

# **The Importance of Asset Management: Optimization for Sustainable Clean Water Utilities**

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# Twin Challenges Facing Clean Water Utilities

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- Main Purpose – Provide clean, safe water to protect the public health and the environment
- But must also do so at minimum cost to rate payers

Thus, utilities must always seek the best balance between optimizing performance and minimizing cost.



# Increasing Challenges for Utilities

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- Environmental
  - Increasing population
  - Climate Change
- Economic
  - Aging infrastructure + increased economic pressures → larger gap between needs & resources
- Demographic
  - Aging workforce → potential loss of institutional knowledge



# Thus, Utility Managers must:

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- Improve environmental performance
- Replace aging capital
- Arrange for succession planning
- All, while keeping rates as low as possible!



# Solution → Increased Efficiency

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- The utility manager must accomplish “more” with “less”
- The public utility must adopt the private sector focus on efficiency and harness it to the public good, by optimizing operations & asset management



# Camden County Municipal Utilities Authority (CCMUA)

- Services 500,000 customers in Southern New Jersey
- Design Flow: 80 MGD
- Average Flow: 58 MGD
- Secondary, pure oxygen activated sludge treatment
- Discharges to Delaware River



# Goals

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**CCMUA has four fundamental goals that are critical to its success:**

- Optimization of Water Quality Performance
- Optimization of Air Quality Performance
- Cost Minimization
- Contribute to Long-Term Sustainability  
(infrastructure and environment)



# Initial Conditions

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- CCMUA obliged to raise rates by 22½%, from \$275 per household to \$337
- Numerous odor complaints from neighboring residents
- Plant struggling to meet state discharge limits, despite receiving only 70% of rated capacity



# Corrective Action Plan

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- Implemented Environmental Management System (EMS)
  - Optimize internal efficiency
  - Improve environmental performance
  - Develop asset management plan to identify critical capital needs
- Utilized NJ Environmental Infrastructure Trust Financing Program to implement capital improvements to treatment plant and sewer facilities



# Capital Improvements Funded Thru NJEIT

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- Upgrade of Wastewater Treatment Plant - \$170M
  - Upgrades to regional sewer system- \$130M
- \$300M



# Environmental Benefits

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- Effluent Quality Improved by 40-50%
  - 22ppm TSS in 1999 to 5ppm in 2014
  - 25ppm BOD in 1999 to 2ppm in 2014
- Sludge Removed Improved by 45%
  - 11,000 dry tons removed in 1999 to 16,000 dry tons in 2014
- Odor Violations down from 16 in 1997/98 to 4 from April 1998 to December 2014



# Economic Benefits

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- Reduced O&M Costs by 25% within three years
- Annual Savings of \$5,000,000 per year
- \$75,000,000 saved since 1999
- In 1996, CCMUA's annual rate was \$337/household; In 2014, the rate was \$342/household representing a 45% reduction in rates compared to the inflation rate total. Ratepayer savings - approx \$430,000,000



# Other Benefits

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- Reduced Risk of:
  - Adverse impact to environment and public health
  - Fines from regulatory agencies
  - Public complaints or lawsuits
- Improved relations with Regulatory Agencies & Neighbors
- Creation of Positive Environmental Culture
- Capture of Institutional Knowledge



# Sustaining Infrastructure, Environment and Rates

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- CCMUA has replaced and upgraded the major process units of its treatment plant through the NJEIT
- Replacing under performing process units results in improved operational performance and reduced O & M costs
- Rate increase avoided by
  - Choosing projects for which operating cost savings exceed marginal debt service
  - Benefitting from lower cost state revolving funds which significantly reduce debt service requirements



# Vital Importance of SRF

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- Capital project of \$20M; Annual O&M Savings- \$2 million
- Funding through SRF- \$1.5M in annual debt service  
-net annual savings of \$0.5M
- Conventional Funding- \$3.25M in annual debt service  
-net annual deficit of \$0.75M
- SRF Financing is often the **difference between a “go” or “no go” for important environmental initiatives**



# Camden's Five-Pronged Plan for Its Combined Sewer System

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- **Green Infrastructure-** *capturing stormwater reduces the volume of flow in the sewer system*
- **Water Conservation-** *using less water also reduces the volume of flow in the sewer system*
- **Infiltration/Inflow Removal-** *eliminating extraneous rainwater and groundwater reduces the volume of flow in the sewer system*
- **Optimization of Combined Sewer System Operations-** *maximizes sewer storage capacity*
- **Capital Improvements to Combined System**



# Conclusion

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- Clean water utilities face very significant challenges, especially aging infrastructure and climate change
- Optimizing efficiency and asset management are key cornerstones for the clean water utility of the future's ability to meet these challenges
- Utilization of the NJEIT's low cost loans were critical to the CCMUA's ability to upgrade its capital, improve its environmental performance while reducing the cost to its ratepayers



# Thanks for Listening!

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