

# Utility Systems – Fiscal Year 2022 Budget

## Customer Advisory Panel

April 1, 2021



# 2021 ASCE Infrastructure Report Card

## National Scores

**G.P.A.**



**C-**



**Energy**



**C-**



**Drinking  
Water**



**C-**



**Wastewater**



**D+**

# Century II Puts KUB Ahead of the Curve

**AP**

## Southern exposure: Cold wreaks havoc on aging waterworks

By MELINDA DESLATTE and LEAH WILLINGHAM February 25, 2021

*In Memphis, residents in the city of 650,000 were told for nearly a week to boil water...*

*...at least 7 million Texans were told to boil their water*

*In Shreveport, where about 200,000 people were being told to boil their water, Mayor Adrian Perkins pointed to “old, aging infrastructure, just like most American cities.”*

*Mayor Chokwe Antar Lumumba (Jackson, MS) said close to \$2 billion is required to modernize its water system...Monday was the first time in a week that residents could line up for water outside of Madonna Manor, a 13-floor apartment complex for seniors and people with disabilities. People brought laundry pails, bowls, buckets and wastebaskets.*



# Overview

- Century II
  - Purpose
  - History
  - Evolution
  - Accomplishments
- Major upcoming projects and programs
- Electric budget does not include broadband (separate)

## Century II



**KUB** Investing for  
Another 100 Years

# Electric System

**Customers:** 211,812

**Service Territory:**  
688 square miles

**Electric Lines:** 5,417 miles  
Distribution Overhead: 4,052 miles  
Distribution Underground: 1,099 miles  
Transmission: 266 miles

**Infeed Substations:** 9

**Substations:** 63

**System Capacity:** 3,029,500 kVA

**Peak Hourly Demands:**  
Winter: 1,332 MW (Feb. 2015)  
Summer: 1,235 MW (Aug. 2007)



County Lines

City Limits

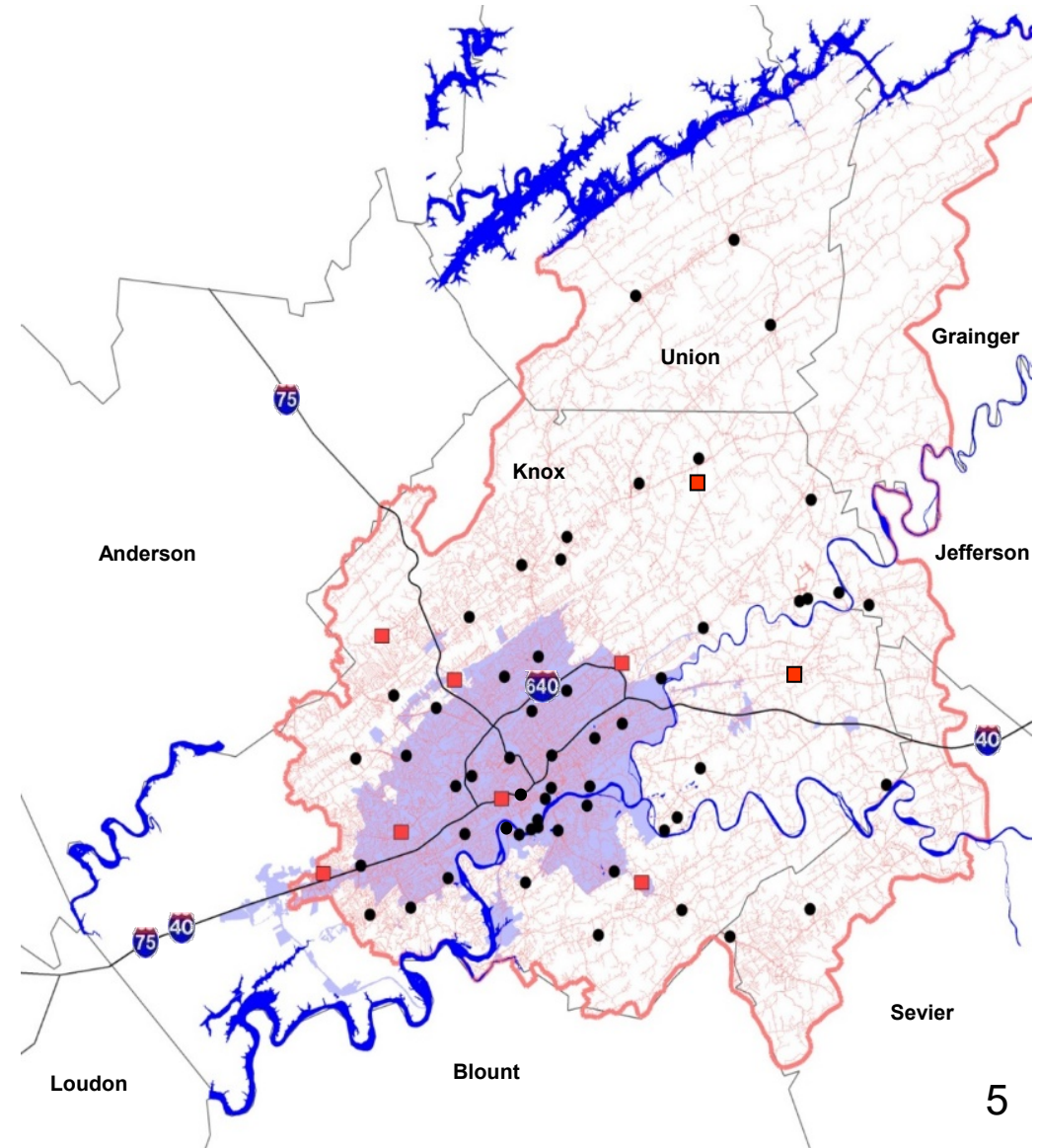
Service Area

Existing Lines

Infeed Stations

Distribution

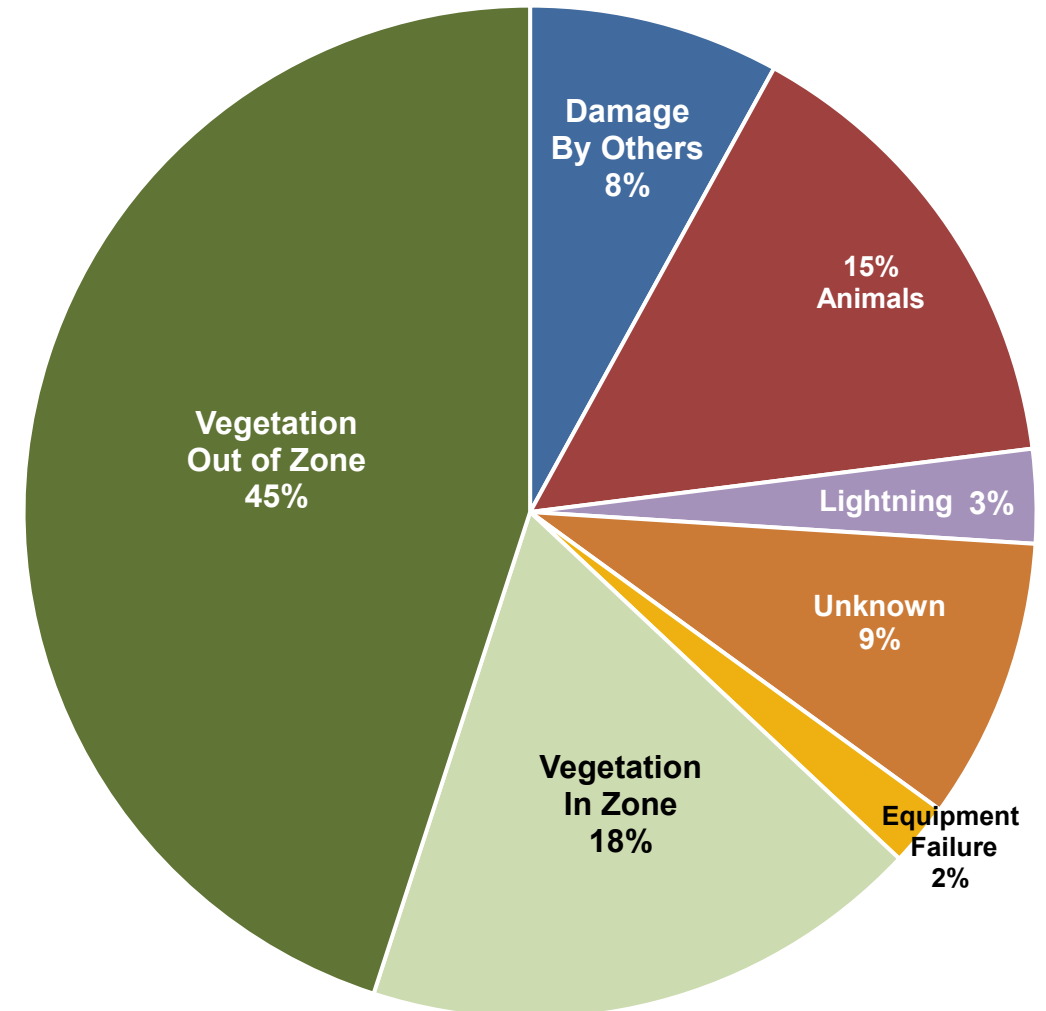
Stations



# Electric Century II Focuses on Reliability

- Data driven
- Requires investments in maintenance, infrastructure and technology
- System maintenance
  - Vegetation – 63% of outages
  - Inspection
- Century II infrastructure replacement
- Grid modernization and system automation

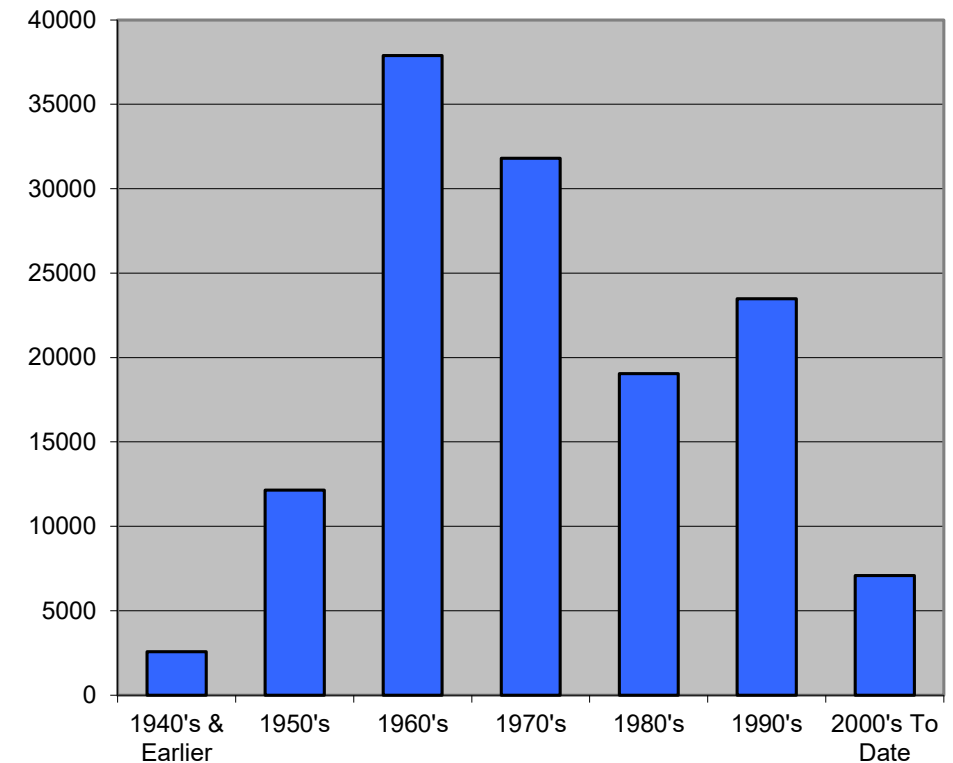
FY20 Outage Causes



# Century II for Electric Began in 2011

- Substation Transformers:
  - Prioritized upgrades
  - 65% had contingency capacity
- Transmission Lines: improve links between substations
- Poles: 50-year cycle
- UG Cable: initial focus on direct buried cable
- Downtown Network: began with vault upgrades

**KUB Wood Poles by Installation Decade**



**Source: 2008 Comprehensive Assessment**

# Century II Electric Has Evolved

- Poles: 2,600 annual replacement target modified based on evolution of data and planning
  - Initial work replaced oldest, worst poles
  - Circuit based approach considers pole condition, conductor size, vegetation needs, etc.
  - Prioritize circuits by outages (customer interruptions)
- Substations: comprehensive evaluation extended replacement timeline from 10 to 20 years



# Century II Accomplishments

- Substations: +50 percent upgraded
- Poles: +23,000 poles replaced
  - First cycle replaced 2,600 poles/year
  - Current LRP replacement rate 1,400/year
  - Future rate based on upcoming pole assessment
- Underground Cable: 90 percent direct buried replaced; cable in conduit next
- Transmission Lines and Fiber Optic Cable: 145 of 265 miles complete, remainder by FY30
- Grid modernization and distribution automation maturing

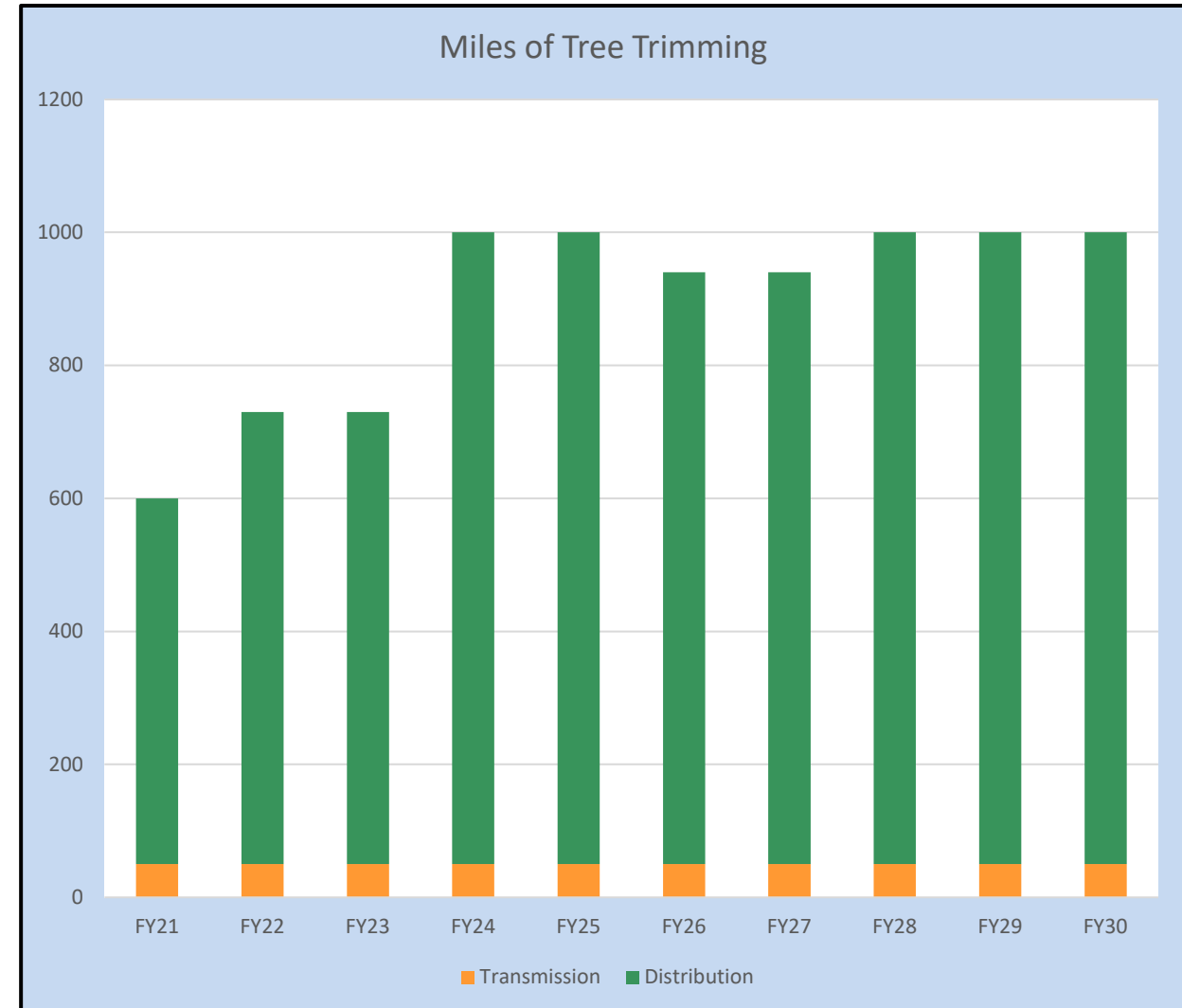
# Grid Modernization Investments Necessary to Improve Reliability, Reduce Outage Time

- Outages and minutes improving this FY
- Century II + Grid Modernization
  - Substation upgrades
  - Transmission, distribution circuit rebuilds
  - Distribution automation
  - Vegetation management



# Vegetation Causes Over 60 Percent of Outages

- Ramping up to \$14M/year (\$11.9M FY22)
- Returning to historic trim levels ~ 1000 miles/year
- Hazardous tree removal outside trim zone
- Strategic insourcing
  - Foresters
  - Vegetation crew



# New Western Avenue Infeed Substation

- Adds capacity and resiliency
- Allows operational flexibility for transmission line and substation upgrades
- Partnering with TVA
  - TVA lines cross property
  - TVA building adjacent switching station
- \$17M in FY21 – FY23  
(\$3.5M FY22)



# Other Major Upcoming Projects FY22

- **Transmission Lines: \$12.8M**
  - Millertown Pike area
  - Morrell Road area
  - Cunningham Road / Halls area
- **Distribution Lines: \$9.6M**
  - Outage prioritization for circuits
  - Includes distribution automation
- **Pole Inspection: \$1.5M**
  - Paused during pandemic
  - Completion date Dec 2021
- **Community Solar: \$1.5M**



# Knoxville's First Community Solar Project

- \$1.5M investment
- Up to 700 kW of solar on City-owned site
- Provides option for customers to invest in local solar
- In partnership with City of Knoxville and TVA
- Green Invest solar purchase (502 MW; \$1.6M annually)



# Grid Modernization Investments Growing

- New and higher expectations of electric grid
- Fiber is key to modernizing KUB electric facilities
  - Provides instant, reliable communication platform
  - Supports system reliability, load management, efficiency
- Future applications
  - Wider adoption of electric vehicles
  - Expansion of solar utilization
  - Home batteries
  - Next generation of advance metering

# Industry Recognition for Electric System

- Reliable Public Power Provider (RP3) Diamond Level Designation



American Public Power Association

- Tree Line USA





# Natural Gas System

**Customers:** 105,382

**Service Territory:**  
293 square miles



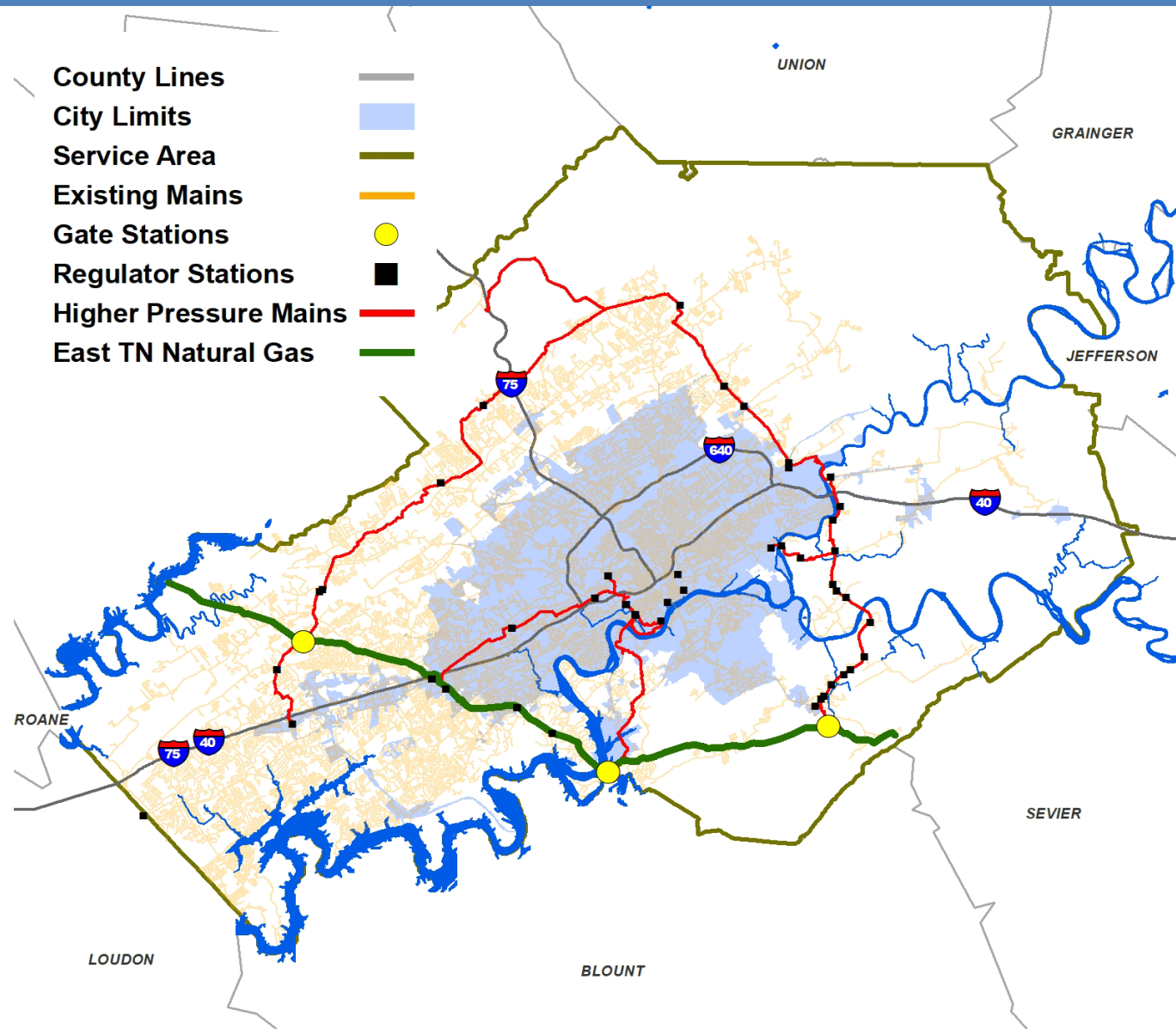
**Mains:** 2,517 miles  
Distribution  
Steel: 154 miles  
Plastic (MDPE): 2,288 miles  
Higher pressure  
Steel: 69 miles  
Plastic (HDPE): 6 miles

**Gate Stations:** 3

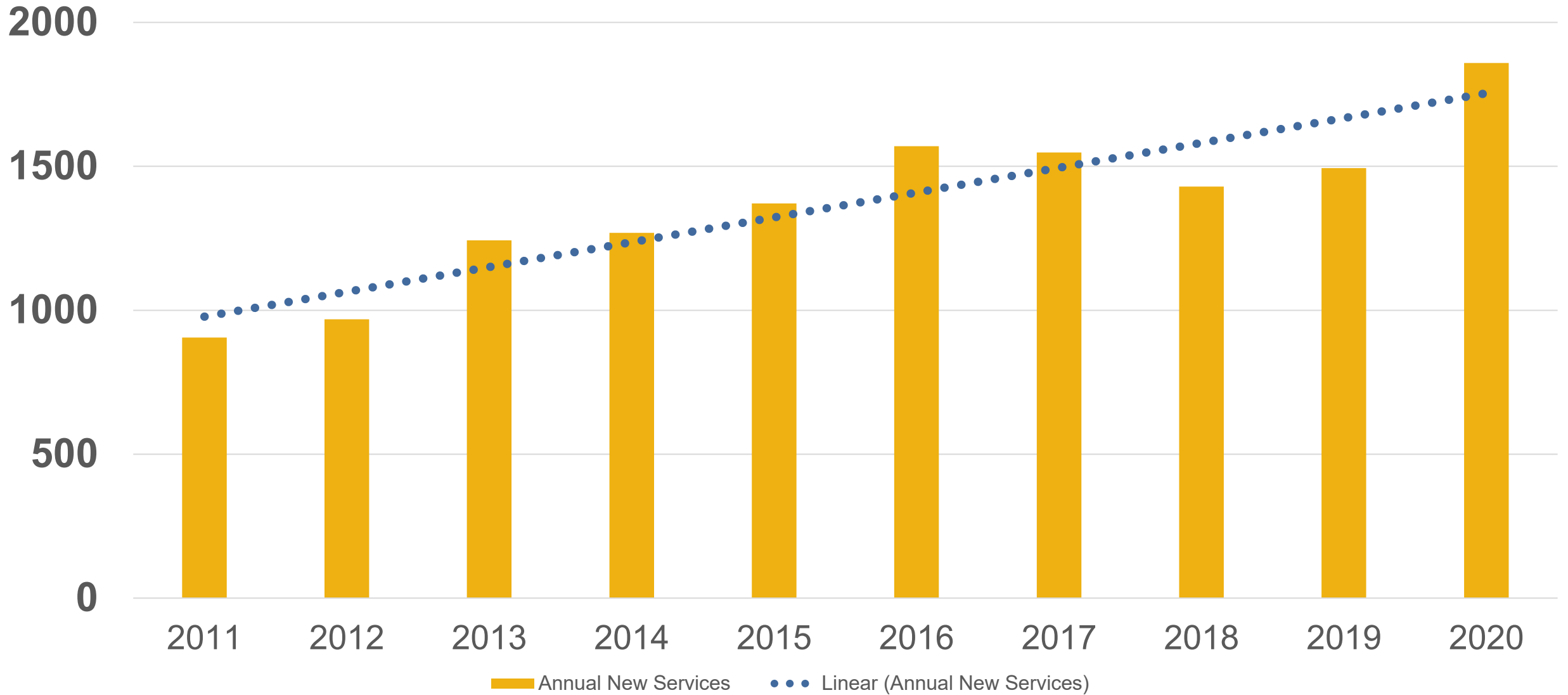
**Regulator Stations:** 48

**System Capacity:** 157,381 dth

**Peak Demand:** 140,204 dth (Jan. 2018)



# Customer Demand Growing



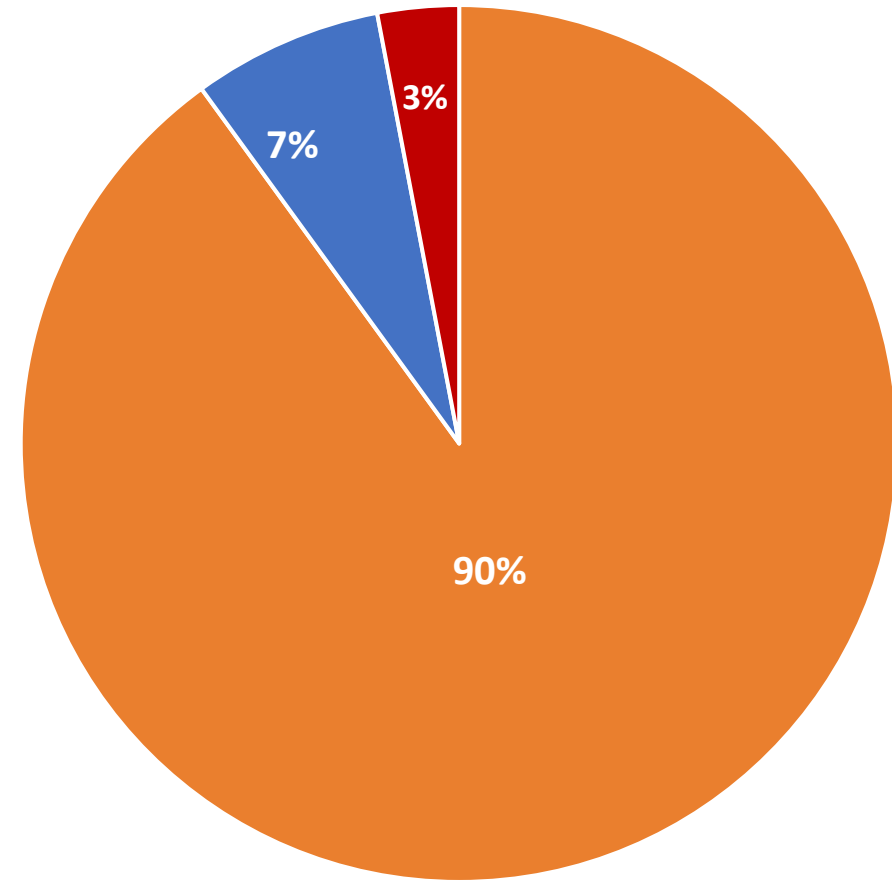
# Natural Gas Century II Supports Growth

- Pipeline extensions provide customer choice
  - Choto community
  - Northern expansion to Raccoon Valley
  - Hardin Valley
- Connect to Comfort



# Century II for Natural Gas Began in 2012

- Newest system
- Original priority: replacement of cast iron / ductile iron pipe
- Distribution Integrity Management Program (DIMP) now drives Century II investments



Newer Types:

■ Polyethylene

■ High-pressure Steel

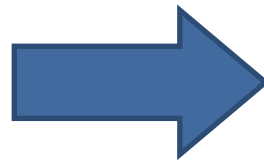
Older Types:

■ Low-pressure Steel

# Distribution Integrity Management Program Drives Century II Investments

## DIMP Objectives

- Know your system
- Identify risk
- Evaluate and rank priorities
- Identify and implement measures
- Measure and evaluate performance for effectiveness
- Evaluate and improve if needed
- Report results



## DIMP Programs

- Low Pressure Steel Replacement
- Resiliency Program
- Leak survey
- Cathodic protection
- Records management

# Major System Projects

- Low-Pressure Steel (\$2.3M)
  - Crestwood Hills (\$1M)
  - Belmont West (\$800K)
- John Sevier Hwy (\$2.5M)
  - \$2.2M for construction in FY22
- Downtown West (\$2.8M)
  - \$2.4M for construction in FY22
- Lovell Rd Ph 1 (\$11.4M)
  - Knox Co Hwy project
  - \$600K for design, easements in FY22



# Industry Recognition for Gas System

- Prepared by Kimley-Horn (2020)
  - Operations
  - Regulatory
  - System Integrity
  - Growth
  - Resiliency
- Reinforced current priorities
- Provides strategic considerations for longer-term system resiliency

*“Overall, it was shown that KUB operates a very robust natural gas system and incorporates the best industry practices into its operations.”*

*“KUB’s system is currently in excellent operational condition.”*

- Michael Alexander, P.E.

American Public Gas Association  
System Operational Achievement Recognition



- Silver Award 2018
- Awaiting 2021 application
- Honors excellence in:
  - System integrity
  - System improvement
  - Employee safety
  - Workforce development

**KUB**



# Wastewater System

**Customers:** 72,505

**Service Territory:** 243 square miles

**Treatment Plants:** 4

**Lift Stations:** 63

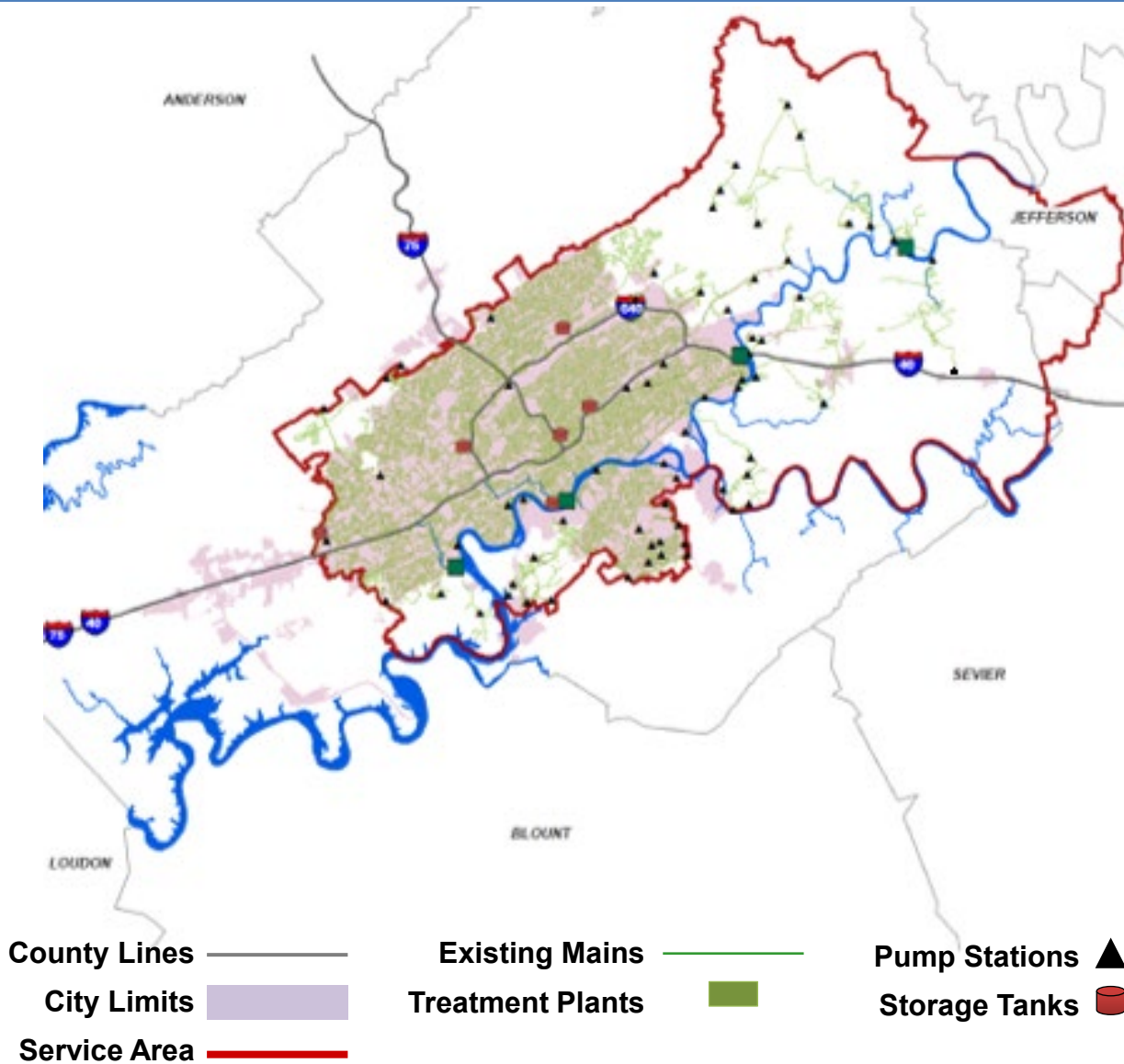
**Collection Mains:** 1,318 miles

**Storage Capacity:** 34 MG

**Plant Maximum Capacity:** 173 MGD

**Average Flow:** 45.62 MGD

**Consent Decree:** 2005 – 2021



# Focus on Reducing Overflows at Manholes

- Wastewater plants
  - Finalizing Consent Decree
  - Modernizing treatment disinfection methods
- Collection system
  - Continuing to upgrade lines



# History of PACE10 and Century II for WW

- PACE10 started in 2004
  - EPA Consent Decree
  - \$530M for 134 collection system projects
  - \$120M for upgrades at two WWTPs
  - Inspections/monitoring programs

- Now incorporated into Century II



## Century II



**KUB** Investing for  
Another 100 Years

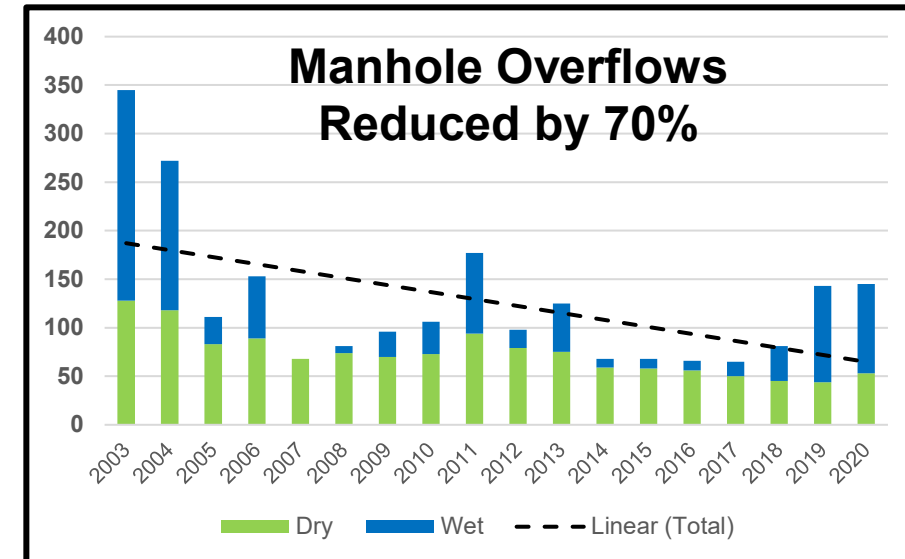
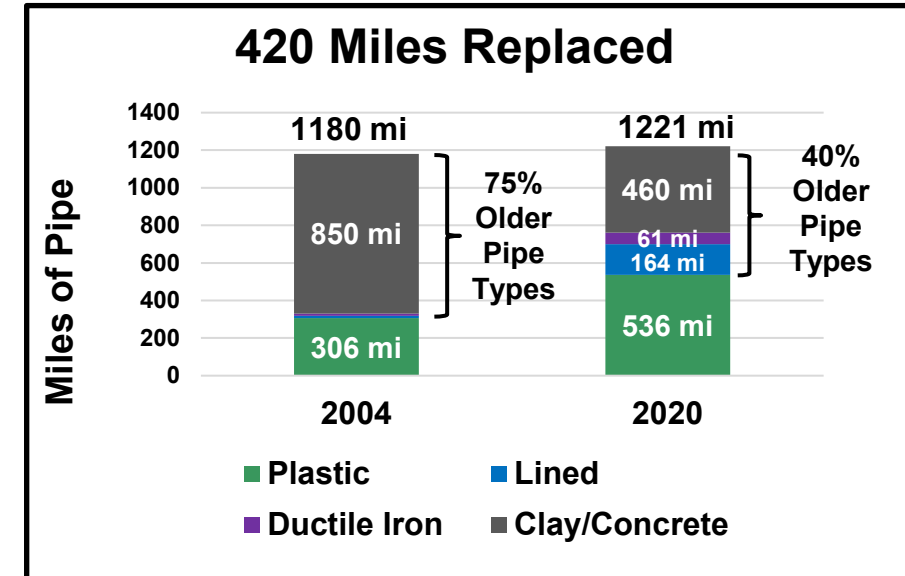
# Century II for Wastewater Has Evolved

- Consent Decree projects near completion
- Plant inspections formalized
- Tank and pump station prioritized by modeling and inspections
- Focus on areas with repeat manhole (MH) overflows
- Utilize hydraulic modeling for solutions

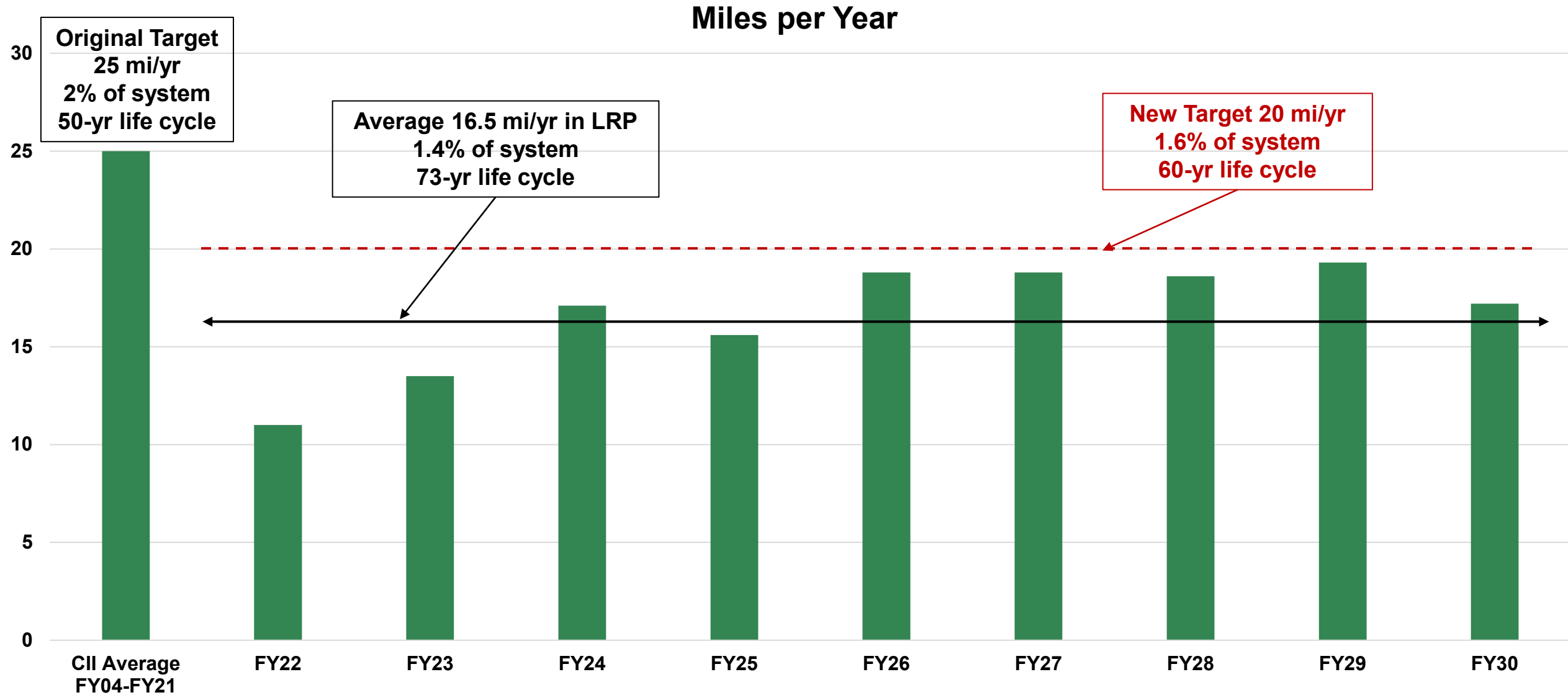


# Century II Improves Wastewater System

- 35% of system upgraded
- Reduced older pipe types from 75% to 40%
- 83% of pump stations upgraded
- Installed 6 storage tanks
- Invested \$120M in plant improvements
- Significant reduction in MH overflows



# Sustainable Pace of Century II Sewer Rehab



# Closing Out the Consent Decree

- Complete final CD project
- Incorporate programs into O&M Manual
  - Inspection of system
  - Blockage Abatement
  - Flow-monitoring
- Formally finalize CD with EPA
- Reduced reporting requirements
- Budget decreases and levels out
- Commitment to Century II remains

Project	Cost	Status
Kuwahee WWTP CCP Phase I	\$51M	✓
Fourth Creek WWTP CCP Phase I	\$20M	✓
134 Collection System Projects	\$530M	✓
Fourth Creek WWTP CCP Phase II	\$4.7M	✓
Kuwahee WWTP CCP Phase II	\$48M	75%



# Major Upcoming Projects

- Wastewater pipe upgrades \$11.6M FY22 - \$166M LRP
- Jones Street Pump Station & Force Main \$14.2M FY21-22
- Kuwahee Primaries Deck \$6.1M FY21-23
- Fourth Creek Disinfection \$3.4M FY21-23
- Loves Creek Electrical \$5.1M FY21-23
- Walker Springs Pump Station & Force Main \$5.5M FY23





# Positive Relationship with Regulators

- All CD requirements nearly complete
  - Budget of \$650M on track
  - Final project in progress
- 54 plant operational awards from National Association of Clean Water Agencies in past 15 years
- Maintained Platinum level Biosolids Reuse Program



*“KUB has shown tremendous progress in controlling unpermitted discharges since entering into the Consent Decree.”*

- **Dennis Sayre**, EPA  
Acting Chief Municipal and  
Industrial Enforcement  
Branch, 2018

# Water System

**Customers:** 81,225

**Service Territory:**  
188 square miles

**Treatment Plant:** 1

**Pump Stations:** 26

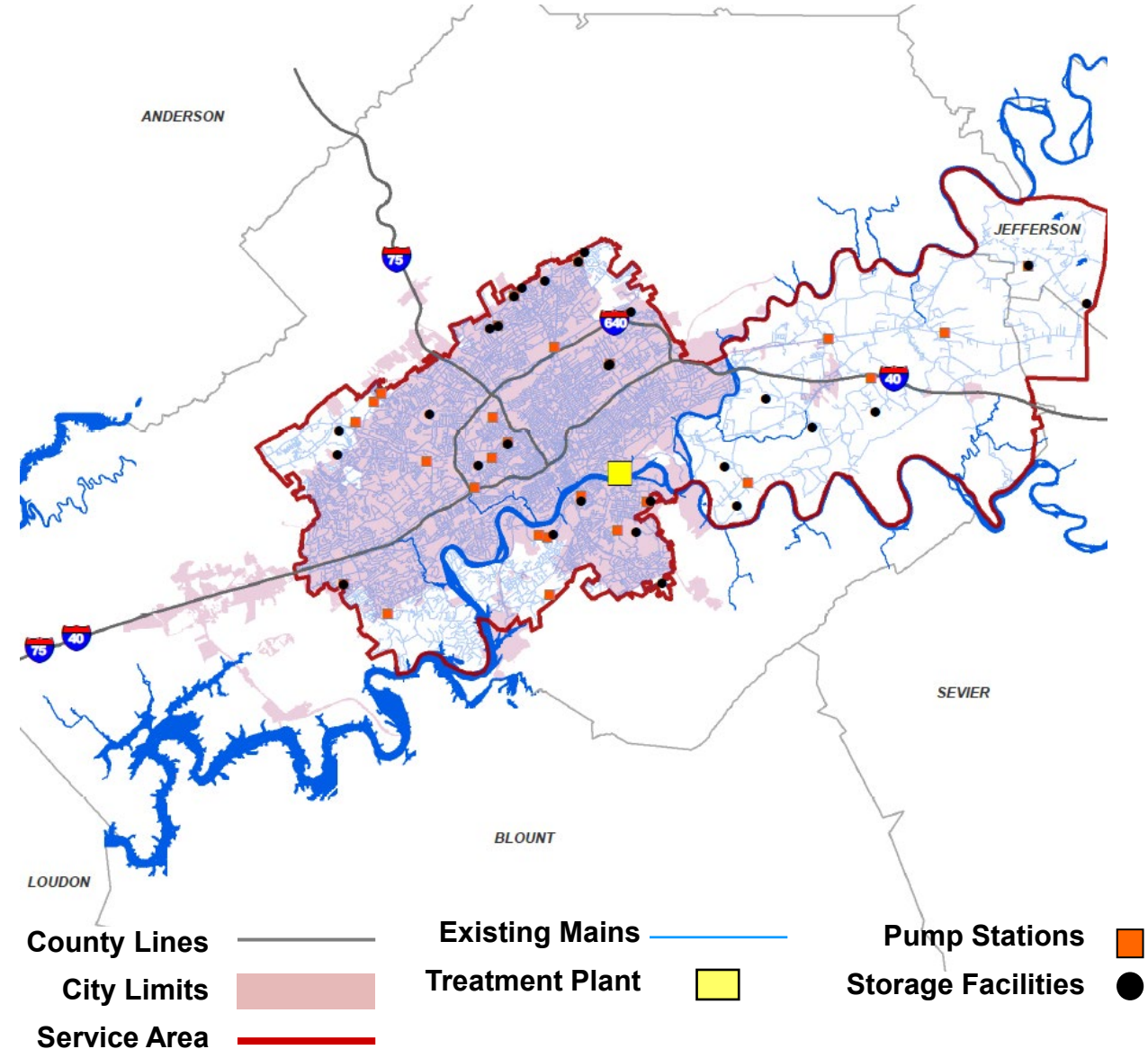
**Storage Facilities:** 28

**Distribution Mains:** 1,410 miles

**Plant Capacity:**  
62.9 million gallons/day (MGD)

**Reservoir Capacity:** 36.9 million gallons

**Treated Water:** 12.7 billion gallons annually



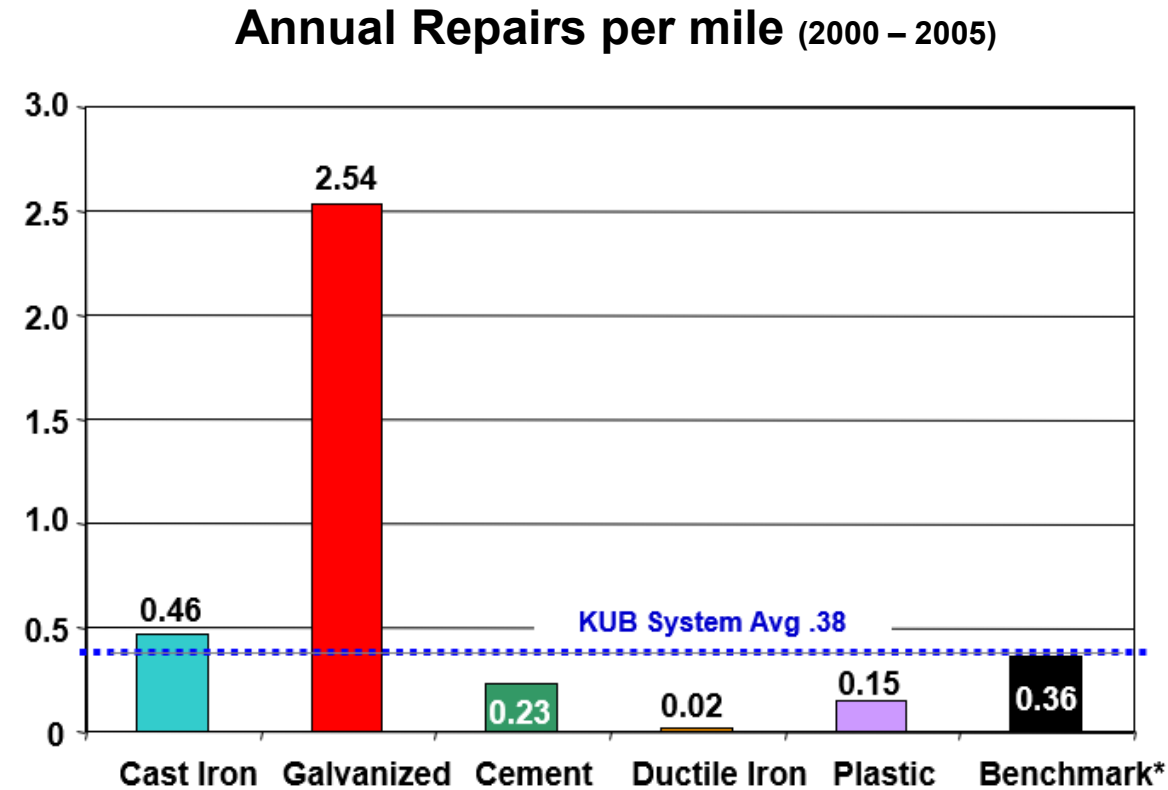
# Water: Focus on Resiliency

- MBW Water Plant
  - Single source of water for community
  - Multi-year plan to provide dual treatment train
- Distribution system
  - Building system resiliency



# History of Century II for Water

- Developed in 2006 due to increase in main breaks
- Modeled after PACE10
- Review of assets with focus on pipe
- Pipe prioritization based on available data
  - Repair history by pipe type
  - Pipe size, type, and age
  - Industry pipe life expectancy



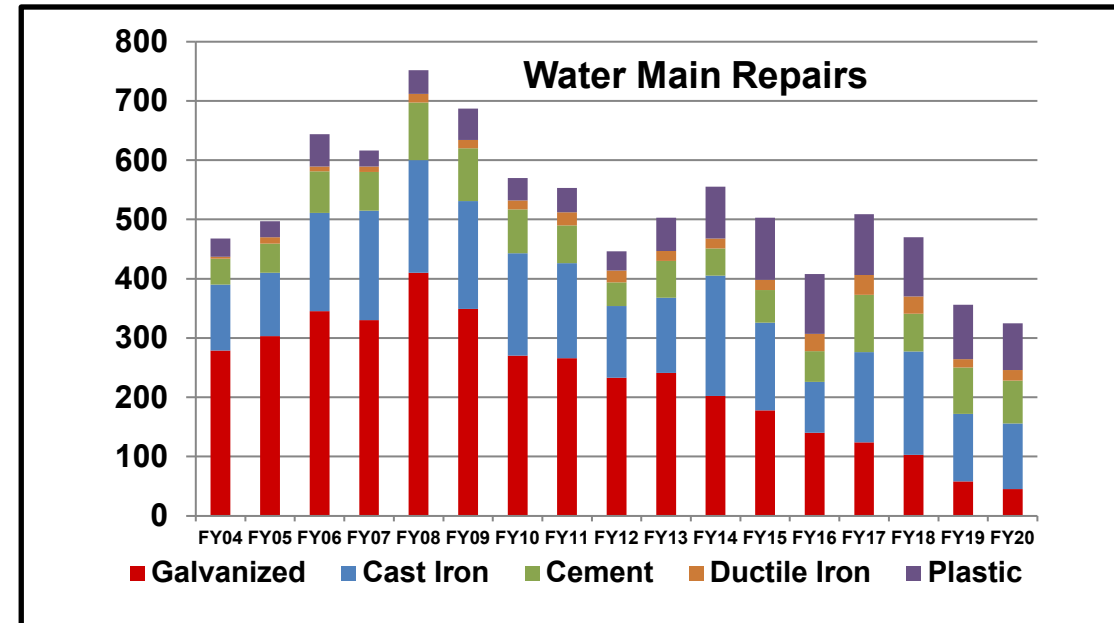
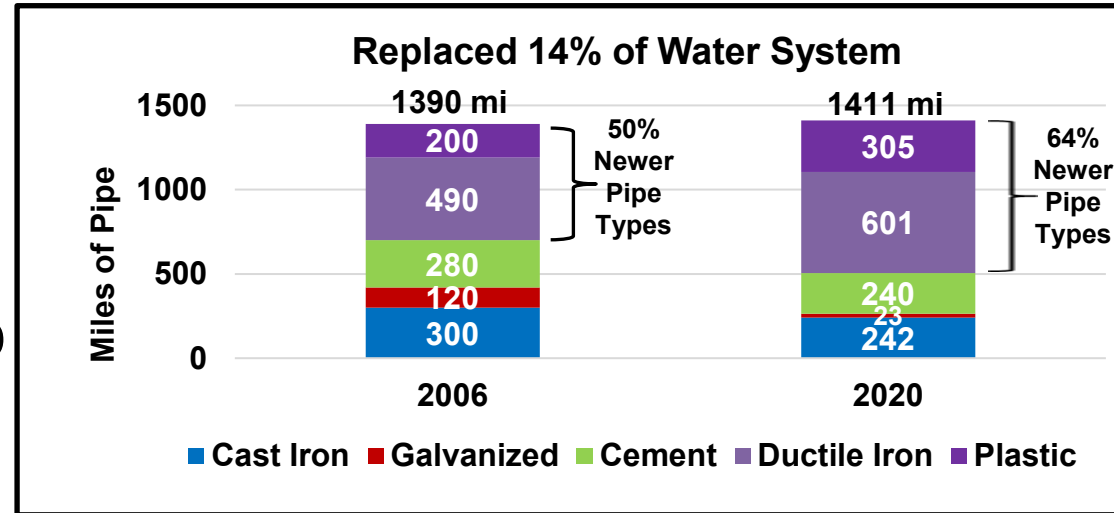
# Century II for Water Has Evolved

- Water Supply Master Plan developed
- Tanks and pump stations prioritized by data
- Expanded valve inspections
  - Distribution 5-yr cycle
  - Transmission 2-yr cycle
- Inspections by KUB vs contractor
- New programs for pipe prioritizations
  - District Metering Areas
  - Find and Fix successful pilot



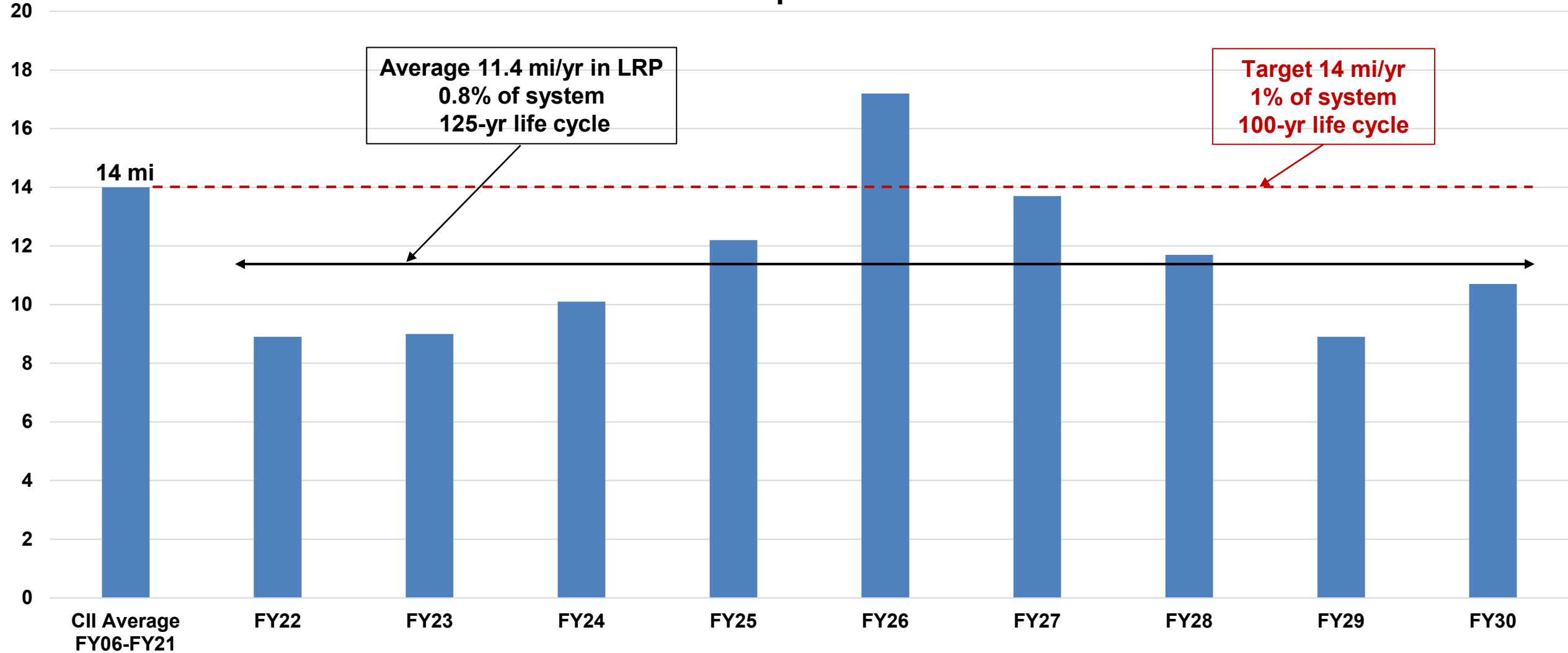
# Century II Improves Water System

- Upgraded 200 miles of pipe
  - System composed of 64% newer pipe vs 50% in 2006
  - Galvanized nearly eliminated
- Pipe repairs down by 57%
  - Enhanced data-driven replacement of pipe



# Temporary Reduction in Pace of Pipe Upgrades

Miles per Year



# Major Upcoming Projects

## ■ Filters

- Six new filters provide 38 MGD treatment capacity
- Cost estimate: \$50.6M
- Bid this summer
- Construction in FY22 – FY24

## ■ Century II pipe replacement

- Complete galvanized by FY24
- Increased data drives cast iron and cement pipe replacement
- \$4M FY22 - \$76M LRP

Process	Cost Estimate	Timeframe
High Service Main	\$2.2M	FY17 – FY18
Ph 1 EL upgrades	\$2.3M	FY17 – FY18
Generators	\$12.9M	FY19 – FY21
Filters	\$50.6M	FY22 – FY24
Raw Water Main	\$6.8M	FY24 – FY25
Ph 2 EL upgrades	\$3.2M	FY25 – FY26
High Service Pump Station and Clearwell	\$23.3M	FY26 – FY29
Source Water Resiliency	TBD	TBD

*Complete*

*Design Complete*

*Planning Phase*



# Industry Recognition for Water System

## ■ TDEC Inspection

- 2019 score was 99.8%
- Next inspection in 2021

## ■ Water Quality Lab

- Perfect scores on past 2 inspections (every 3 years)
- Certified for more tests than any other public water system in Tennessee



**KUB**



PRESENTATION TO  
Customer Advisory Panel

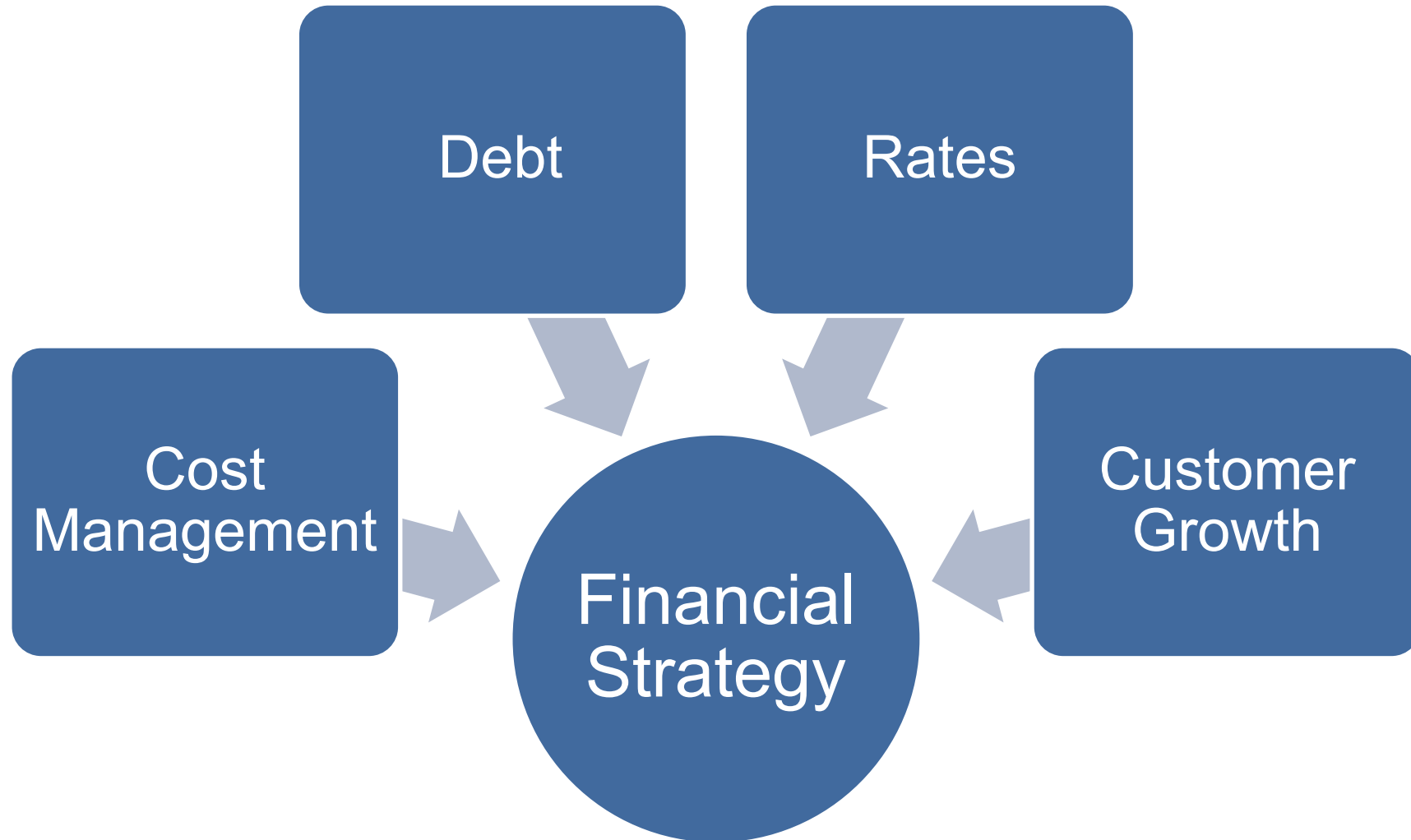


# Our Mission

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Our mission is to act as good stewards of our communities' resources: utility assets, customers dollars, and the environment. We work to safeguard those resources and enhance their value for the people of the communities we serve and generations to come.

# Our Financial Strategy Supports Our Mission

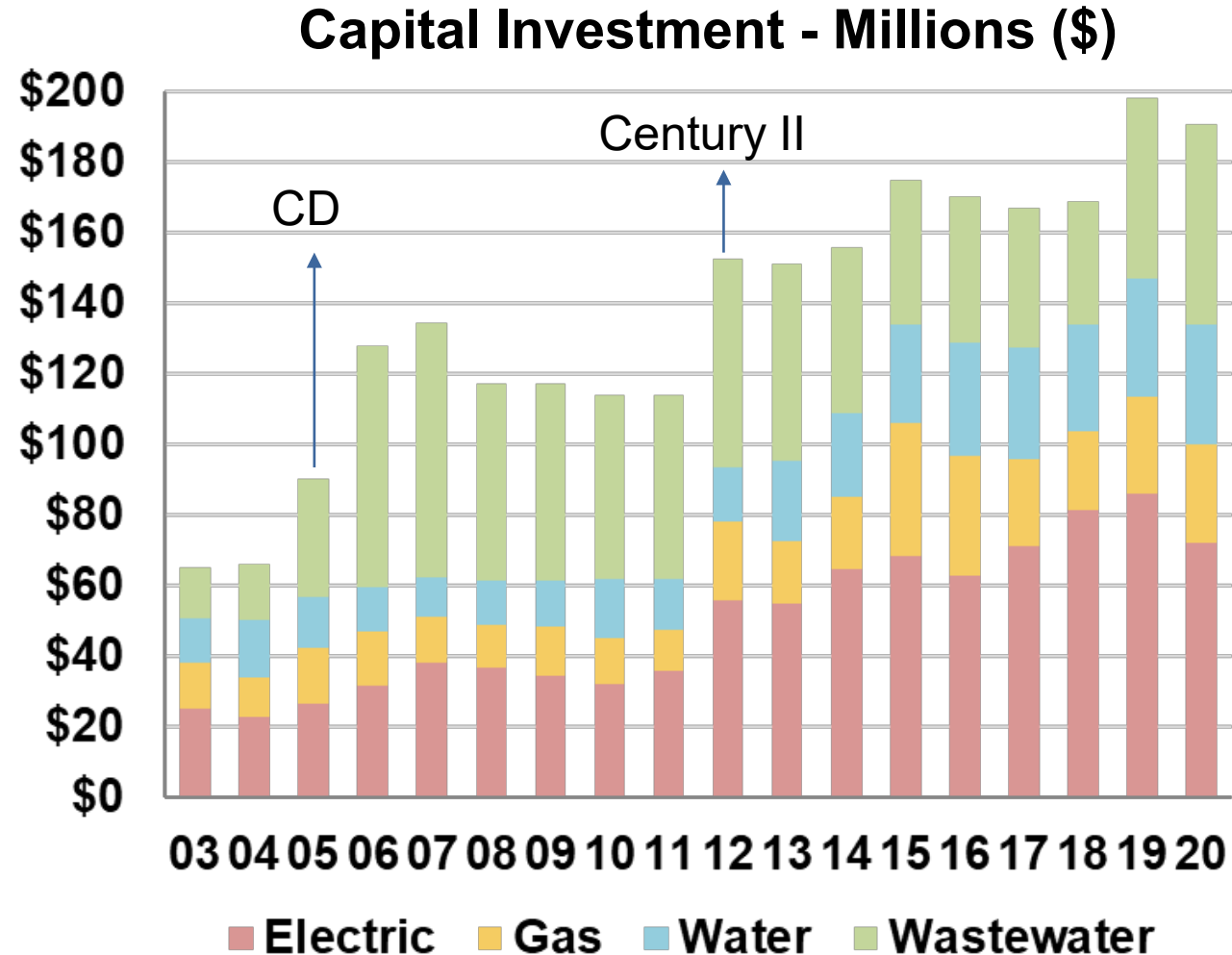


# Budgeting Approach & Background

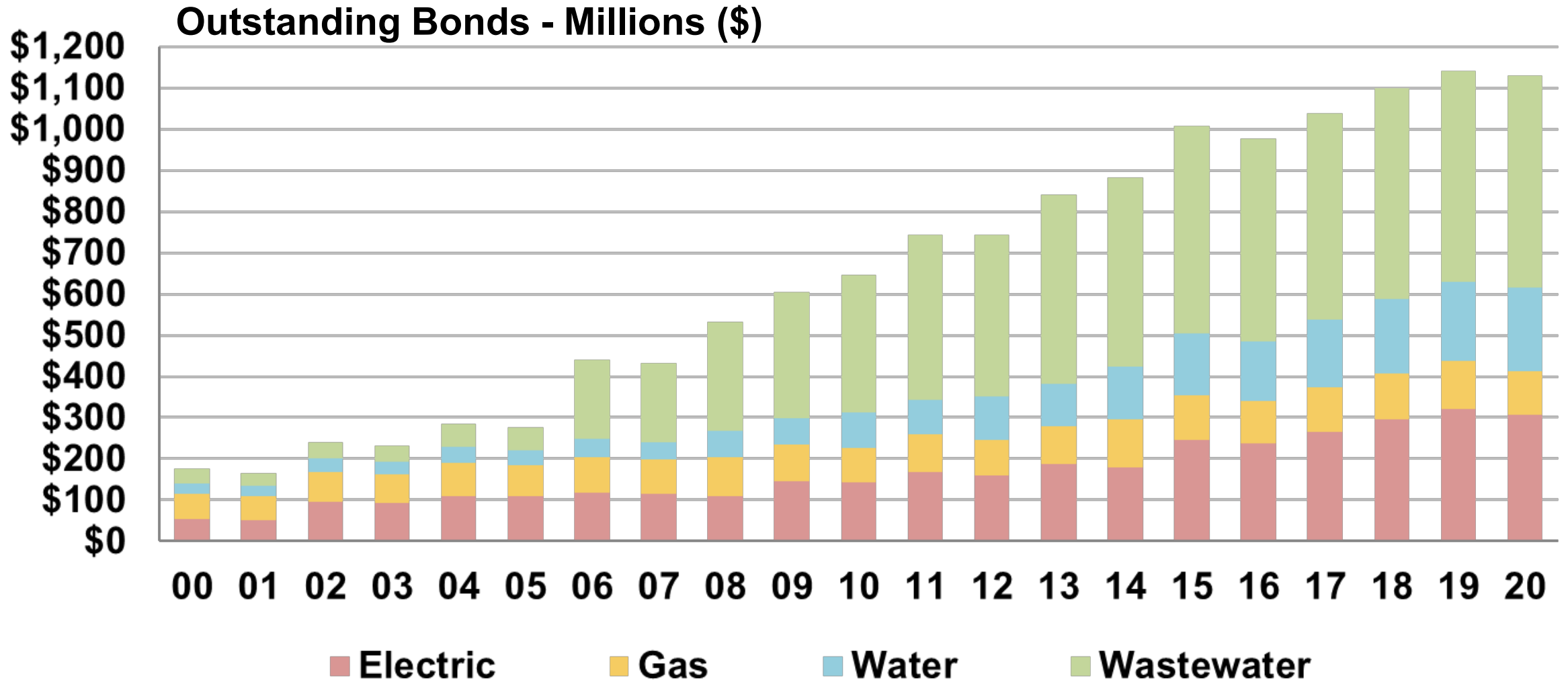
- Divisions are financially independent
- Balanced Approach
  - Maintenance and Replacement of Assets
  - Rates and Debt
- Consent Decree impacts
- Century II programs address aging infrastructure

# KUB's Capital Needs Increased with Consent Decree & Century II

- Wastewater capital spending accelerated in 2005 with Consent Decree
- Century II programs for electric, gas, and water fully implemented in FY 12



# Debt Levels Have Increased to Help Fund Capital Requirements





# High Quality Bond Ratings Reflect KUB's Financial Soundness

## Current Bond Ratings

	S&P	Moody's
Electric	AA	Aa2
Natural Gas	AA	Aa2
Water	AAA	Aa1
Wastewater	AA+	Aa2

“Based on S&P’s financial management assessment, **we view KUB to be ‘1’ on a scale of 1-6, with ‘1’ being the strongest.**”  
— Standard & Poor’s

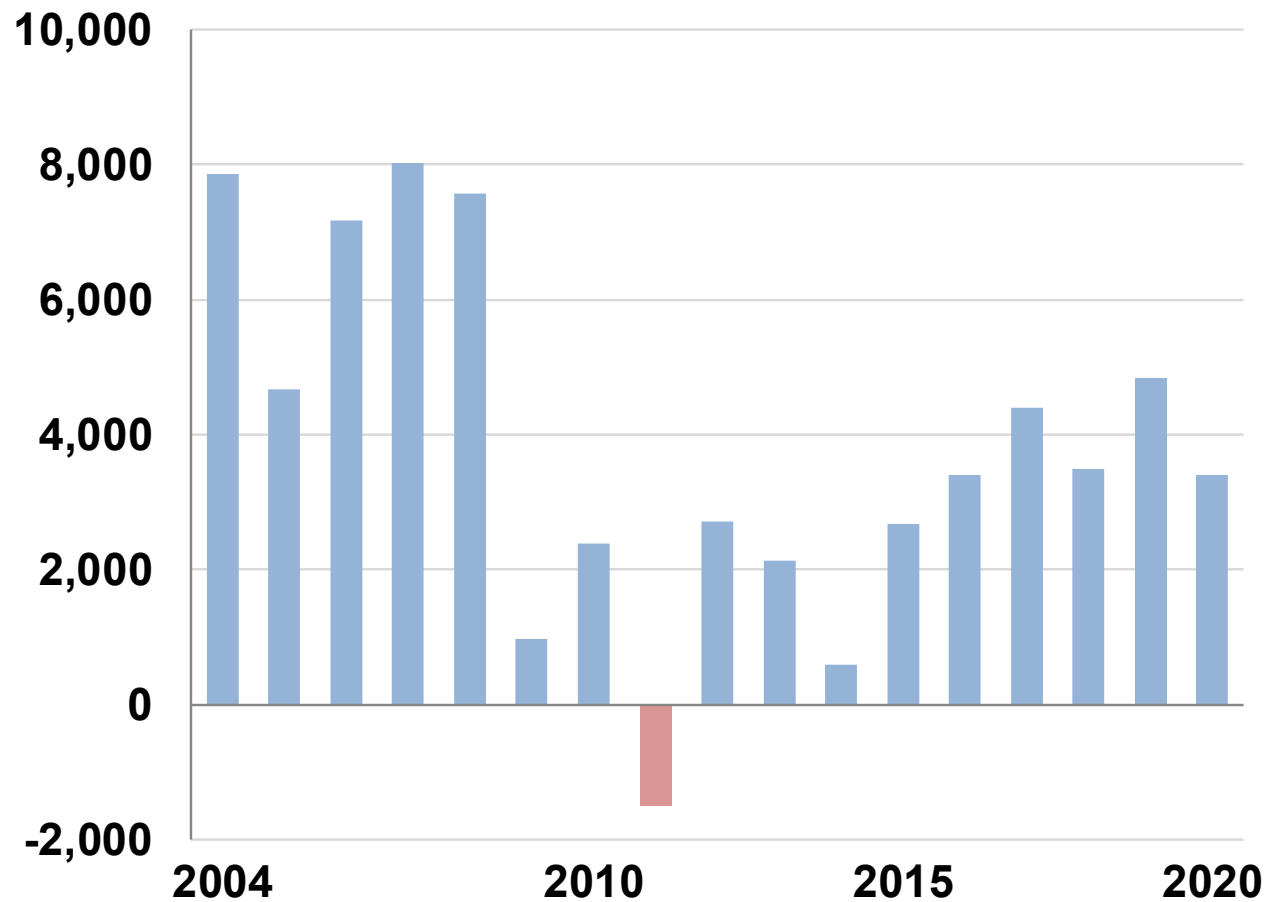
“KUB has a long-standing history of well-managed operations, sound fiscal planning, **and well-developed asset management plans.**”  
— Moody’s Investors Service

# **Rates Instrumental in Funding Consent Decree & Century II**

- Two large wastewater rate increases in 2005 and 2007, with smaller increases every other year through 2012
- Small, annual rate increases beginning 2011 for electric and water; 2014 for gas and wastewater
- No rate increases in FY 21 – eliminated or deferred due to Pandemic

# Customer Growth Supports Finances

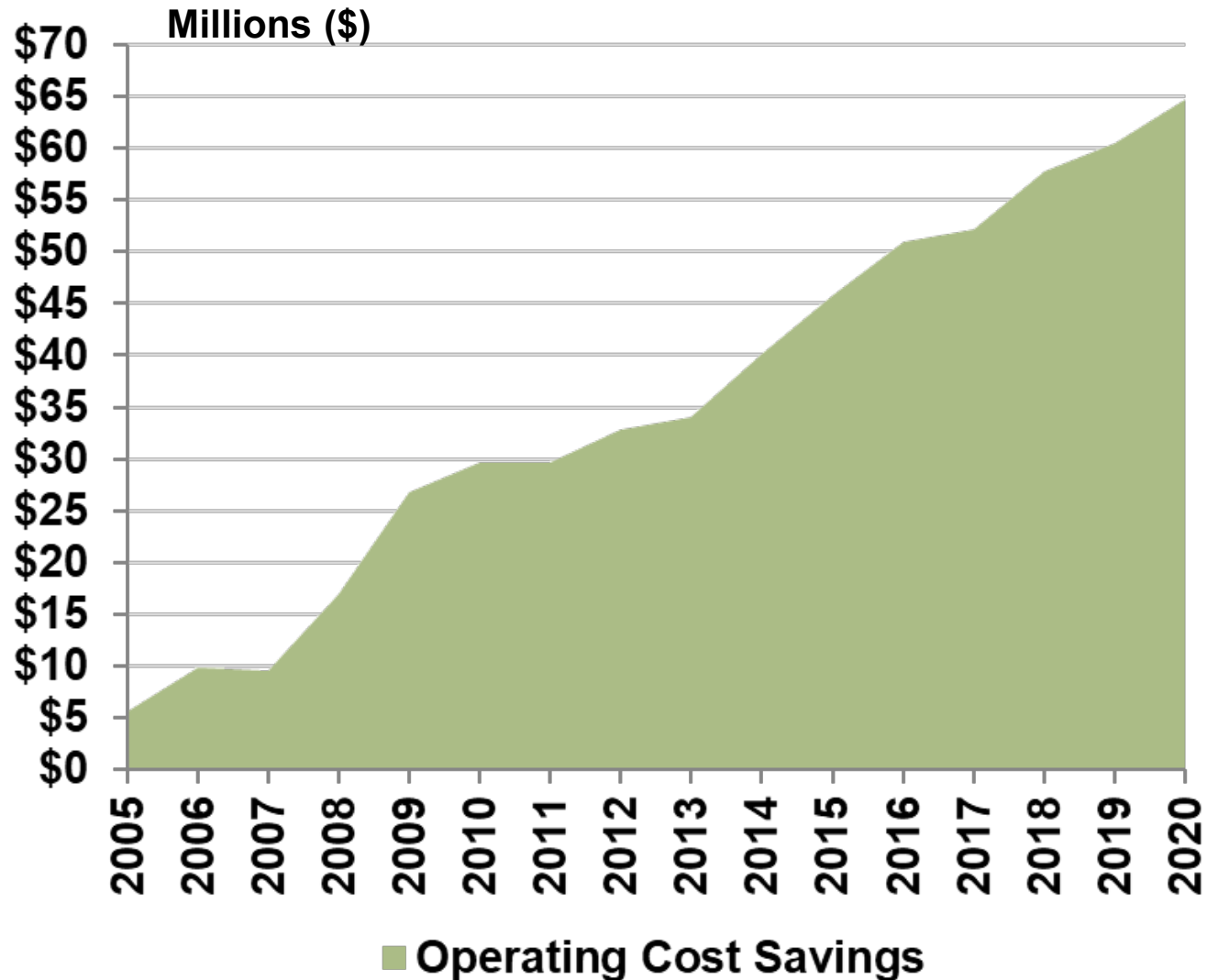
Annual Customer Additions



- 2019 highest level since 2008
- Steady during pandemic
- Business growth
  - Fresenius
  - Lifetime Products
  - Town of Dandridge
  - Carpenter Creek
  - Duracap Asphalt

# Focus on Cost Management

- \$65M saved since 2005
- Staffing savings
- Medical plan savings
- Operating efficiencies
  - Workforce mix
  - Improved processes
  - Technology
- Debt refinancing
- Project deferrals



# Proposed FY22 Budget: \$934M

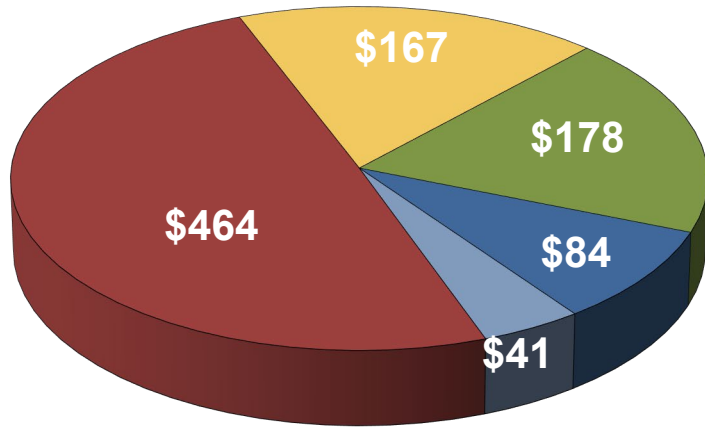
	<b>Electric</b>	<b>Gas</b>	<b>Water</b>	<b>Wastewater</b>	<b>Total</b>
<b>Energy Cost</b>	\$406.1	\$57.5	\$ ---	\$ ---	\$463.6
<b>O&amp;M</b>	\$70.3	\$24.1	\$32.6	\$40.1	\$167.1
<b>Capital</b>	\$73.2	\$30.1	\$26.9	\$47.5	\$177.7
<b>Debt Service</b>	\$24.9	\$10.9	\$14.3	\$34.1	\$84.2
<b>Taxes and Equivalents</b>	\$21.5	\$8.8	\$5.1	\$6.2	\$41.6
	<b>\$596.0</b>	<b>\$131.4</b>	<b>\$78.9</b>	<b>\$127.9</b>	<b>\$934.2</b>

# Major Expenditures

	O&M	Capital
Vegetation Management	\$11.9M	
Utilities	\$8.8M	
MBW Water Plant Filter Project		\$10.7M
Jones Street WW Pump Station		\$9.7M
Kuwahee WW Plant Clarifiers		\$4.7M

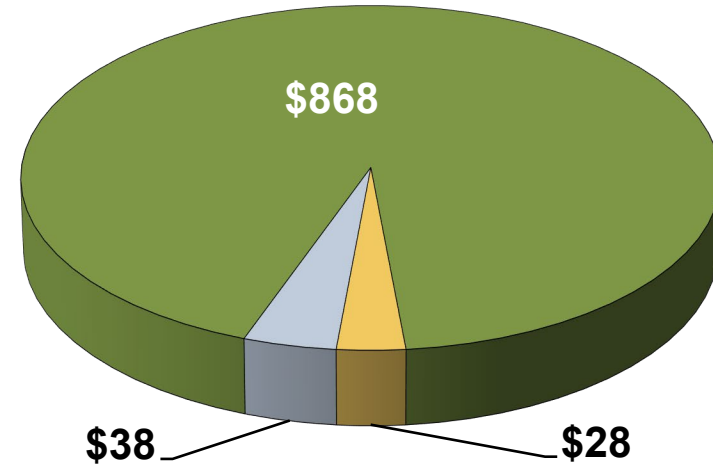
# Funding FY 22 Budget

**Budget = \$934M**



- Wholesale Energy = 50%
- O&M = 18%
- Capital = 19%
- Debt Service = 9%
- Taxes and Equivalents = 4%

**Funding = \$934M**



- System Revenues = 93%
- Bonds = 3%
- Cash on Hand = 4%

# Pandemic Rate Response

Rate Increase s*	FY21		FY22	
	Planned	Actual	Planned	Proposed
Electric	0%	0%	0%	0%
Natural Gas	0%	0%	0%	0%
Water	5%	0%	5%	2%
Wastewater	2.25%	0%	2.25%	0%

\* As projected to KUB's Board fall 2019



# Water Rate Increase Supports Resiliency

- 2% rate increase effective summer 2021
- Approximately 65 cents on residential bill based on usage
- Supports Century II and Water Resiliency projects suspended in pandemic
- No water rate increases since summer 2019

# Water Residential Bill Comparison

