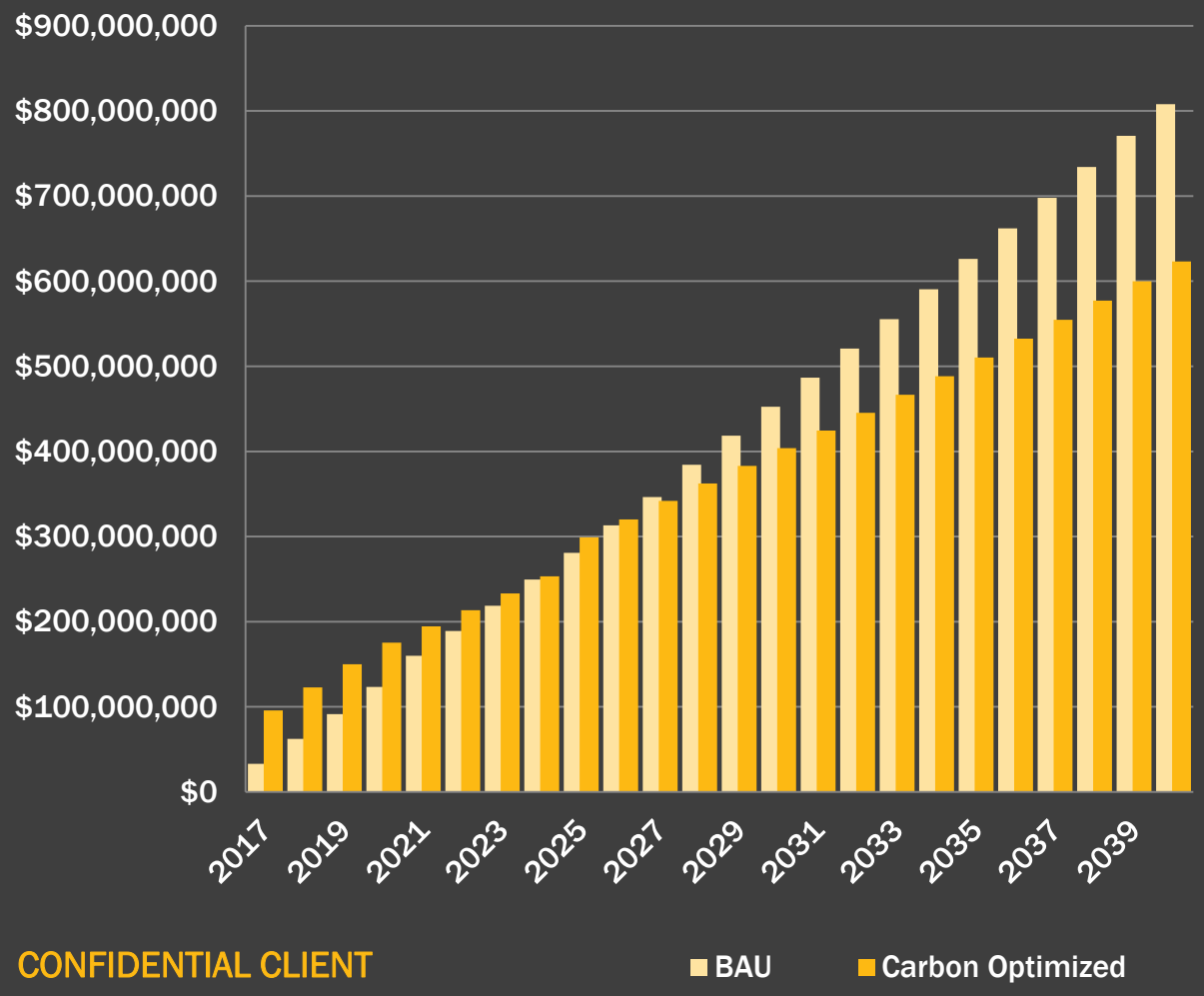
LIFE CYCLE COST ANALYSIS



Life Cycle Cost Savings
$6,015,334

Projected Cost Reduction
26%

Average Annual Utility Savings
Electrical: **0 kWh**
Nat. Gas: **110,161 mmBTU**
Water: **0 kGal**

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Utility Master Plan

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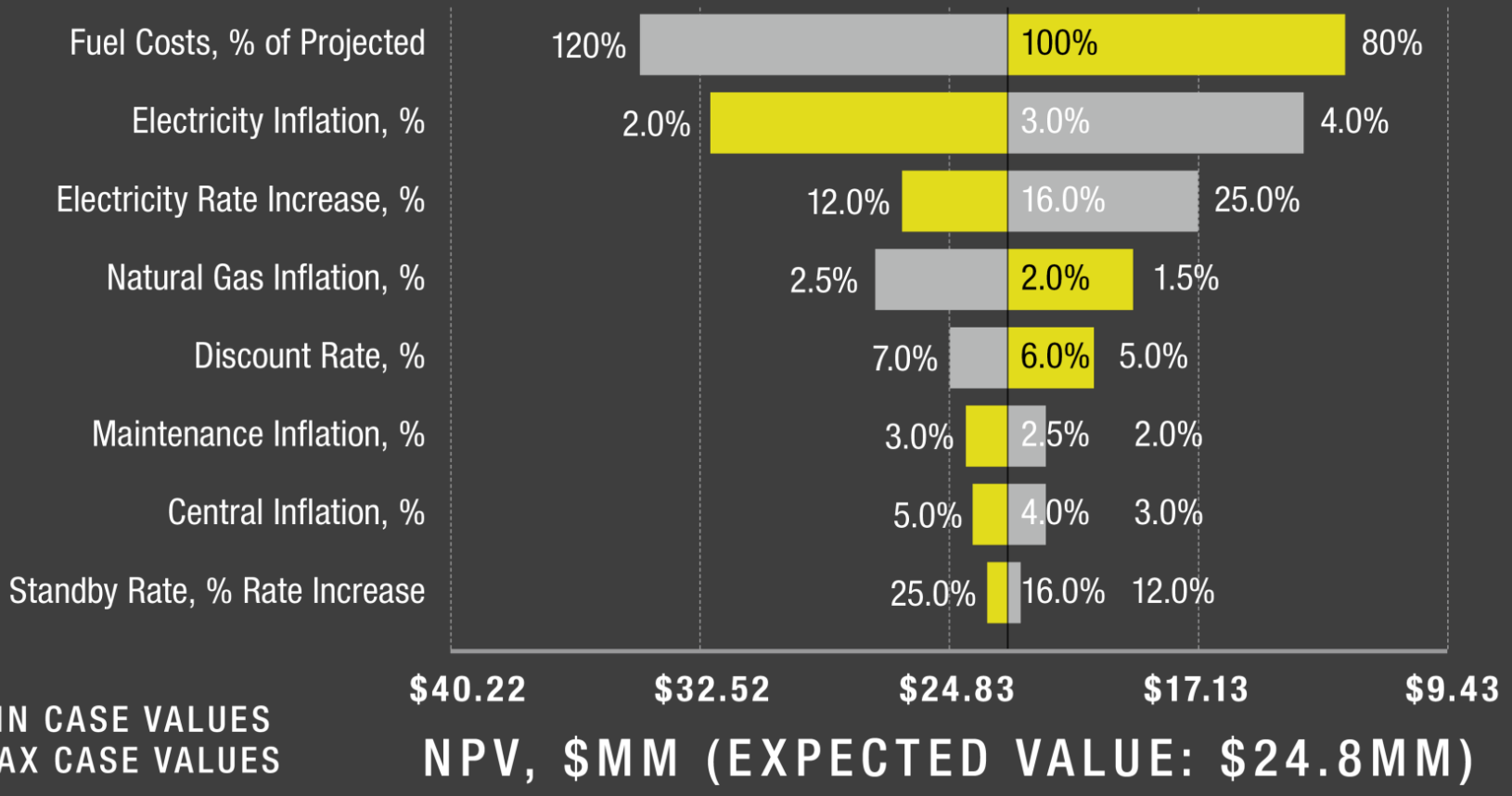
COST ALLOCATION

Rate development | Cost analysis



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SUSTAINABILITY TRACKER

Energy Reduction

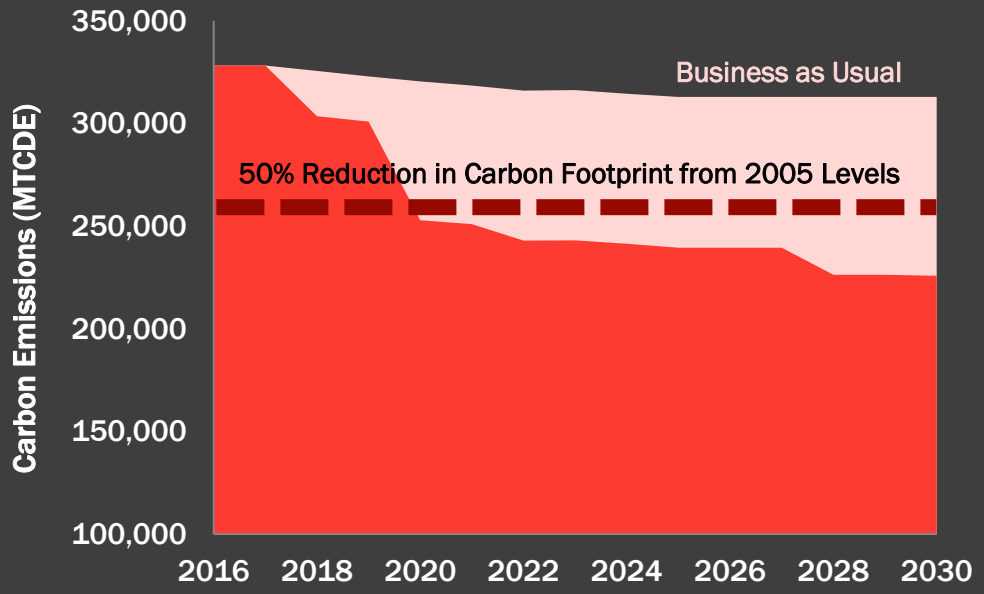
14%

Greenhouse Gas Reduction

14%

Water Conservation

0%



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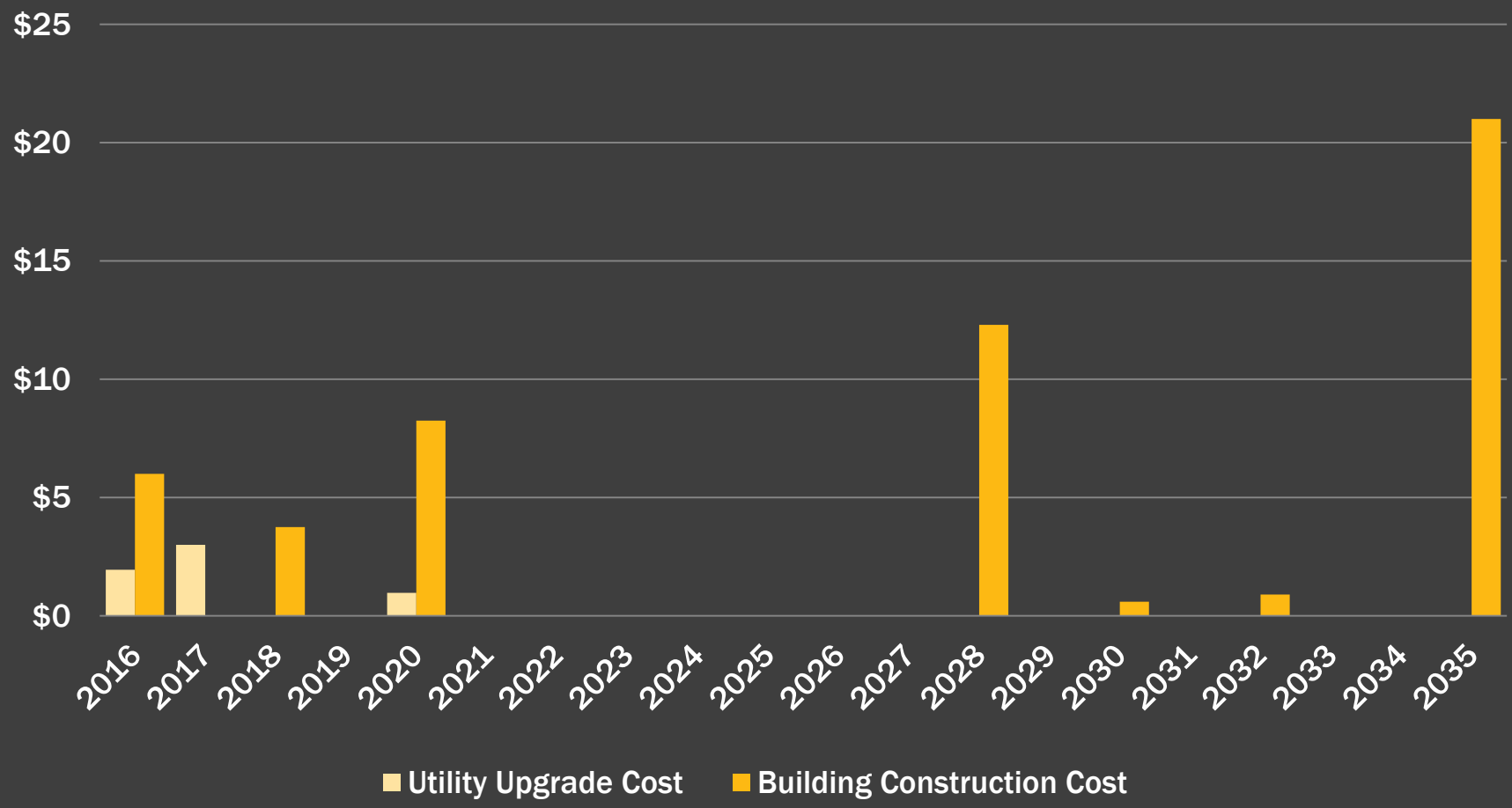
CAPITAL PLANNING



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SUMMARY

Flexibility **over the entire lifetime** of the utility master plan

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SUMMARY

Flexibility over the entire lifetime of the utility master plan

Collaborative effort between stakeholders

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SUMMARY

Flexibility over the entire lifetime of the utility master plan

Collaborative effort between stakeholders

Robust plan providing long term savings

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