



Smart Management for
Small Water Systems

Financial Management for Small Drinking Water Systems Workshop

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Tulsa, OK
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UNC
ENVIRONMENTAL
FINANCE CENTER

This program is made possible under a
cooperative agreement with EPA.



Long Term Capital Planning



Uh oh! How Do You Pay for This?



Emergency
repair

vs.

Preventative
rehab./
replacement
(capital
planning)



Session Objectives

- Learn about two aspects of long-term system planning: asset management and capital planning
- Figure out how to pay for the future needs



In the Old Days...

- Water systems took advantage of the federal government's ambitious construction grants program of the 1970s and 1980s
- Everybody loved their “free” money



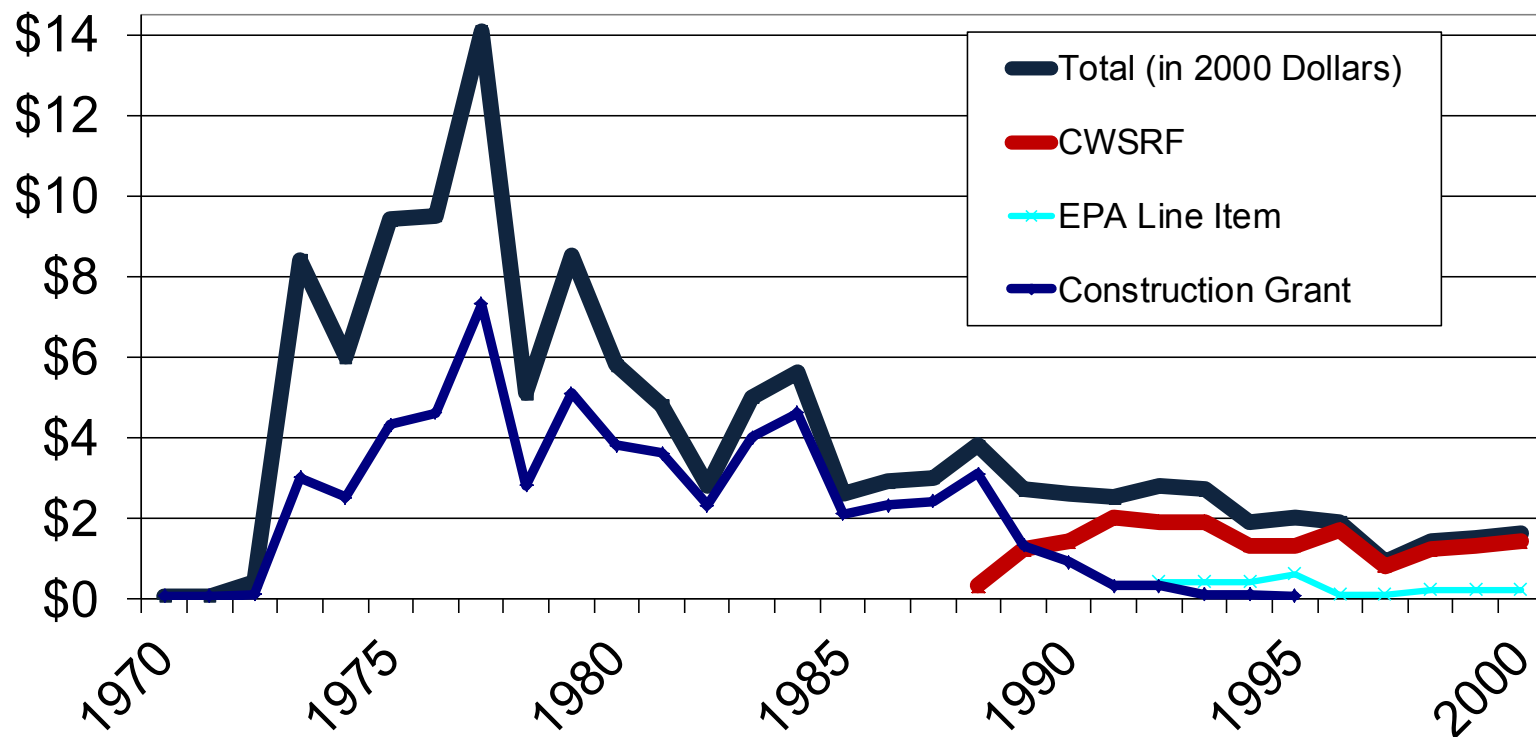
Capital Finance Today

- The money never really was “free” — it came from tax dollars
- Today, the financial burden has been shifted away from federal and state tax dollars (grants) to funds raised by the water system itself (customer sales and loans). For example...



Grants Have Been Replaced by Loans

EPA Wastewater Spending by Type (billions of dollars)



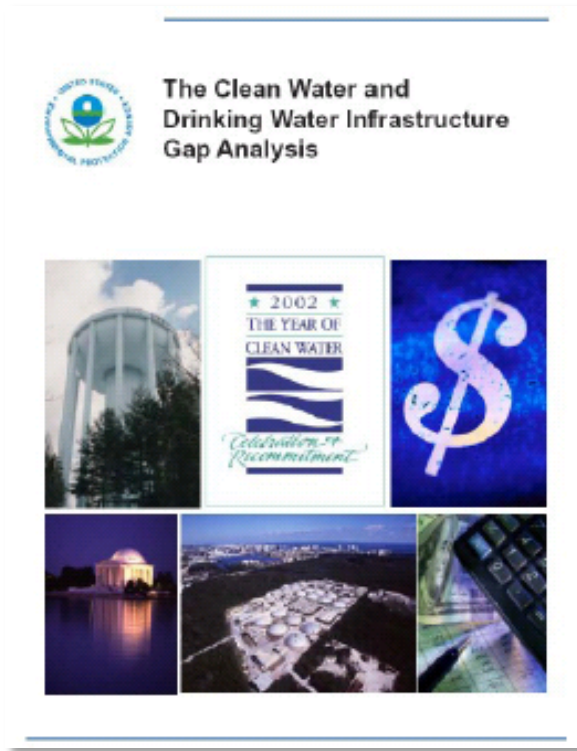


Capital Finance Today

- In other words, you pay
- The harsh reality is that water and wastewater infrastructure is expensive, regardless of the size of your system. Smaller or poorer systems will likely have a hard time paying for capital improvements



Nationwide, We Are Behind Where We Should Be

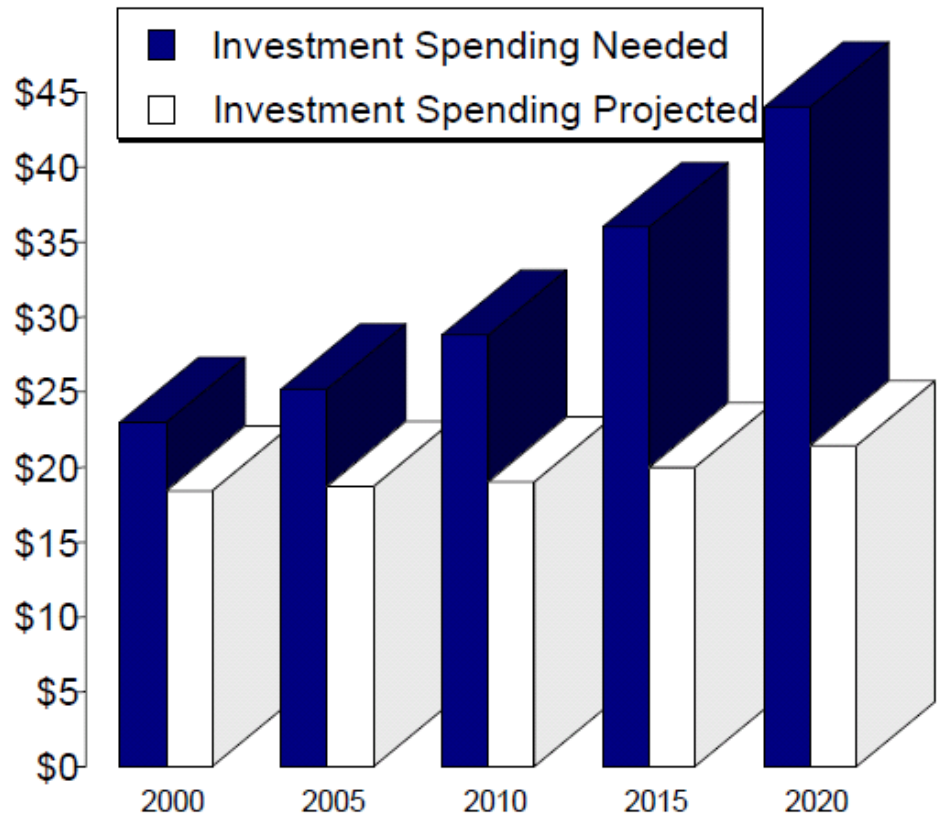


EPA Report on “Infrastructure Gap”:

<http://www.epa.gov/ogwdw/gapreport.pdf>



And That Gap Is Growing Every Year



EPA's projected spending gap through 2020



Poor Investment → Poor Infrastructure

2013 REPORT CARD for america's INFRASTRUCTURE

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

LAUNCH THE REPORT CARD > HOME GRADES STATES NEWS TAKE ACTION

EXPLORE ASCE'S 2013 REPORT CARD FOR AMERICA'S INFRASTRUCTURE ONLINE!

- > GRADES
- > STATE
- > VIDEOS
- > INTERACTIVE CHARTS

LAUNCH THE REPORT CARD >

AMERICA'S GPA: D⁺

The American Society of Civil Engineers is committed to protecting the health, safety, and welfare of the public, and as such, is equally committed to improving the nation's public infrastructure. To achieve that goal, the Report Card depicts the condition and performance of the nation's infrastructure in the familiar form of a school report card—assigning letter grades that are based on physical condition and needed investments for improvement.

ESTIMATED INVESTMENT NEEDED BY 2020:

\$3.6 TRILLION

REPORT CARD

Aviation **D**

Bridges **C+**

Dams **D**

Drinking Water D

Energy **D+**

Hazardous Waste **D**

Inland Waterways **D-**

Levees **D-**

Ports **C**

Public Parks **C-**

Rail **C+**

Roads **D**

Schools **D**

Solid Waste **B-**

Transit **D**

Wastewater D



ASCE Gives Drinking Water a D

- Bad news: ... much of our drinking water infrastructure is nearing the end of its useful life. ... estimated 240,000 water main breaks per year in the US. Assuming every pipe would need to be replaced, the cost ... could reach more than \$1 trillion, according to AWWA.



ASCE Gives Drinking Water a D

- Good news: The quality of drinking water in the United States remains universally high. Even though pipes and mains are frequently more than 100 years old and in need of replacement, outbreaks of disease attributable to drinking water are rare. (ASCE)



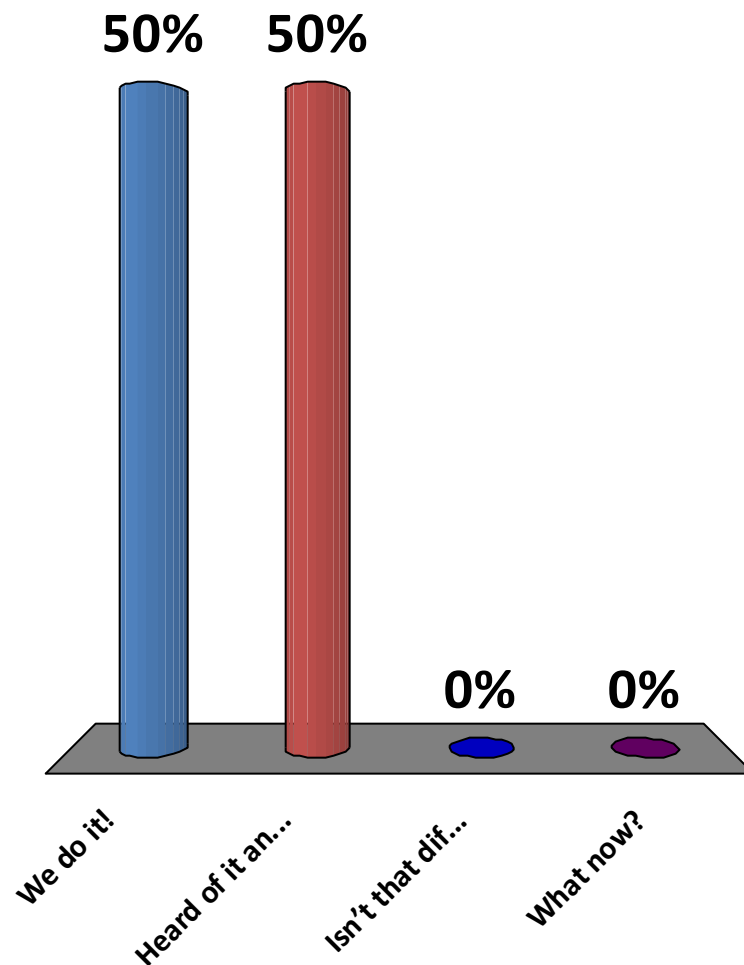
Two Related Concepts:

Asset Management & Capital Planning



Asset Management

1. We do it!
2. Heard of it and might be interested
3. Isn't that difficult software stuff?
4. What now?







Working **smarter** *not harder* is the essence of Effective Management / Asset Management



Mike Daly, White Cliffs, NM **Video Profile**



Asset Management
Helps You Have the
Most Impact in Your
System By Spending
Your Limited Dollars in
the Best Way Possible



What you want to do....

Replace all
the assets

New tank
New pipe
New pump
New filter





\$5 Million

Elected Officials/
Decision-Makers Say No





Second Choice: \$3 M

Replace

Some of the

Assets

Elected Officials/
Decision-Makers Still Say No

W Pump



Now What?

Repair and
Rehabilitate





Rehab Option: \$1 M

Rehab
Assets



Reduced
risk almost
as low as
new assets
for 1/5 the
cost



What does this type of analysis take?

- Nothing more than following a systematic approach for managing the assets
- 5 core components of Asset Management



Five Core Components of AM



Current State of the Assets



Level of Service



Criticality



Life Cycle Costing

Long-Term Funding





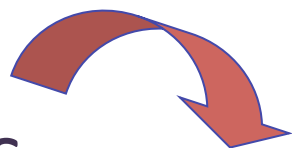
Current State of the Assets

- What do I own?
- Where are the assets?
- What condition are they in?
- How much useful life is remaining?
- What is the replacement value?



Level of Service

Involve
Customers



Measurable
Goals: Internal
and External



Track Progress
Towards
Meeting Goals

Involve
Staff



What would my customers
want?

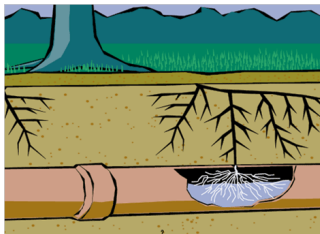


Asset Criticality

What is the probability or likelihood that a given asset will fail?

How do my assets fail?

What's the condition of my assets?





Asset Criticality

What is the consequence if the asset does fail?

What is the cost of the repair?

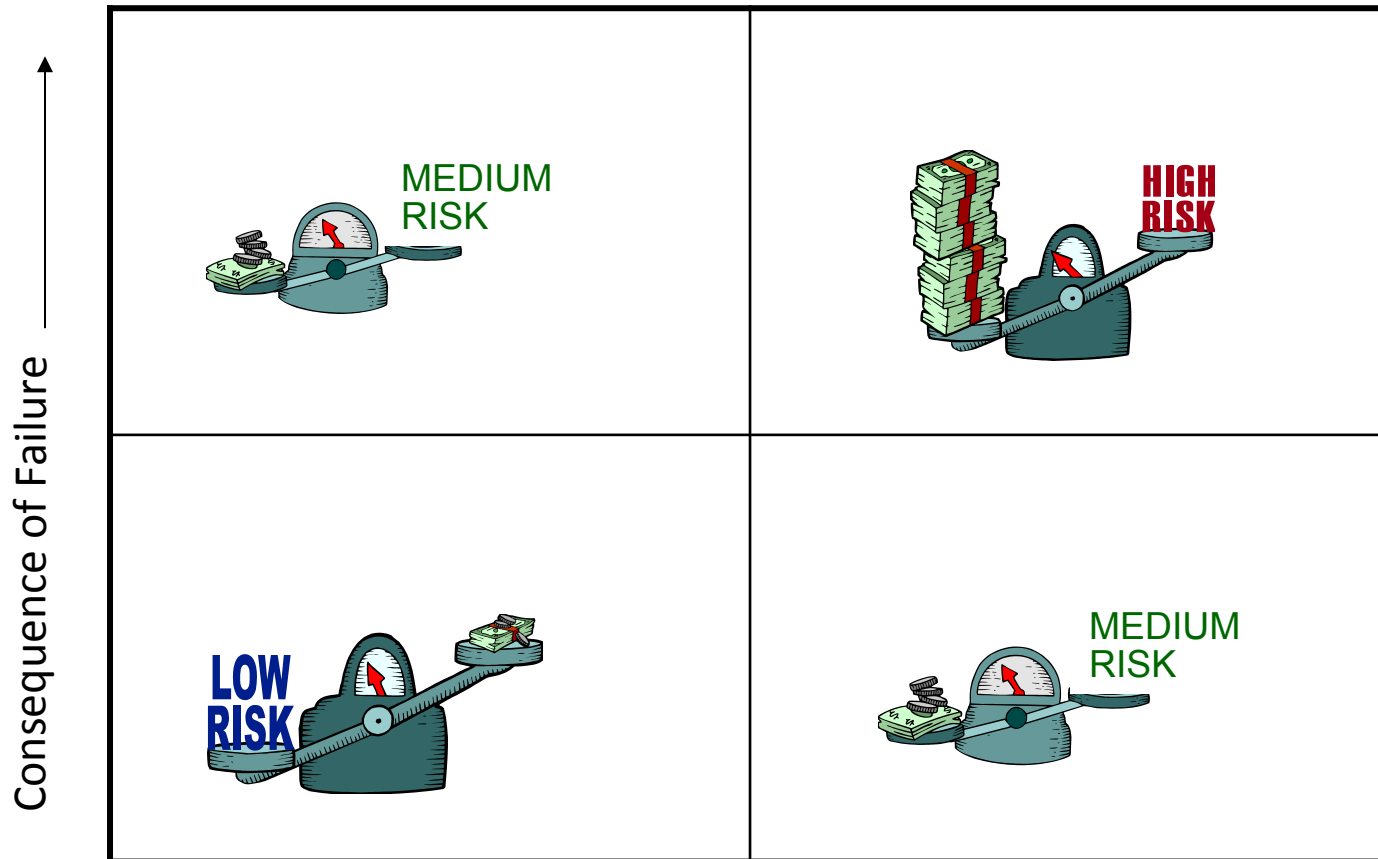
Are there legal consequences,
environmental consequences,
social consequences?

Are there redundant assets?





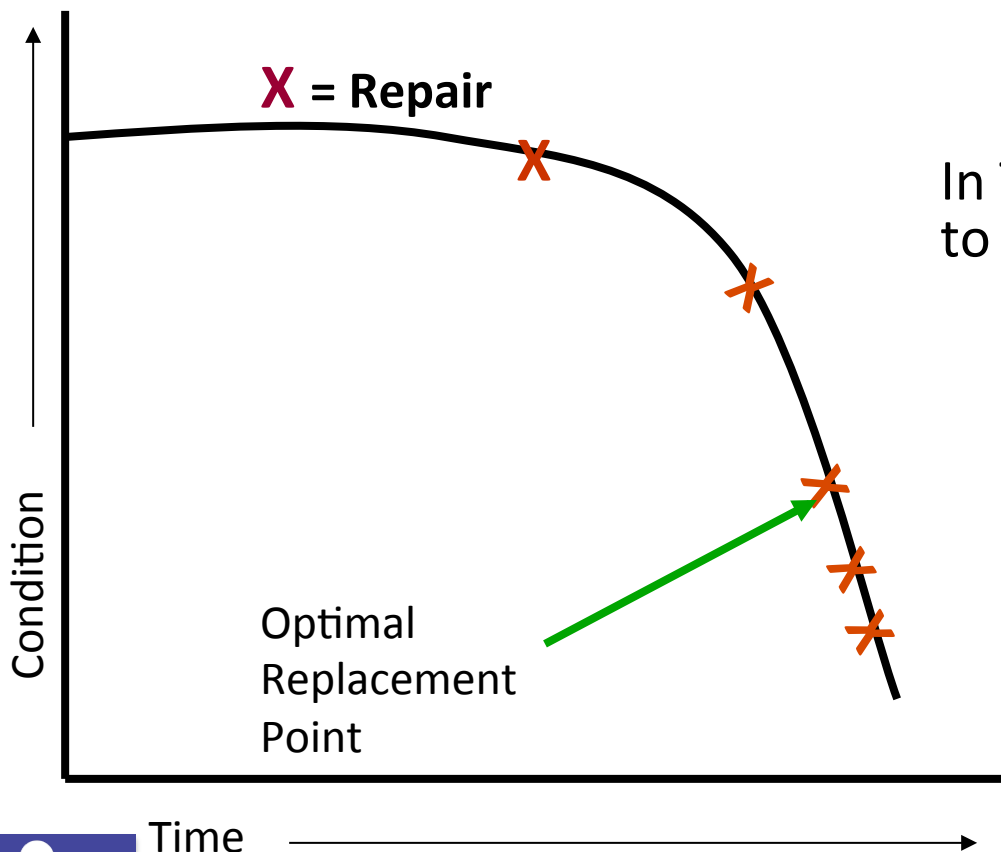
Asset Criticality



Which category of assets do I care the most about? The least?



Life Cycle Costing: Replacement of Assets



In Theory, there is an exact right time to replace an asset

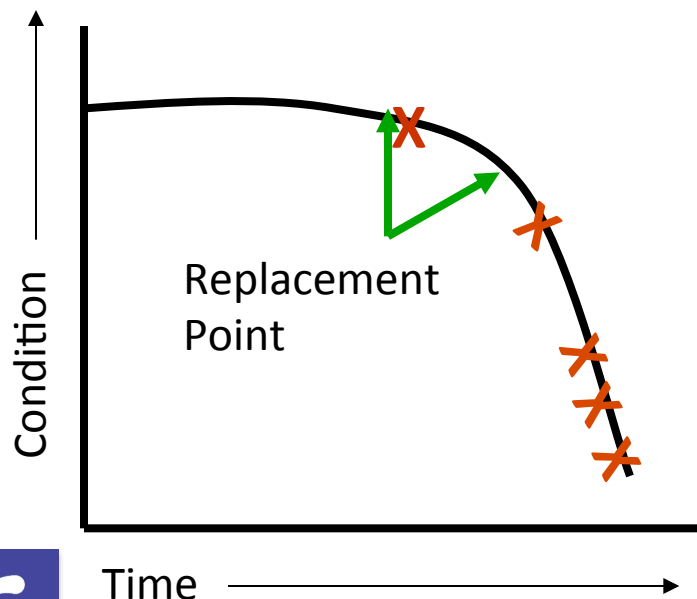
Not possible to know the optimal time to replace every asset

So... need to use the concept of risk

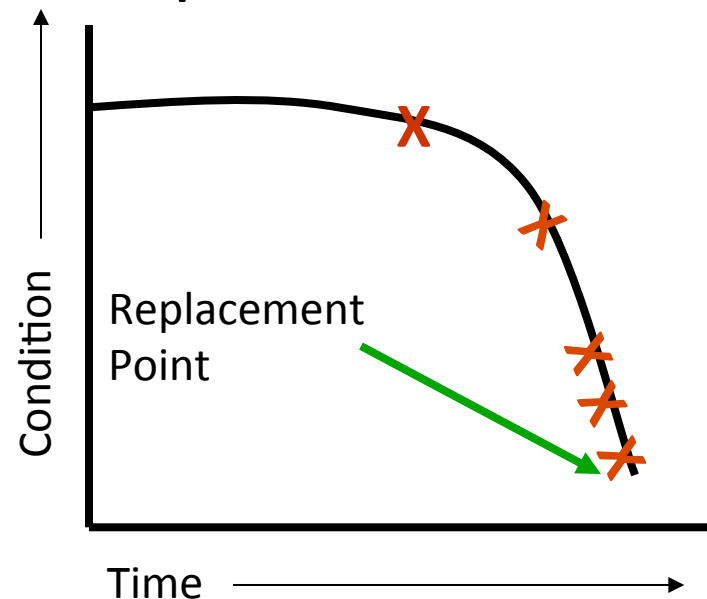


Life Cycle Costing & Risk

High risk : replace assets early, before failure



Low risk assets: run to failure and replace afterwards





Long Term Funding

- This is where capital planning comes in
- Once you figure out how to get the longest life out of your assets, plan to have the money you need to replace them when necessary



Comments from a Few Practitioners



Jim Smith, City of Louisville, KY

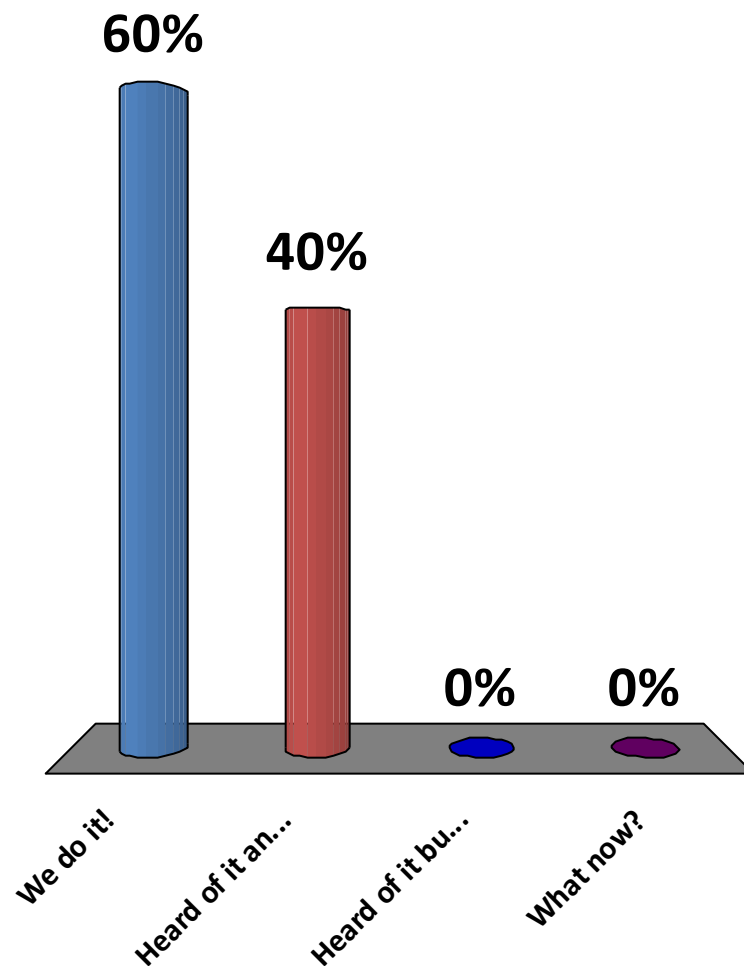


Shawn McLean, City of Somersworth, NH



Capital Planning

1. We do it!
2. Heard of it and might implement
3. Heard of it but not interested so far
4. What now?





Long Term Capital Planning

- This is strongly related to asset management
- An official multi-year document that identifies and prioritizes capital projects, identifies funding sources, and sets timelines



Capital Improvement Program

- Identify regulatory deficiencies (discuss with regulatory agencies, look at proposed regulations, talk to consultants), in a 10-20 year window
- Identify growth needs, expansion



Capital Improvement Program

- Identify deferred maintenance problems or where current service is inadequate
- Prioritize based on need realizing that “hidden” infrastructure tends to be ignored



Capital Improvement Program - Timelines

- Use **Asset Management Plan** to plan for capital expenses in the long term (~20 years)



Capital Improvement Program - Timelines

- Create a **Capital Improvement Plan** with a narrower timeline (~5 years) in more detail. Specify the projects and accurate estimates of cost. Plan where money will come from.



Capital Improvement Program - Timelines

- Create a **Capital Improvement Budget** with an even narrower timeline (1 – 2 years) committing funds for the planned capital projects. Get it approved/adopted.



Example Capital Improvement Plan (CIP)

Project Name	Planning Years (Values in 000s)					Future	Total
	FY 02	FY 03	FY 04	FY 05	FY 06		
Water Supply & Treatment							
Water Treatment Objective							
Lime pumps and slakers	740						740
Chemical Enclosures		500					500
Filter 7-18 Control			330				330
Filter Gallery Rehab	1,140						1,140
High Service Pumps		1,500					1,500
Upgrade or Replace Reclaim System Drier	200						200
New Membrane Skids				5,700			5,700
Sodium Hypochlorite Plant	2,000						2,000
Additional Storage Tanks					5,000	3,300	8,300
Repair R/O Capacity		150					150
Filter Gallery Mech Parts	300						300
MMIS						150	150
VFDs - HSP		344					344
Membrane Replacement		1,600					1,600
Painting of Water Plant						3,000	3,000
Phase II Emergency Power Generator						1,500	1,500
Portable Generator - South Well Field				150			150
Replacement of Fuel Tanks			170				170
Upgrade of Existing Control System @ WTP						580	580
Water Treatment Total	4,380	4,094	500	5,850	5,000	8,530	28,354



Where Can You Find the Prices?

- Call a vendor. Actually, call a few.
- Ask other systems
- Look at past expenses but adjust for increases in costs

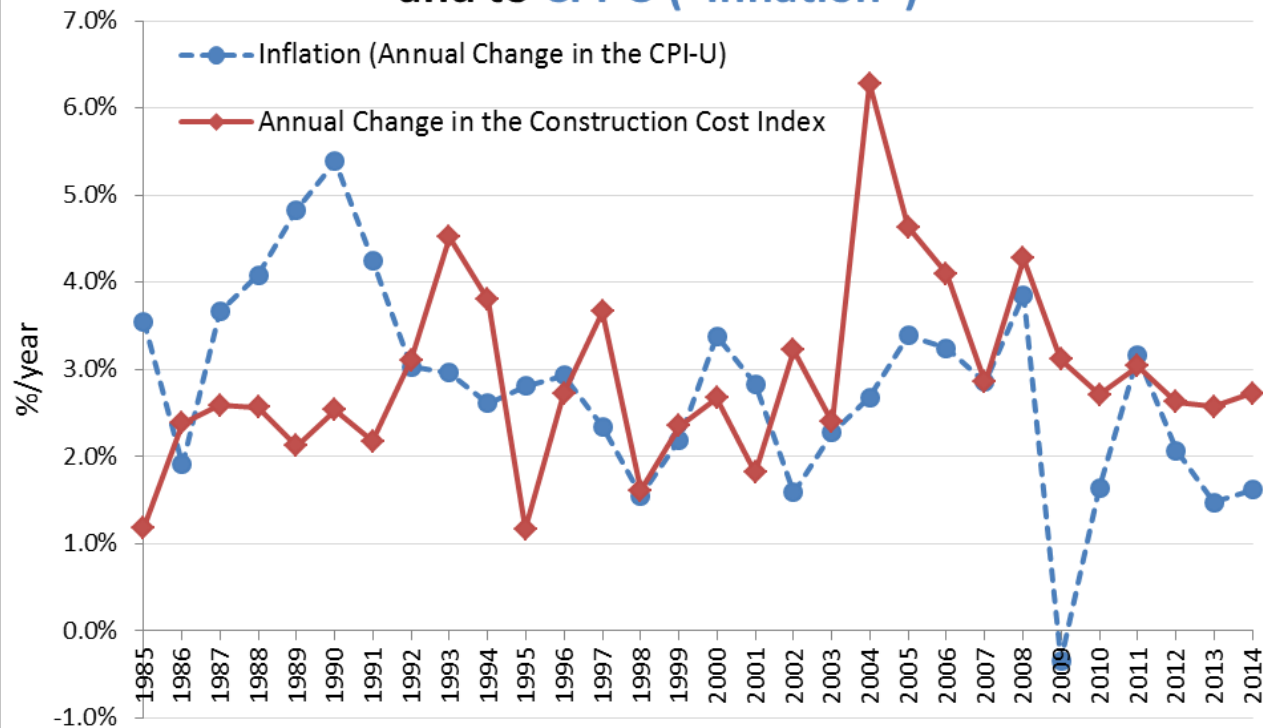


Measures of Inflation

- **Consumer Price Index (CPI)**—measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services
- **Construction Cost Index (CCI)**—average prices for labor and key construction materials from 20 cities across the United States



Annual Changes to the **Construction Cost Index** and to **CPI-U ("Inflation")**



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Data Sources: Bureau of Labor Statistics, Engineering News-Record ENR.com, InflationData.com, USDA Natural Resources Conservation Services.

<http://efc.web.unc.edu/2012/09/26/using-an-index-to-help-project-capital-costs-into-the-future/>



Drive Down the CIP Cost

- Is it possible to
 - Eliminate projects?
 - Defer projects?
 - Repair or refurbish instead of replace?
 - Find a non-asset solution?
 - Find collaboration/partnerships alternatives with neighboring systems?
 - Improve balance of cash vs. debt-financed?
- Re-evaluate water demands of your customers. Many systems are now noticing that *total* demand is *decreasing* over time.



The Debt Market

- Why Borrow?
- Water infrastructure has a long useful life. You may wish to amortize the loan over the life of the equipment so that the people who benefit from the system pay for it



When You Need Cash Now: The Debt Market

- Lenders will look at your creditworthiness, your ability to repay the debt, in determining whether to loan to you and your interest rate



The Debt Market

- Two types—Loans and Bonds
 - Loans are universally available
 - Bonds are typically only available to large systems with significant revenues and managerial capacity



Loans

- Typically from a bank
- Can be from a government-sponsored program such as the Drinking Water State Revolving Fund



Bonds

- A written promise to repay borrowed money (on a definite schedule and usually at a fixed rate of interest for the life of the bond)
- Different types exist:
 - General Obligation (GO)
 - Revenue



Source: bettermondays.com

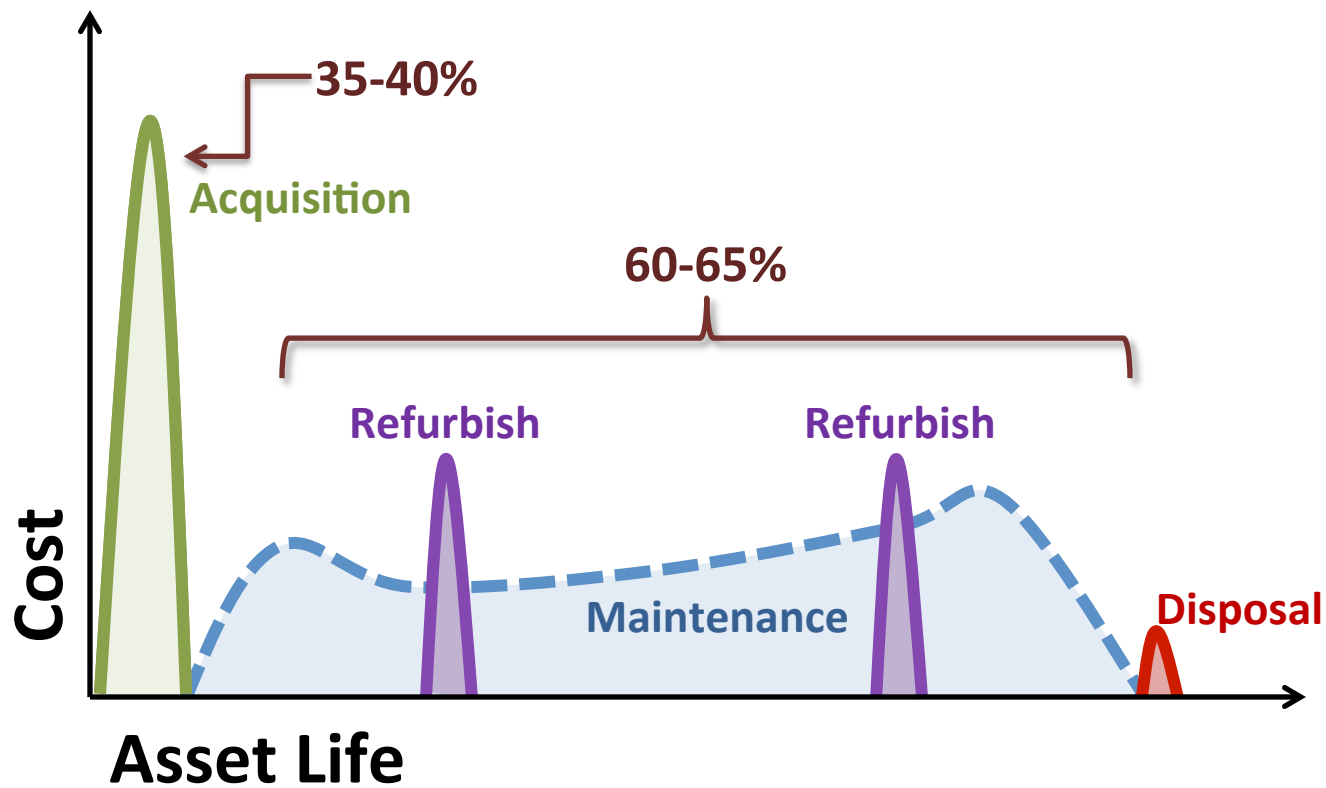


Reminder: Life Cycle Costing

- Purchase Price \neq Total Price



Capital Investments are Just the Tip of the Iceberg...



Source: Adapted from Steve Allbee, USEPA

Resource Webpage for Capital Planning

UNC SCHOOL of GOVERNMENT

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Mission Statement

We work to enhance the ability of governments and other organizations to provide environmental programs and services in fair, effective and financially sustainable ways.

Project Tools

User-friendly Capital Improvement Plan (CIP) Tool for Water & Wastewater Utilities



Calculator, 03/20/2014 (MS Excel, 802 Kb)

Enter in all capital projects and this tool will project your fund balance (revenues, expenses and reserves), and necessary rate increases for the next 20 years, and more!

What to Include in your Capital Plan:

PROJECT CAPITAL PLANNING AND WASTEWATER



This project, p
Support projec
Department of
together many
water and wast
creation of a C
Management P

Blog Post on "Using an Index to Future"

Read a short blog post on selecting an appropriate

Summary of

"What to Include in Your Capital Plan: A Reference Guide for NC Water and Wastewater Utilities"

Last updated: February 2011

Categories	EPA's Asset Management: A Handbook for Small Water Systems	Jack Vogel DOG Facility's Capital Budgeting and Finance Guide	DEHM PWS Capacity Development Program	DEHM PWS Loans and Grants	G.S. 1506-23	USDA Loans and Grants	NC Rural Economic Development Center	Local Government Development Center	EPA Drinking Water Needs Survey	DEHM DWR Local Water Supply Plans	EPA Software: CIPSS
Goal statement/Introduction to your capital plan	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
Date of documentation of capital plan	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Capital planning time period	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Description of systems			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Existing capacity and demand			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Description of customers			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Inventory of existing assets (details on each asset)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Condition of systems			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Project-specific details (complete for each project in every year)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Financial planning (complete for each year in time period)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
Long-term planning descriptions (may be not project-specific)			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Approvals		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
Updating the capital plan	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Ties or links to other studies	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		

For updates and to view details in each category, go to <http://www.efc.unc.edu/projects/capitalplanning.html>


Created by the Environmental Finance Center at the UNC School of Government

www.efcnetwork.org

EFC C.I.P. Tool

<http://efc.sog.unc.edu/>

Free, simplified CIP tool using only MS Excel (EFC @ UNC)

Tool developed by

UNC ENVIRONMENTAL FINANCE CENTER

User-friendly Capital Improvement Plan (CIP) for Water and Wastewater Utilities

Version 2.0 (Created September 2012)

20-year capital planning Debt and/or capital reserve financing options Guided data inputs Simple data needs
 Financial dashboard outputs Estimates necessary rate increases over time to pay for capital projects

Start

1) Use tabs at bottom of screen and buttons to navigate to different pages.

Next: Enter C.I.P. Projects View Fund Balance View Dashboard

2) In **"Data Input 1"**, enter utility characteristics, rates and usage information in blue cells.

3) In **"Data Input 2"**, enter details on capital improvement projects in the light blue cells. Each row is a different project.

4) In **"20-Year Projections"**, view your fund balance projections for 20 years and observe the estimated rate increases needed each year to pay for your Capital Improvement. No data entry required on this page.

5) After all your utility information and capital improvement project details are entered, go to the **"Dashboard"** to view long term trends in your financial reserves, rate increases and average bills, and capital investments.

INSTRUCTIONS

CAPITAL IMPROVEMENT PROJECTS - 20 YEARS

Project	Project Construction Start Year	Project Construction Period (Years)	Estimated Construction Cost (\$)	Annual Construction Cost Inflation Factor (%)	Estimated Cost in the Start Year	Cost of C
1. Project 1 - Immediate project, start now	FY15	1	1,000,000	2.0%	1,000,000	\$
2. Project 2 - Immediate project, start now	FY15	1	2,000,000	2.0%	2,000,000	\$
3. Project 3 - Immediate project, start now	FY15	1	3,000,000	2.0%	3,000,000	\$
4. Project 4 - Immediate project, start now	FY15	1	4,000,000	2.0%	4,000,000	\$

Water and Sewer Rates in FY15

Category	Rate (\$/1000 gallons)
Residential	\$ 5.67
Commercial	\$ 12.34
Industrial	\$ 15.67

Expected Revenues and Expenses in FY15

Category	Amount (\$)
Annual Operating and Non-Operating Revenues	5,000,000
Annual Non-Capital Expenditures (O&M, Admin, etc.)	4,500,000
Expected Annual Inflation of Expenditures (%)	2.7%

Estimated Rate Changes Needed to Maintain the Fund Balance

Category	FY15	FY16	FY17	FY18
1-Year Increase (Decrease) in Rates (Base and Volumetric)	N/A	0.0%	5.1%	2.6%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.00	\$1.51	\$0.79
Increase (Decrease) in the Monthly Base Charge	N/A	\$0.00	\$0.64	\$0.34
Monthly Base Charge ("Minimum Charge")	\$12.34	\$12.34	\$12.98	\$13.31
Volumetric Rate at 5,000 gallons/month (\$/1000 gallons)	\$5.67	\$5.67	\$5.96	\$6.11
Volume Included with the Base Charge (1,000's of gallons)	2	2	2	2
Approximate Monthly Charge for 5,000 gallons (\$)	\$29.35	\$29.35	\$30.94	\$31.60

Projected Fund Balance

Category	FY15	FY16	FY17	FY18
Total Revenues	\$ 5,000,000	\$ 5,000,000	\$ 5,238,347	\$ 5,354,405
Base Charges	\$ 1,776,960	\$ 1,795,322	\$ 1,907,268	\$ 1,976,733
Usage Charges	\$ 3,123,040	\$ 3,094,595	\$ 3,216,569	\$ 3,261,742
Interest Earned from Previous Year's Positive Balance	\$ 0	\$ 9,455	\$ 9,167	\$ 9,507
Revenues from Other Sources Besides Charges	\$ 103,200	\$ 104,266	\$ 106,344	\$ 108,433

Financial Reserves (End of Year)

Rate Increases

Total Capital Expenditures


Total Cumulative System Investment



Software: CUPSS (EPA)


<http://www.epa.gov/cupss/>








Check Up Program for Small Systems


Set-up | Switch Utility | Create User | Help | Training | Exit


 My Home

 My Inventory

 My O & M


 My Finances


 My Check up

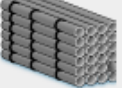
 My CUPSS Plan


Welcome Back Helen, Beauty View Acres Subdivision - DW


What would you like to do today?


[Do Some Training](#)


[Create or Update My Schematic](#)


[Create or Update My Inventory](#)

[Print My Check Up Reports](#)

[Enter a New Task or Work Order](#)

[Search Asset and Maintenance](#)

[Enter My Finances](#)

[Work on My CUPSS Plan](#)

My Calendar

April 2008

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10

My Messages and Alerts

Popup Messages Are Off. [Click To Turn On.](#)

Reminder - Today's Tasks	8
Tasks Currently Past Due	160
Assets Needing Update	0
Number of High Risk Assets	2