



Smart Management for
Small Water Systems

Navigating Water Infrastructure Funding Programs - Workshop for Small Water Systems

06/01/17| Phoenix, AZ

www.efcnetwork.org



UNC
ENVIRONMENTAL
FINANCE CENTER



American Water Works
Association

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



What is Asset Management?

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



**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
- *More on this after lunch ...*

Five Core Components of AM



Current State of the Assets



Level of Service



Criticality



Life Cycle Costing



Long-Term Funding



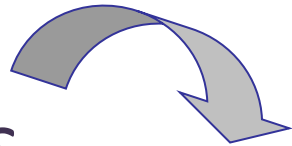
Current State of the Assets

- 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



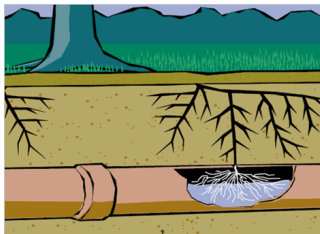
What would my customers want?

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?

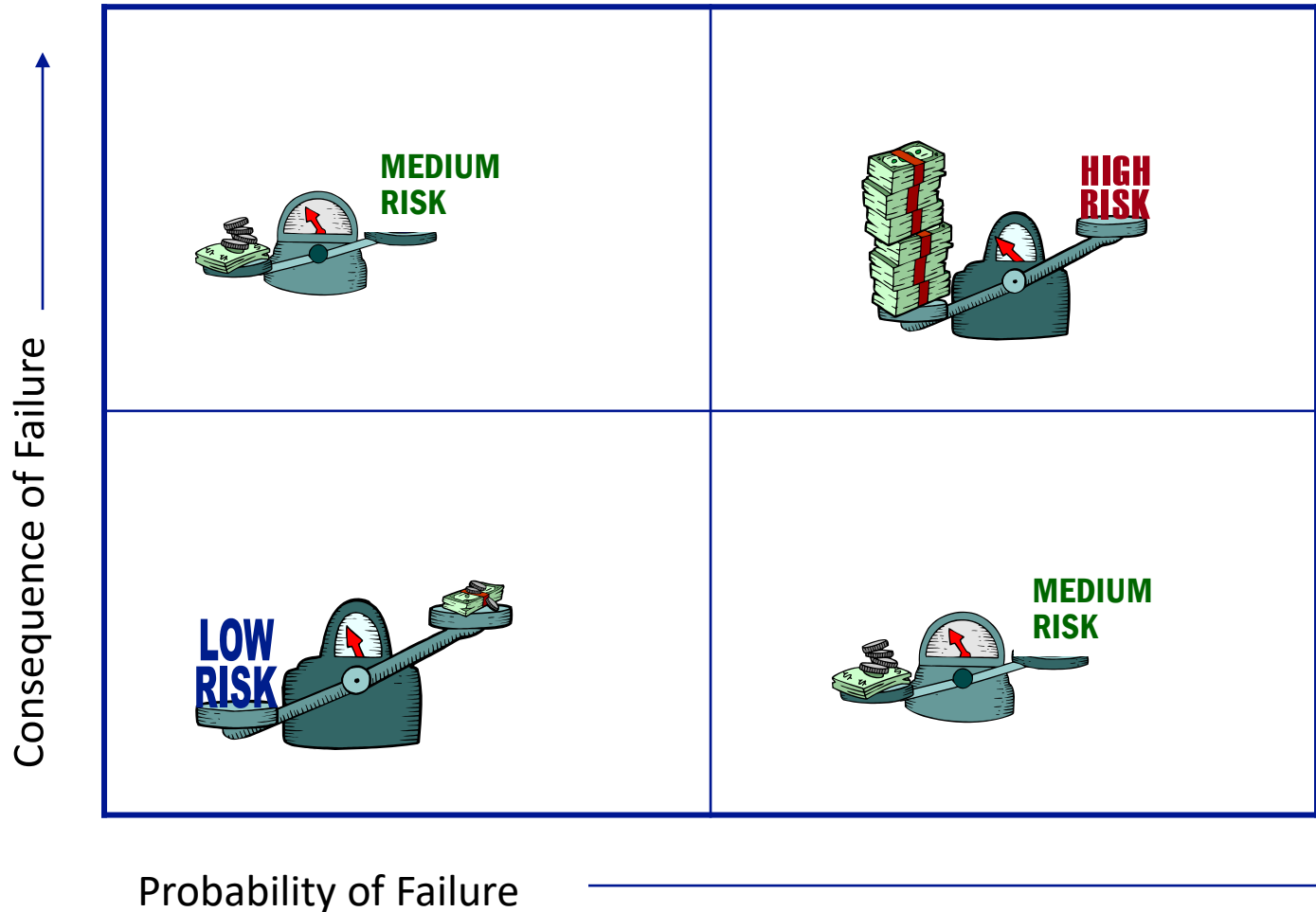
What is the cost of the repair?

Are there legal consequences,
environmental consequences,
social consequences?

Are there redundant assets?

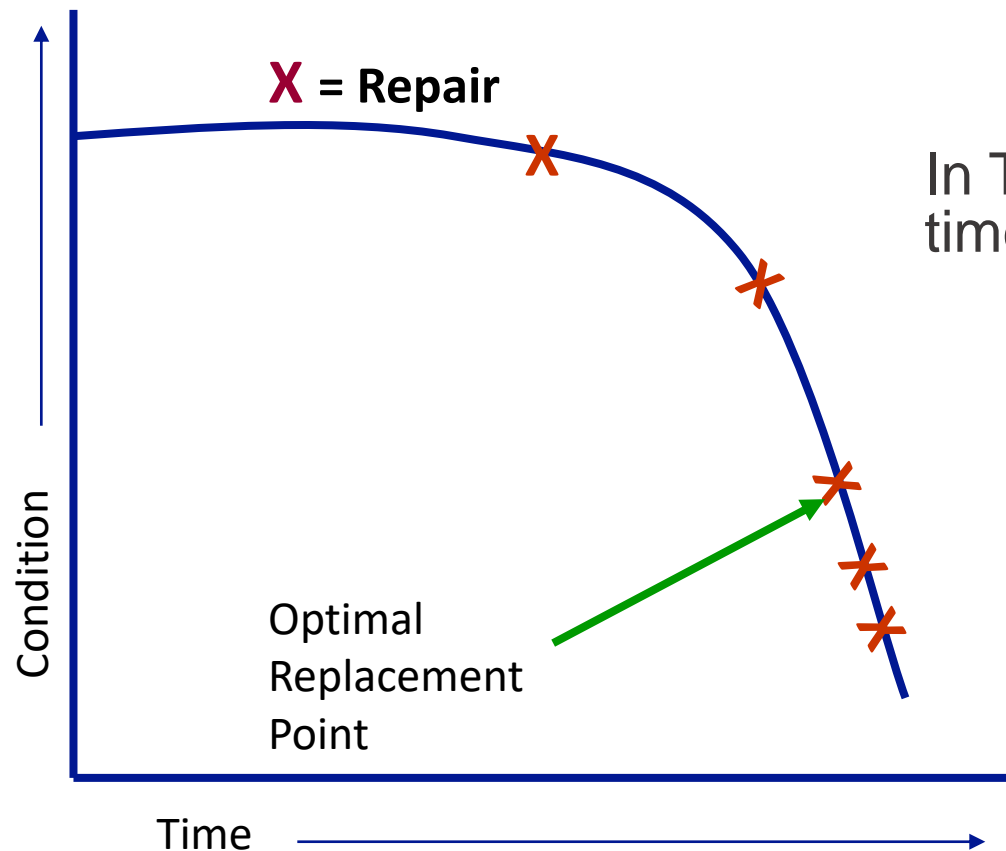


Asset Criticality



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

Life Cycle Costing: Replacement of Assets



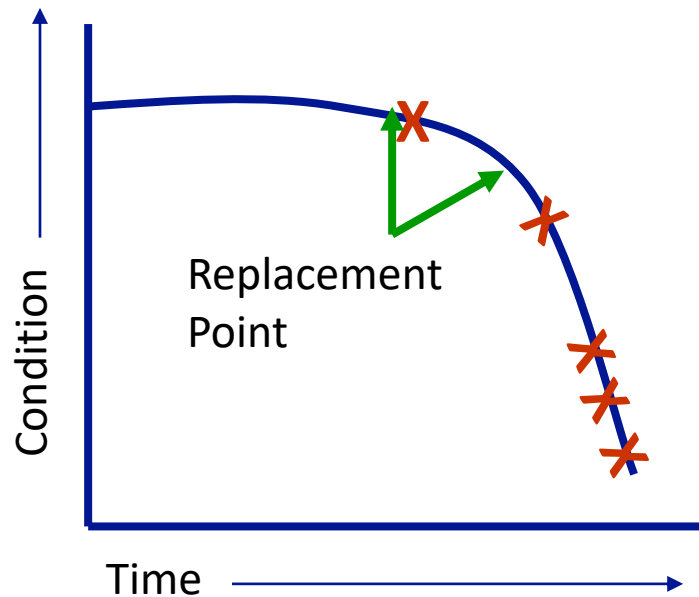
In Theory, there is an exact right time to replace an asset

Not possible to know the optimal time to replace every asset

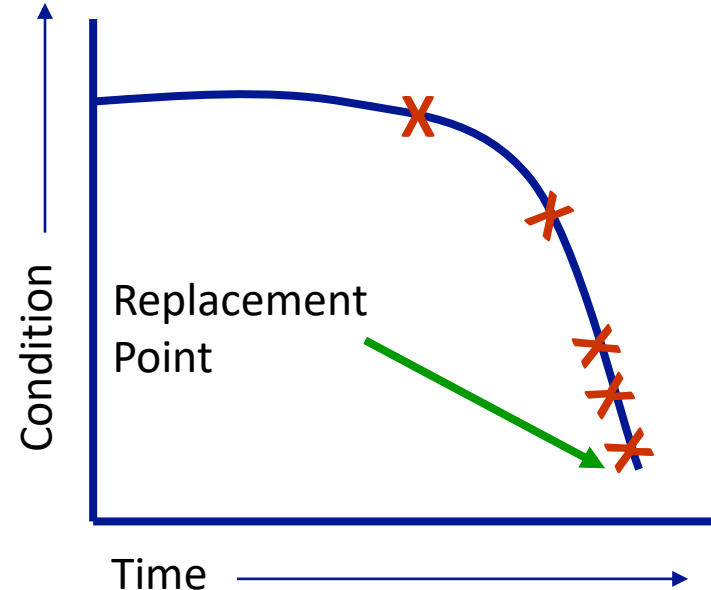
So... need to use the concept of risk

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



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?

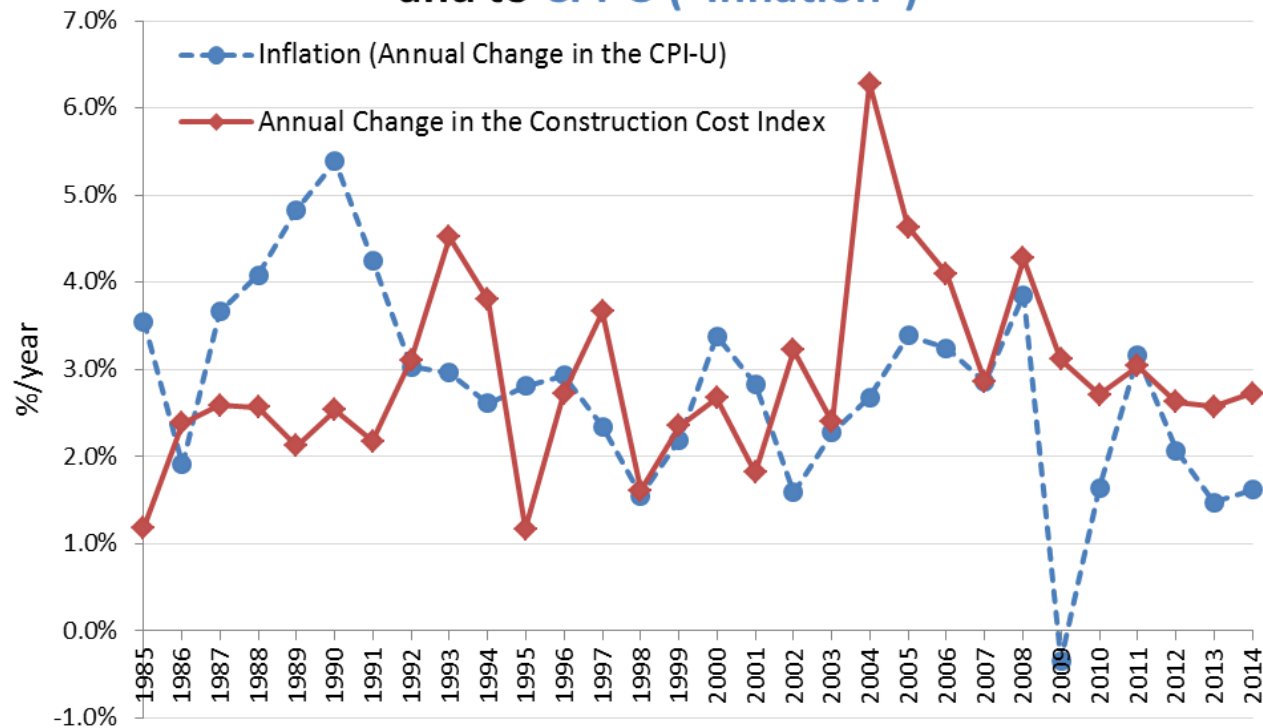
- Call a vendor. Actually, call a few.
- Ask other systems
- Look at past expenses but adjust for increases in costs



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.

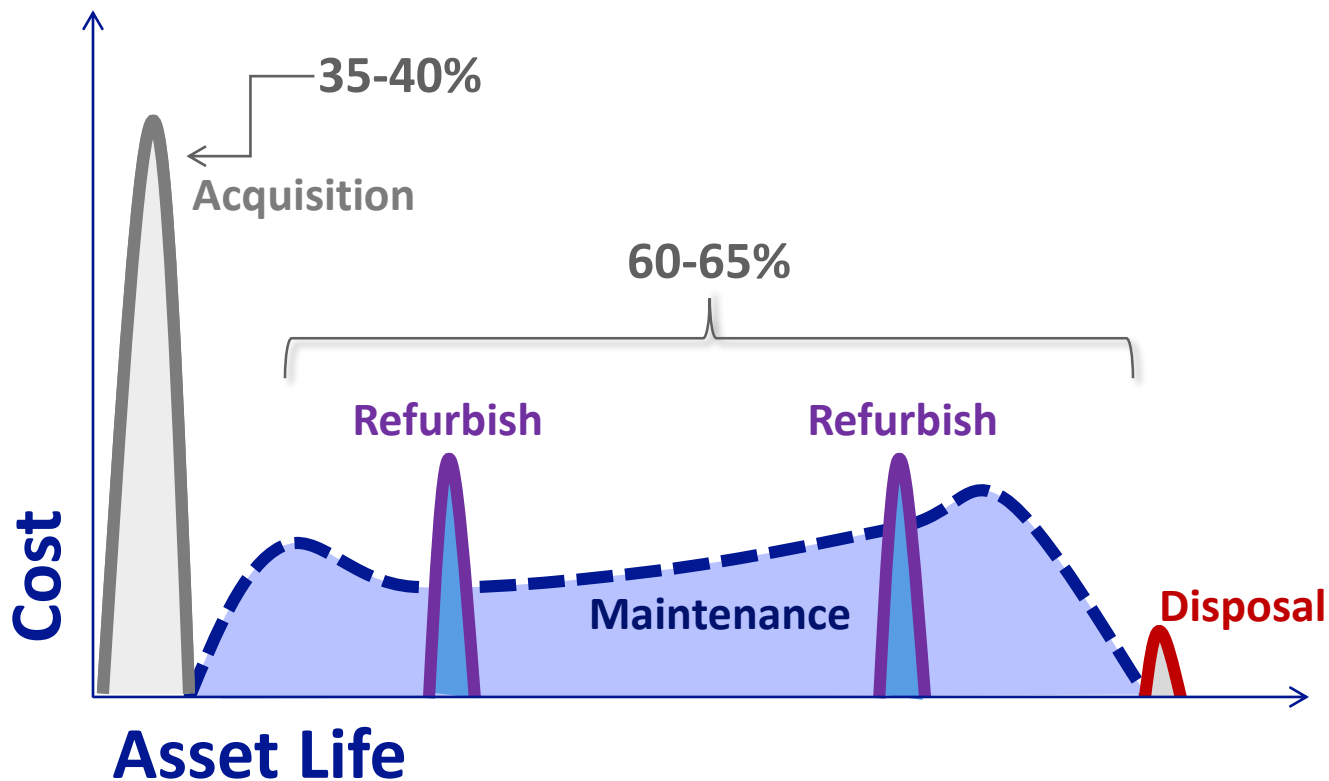
<http://efc.web.unc.edu/2012/09/26/using-an-index-to-help-project-capital-costs-into-the-future/>



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.

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



Source: Adapted from Steve Allbee, USEPA

Resource Webpage for Capital Planning

UNC SCHOOL of GOVERNMENT

About the School | Courses and Resources | Library | MPA | Publications



search this site

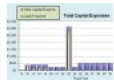
About Services Programs Resources Events

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 "DOO 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 DWM 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"/> | <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"/> | <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"/> | <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"/> | <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"/> | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |

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

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

User-Friendly Capital Improvement Plan (C.I.P.) for Water & Wastewater Utilities Tool

Free, simplified CIP tool using only MS Excel,
developed by the Environmental Finance Center at UNC.

Download the latest
version at
<http://efc.sog.unc.edu>.
Find it in Resources /
Tools.

Tool development was funded by
the
Public Water Supply Section of
DWR/ NCDENR
and partly by the USEPA.

Tool developed by
UNC
ENVIRONMENTAL
FINANCE CENTER

User-friendly Capital Improvement Plan (CIP) for Water and Wastewater Utilities
Version 2.5 (Updated March 2014)

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.

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 Name | Project Start Year | Project End Year | Project Construction Period (Years) | Estimated Construction Cost | Annual Construction Cost (Divided by Period) | Estimated Cost in the Start Year | Estimated Cost in the End Year |
|--|--------------------|------------------|-------------------------------------|-----------------------------|--|----------------------------------|--------------------------------|
| Project 1 - Water Main Replacement | 2015 | 2017 | 3 | \$1,000,000 | \$333,333 | \$333,333 | \$1,000,000 |
| Project 2 - Sewer Main Replacement | 2016 | 2018 | 3 | \$2,000,000 | \$666,667 | \$666,667 | \$2,000,000 |
| Project 3 - Capital Reserve Investment | 2017 | 2019 | 3 | \$500,000 | \$166,667 | \$166,667 | \$500,000 |
| Project 4 - Immediate Project, Start next year | 2018 | 2018 | 1 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 |
| Project 5 - Immediate Project, Start next year | 2019 | 2019 | 1 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 |

Financial Reserves (End of Year)

Rate Increases

Total Cumulative System Investment

Projected Fund Balance

| | FY15 | FY16 | FY17 | FY18 |
|--|---------|---------|---------|---------|
| Estimated Rate Changes Needed to Maintain the Fund Balance | 2.7% | 5.1% | 2.0% | |
| 1 Year Increase (Decrease) in Rates (Base and Volumetric) | N/A | \$0.00 | \$1.51 | \$0.79 |
| 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 | \$0.34 | \$0.34 |
| Monthly Base Charge (Minimum Charge) | \$12.34 | \$12.34 | \$12.34 | \$12.34 |
| Volumetric Rate at 5,000 gallons/month (10,000 gallons) | \$5.47 | \$5.47 | \$5.47 | \$5.47 |
| Volume Included with the Base Charge (1,000 gallons) | 2 | 2 | 2 | 2 |
| Approximate Monthly Charge for 5,000 gallons (\$) | \$29.35 | \$29.35 | \$29.35 | \$29.35 |

Projected Fund Balance

| | FY15 | FY16 | FY17 | FY18 |
|---|-------------|-------------|-------------|-------------|
| Total Revenues | \$1,110,000 | \$1,093,000 | \$1,208,347 | \$1,316,405 |
| Base Charges | \$1,776,968 | \$1,776,322 | \$1,807,268 | \$1,839,733 |
| Usage Charges | \$3,129,840 | \$3,094,095 | \$3,216,568 | \$3,281,742 |
| Interest Earned from Previous Year's Positive Balance | \$ | \$4,405 | \$1,167 | \$1,087 |
| Revenues from Other Sources Besides Charges | \$103,200 | \$104,266 | \$101,344 | \$106,433 |
| Total Revenues (Including Capital) | \$6,010,008 | \$5,999,086 | \$6,326,256 | \$6,545,900 |

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Development of this tool was funded by the NC Department of Environment and Natural Resources (Public Water Supply Section) and the U.S. Environmental Protection Agency
Download the latest version of this tool at efc.sog.unc.edu. Find it in Resources / Tools.



Summarizes your utility's capital needs in the next 20 years, and estimates rate increases needed to fully fund the capital projects, based on debt and/or cash funding requirements

