



Smart Management for  
Small Water Systems

## Rates and Finance Workshop for Small Water Systems

09/21/17| St. George, UT

[www.efcnetwork.org](http://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



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
- *More on this after lunch ...*



# Is Asset Management Relevant to **SMALL** systems?

- Let's hear from a small town called Gallup, NM



# Five Core Components of AM



Current State of the Assets



Level of Service



Criticality



Life Cycle Costing



Long-Term Funding



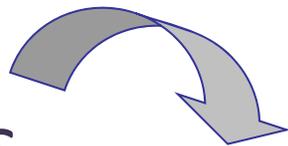
# Current State of the Assets

- 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?

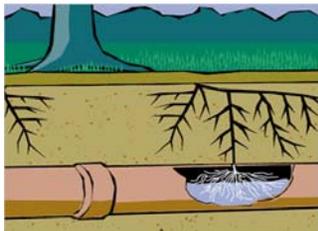


# Asset Criticality

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?

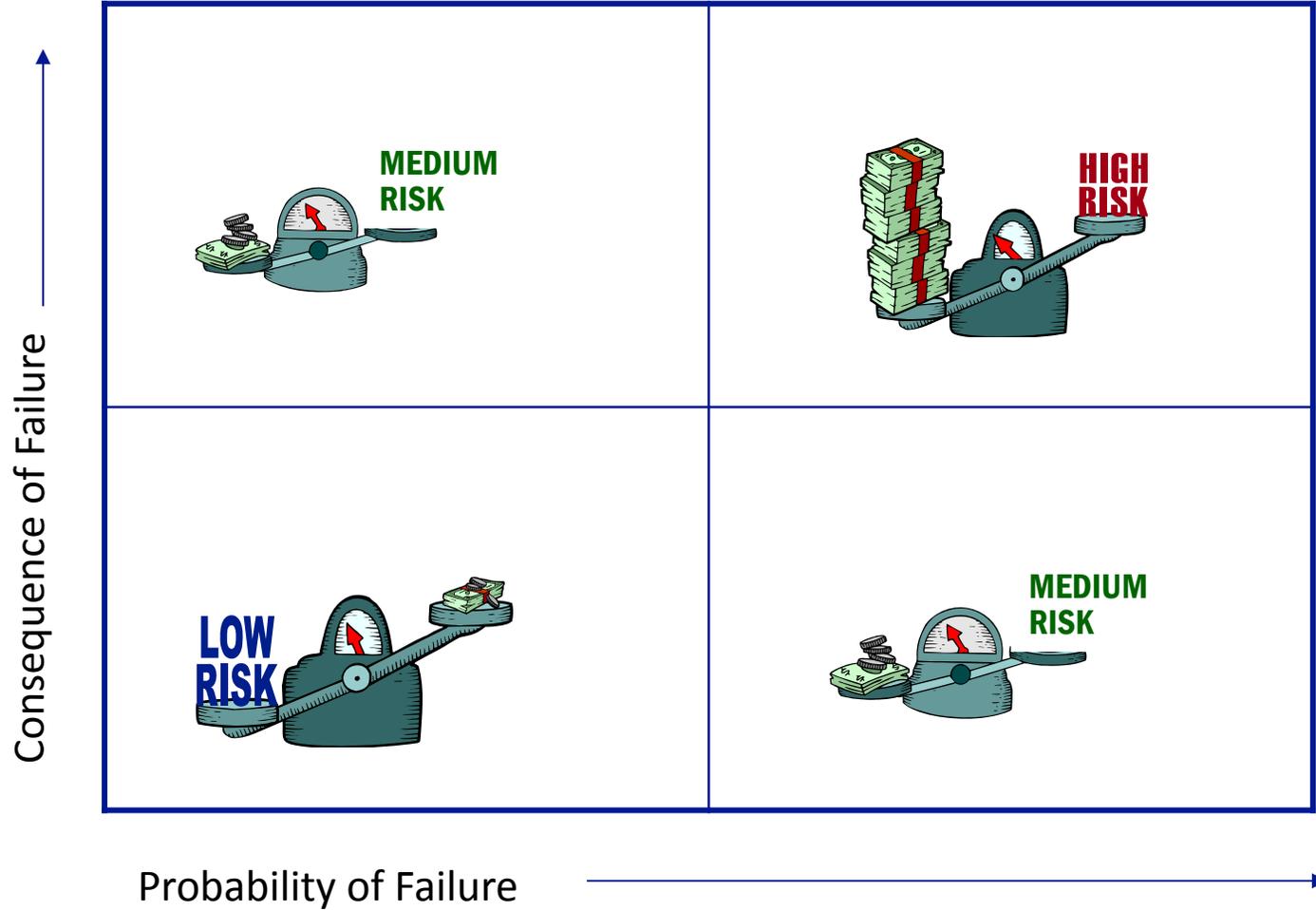
Are there legal consequences, environmental consequences, social consequences?

Are there redundant assets?





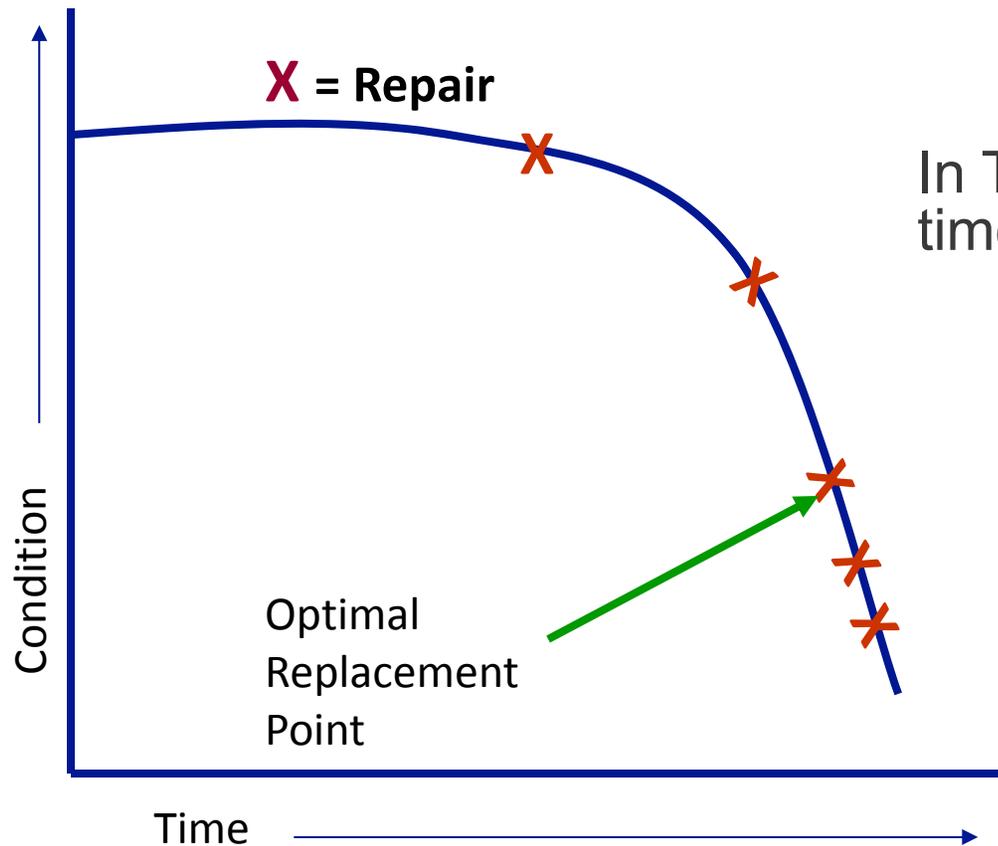
# Asset Criticality



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

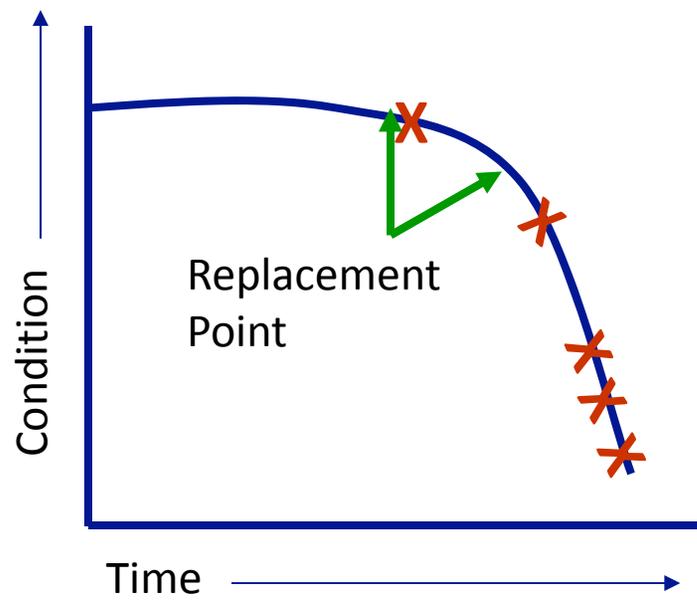
Not possible to know the optimal time to replace every asset

So... need to use the concept of risk

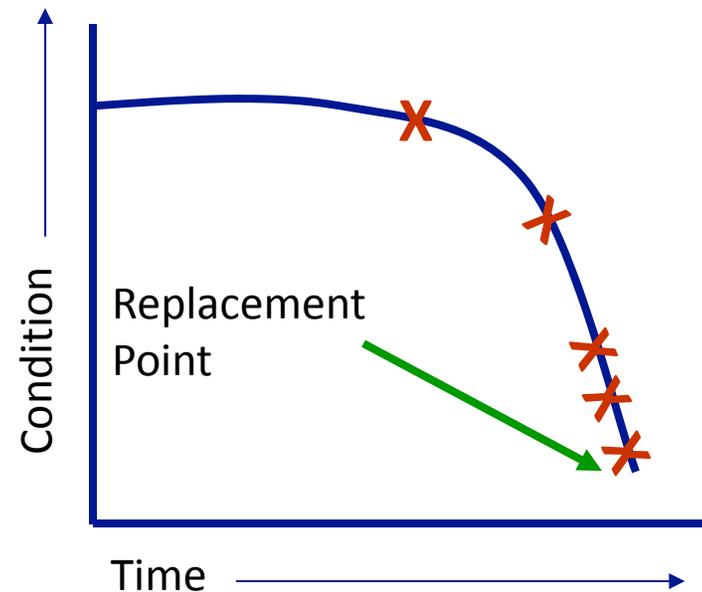


# Life Cycle Costing & Risk

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



# 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		
<b>Water Supply &amp; Treatment</b>							
<b>Water Treatment Objective</b>							
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
<b>Water Treatment Total</b>	<b>4,380</b>	<b>4,094</b>	<b>500</b>	<b>5,850</b>	<b>5,000</b>	<b>8,530</b>	<b>28,354</b>



# 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

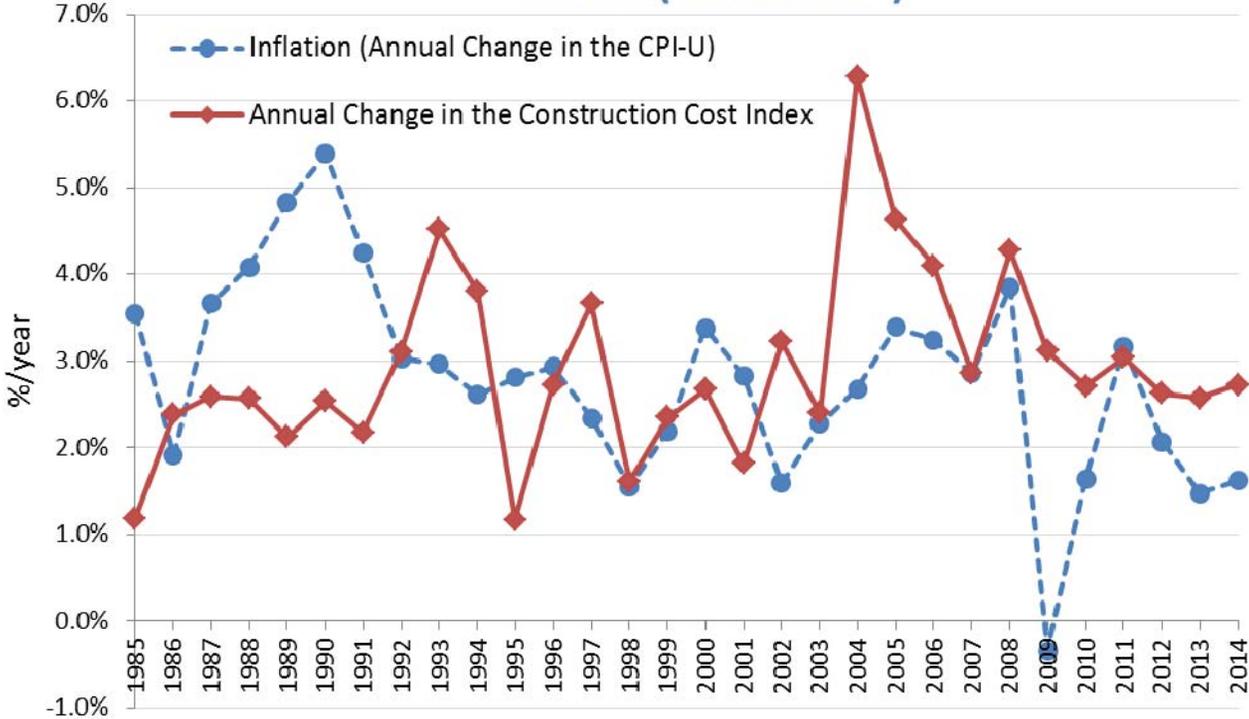


# Measures of Inflation

- 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/>

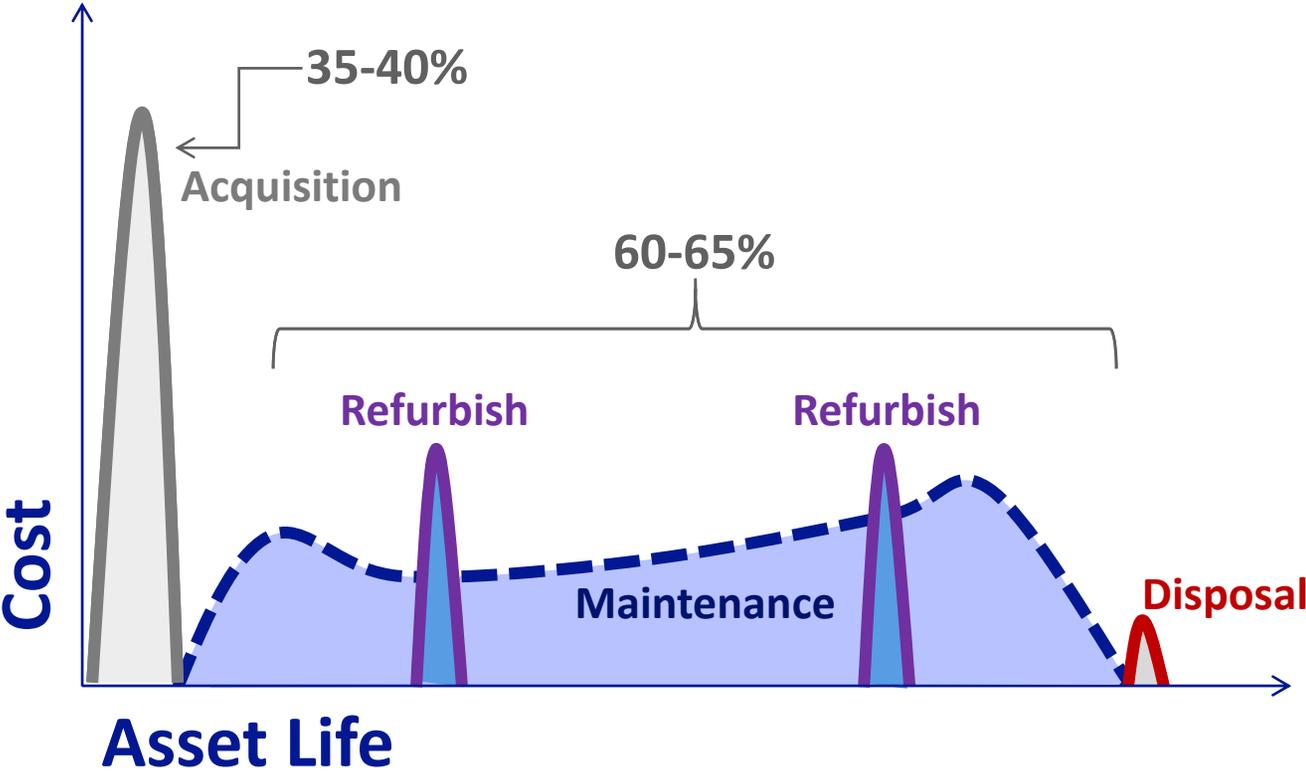


# Drive Down the CIP Cost

- 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

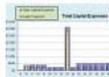
About Services Programs Resources Events

## 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 project... 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*	DE-RW PWS Capacity Development Program	DE-RW PWS Loans and Grants	DE-RW DWR Construction Grants and Loans	G.S. 159B-23	USDA Loans and Grants	NC Rural Economic Development Center	Local Government Commission	EPA Drinking Water Needs Survey	DE-RW 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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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.efc.unc.edu/projects/capitalplanning.html>

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



# Utah Specific Resources

- Toolbox:
  - <http://ruralplanning.org/toolkit.html>
- RECENT GUIDES
- [Procurement: Policy & Best Practices](#)
- [Capital Improvement Planning](#)
- [Operations & Maintenance: Costs and Considerations](#)
- [Annexation: Introduction for Local Leaders](#)
- [Capital Asset Inventory](#)

# 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.

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**

**FINANCED**  
et \$ 950,000  
et \$ 750,000

**Pre-Exist**  
Input annu  
incurred for

**Estimated Rate Changes Needed to Maintain the Fund Balance**

	FY16	FY17	FY18
Total Revenue (Decreases) in Rate Base and Volumetric	N/A	2.0%	5.1%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.00	\$1.51
Increase (Decrease) in the Monthly Base Charge	N/A	\$0.00	\$0.38
Monthly Base Charge ("Minimum Charge")	\$12.34	\$12.34	\$12.90
Volumetric Rate at 5,000 gallons/month (at 1000 gallons)	\$5.67	\$5.67	\$5.96
Volume Included with the Base Charge (1,000 of gallons)	10	2	2
Approximate Monthly Charge for 5,000 gallons (\$)	\$29.35	\$29.35	\$31.65

**Projected Fund Balance**

	FY16	FY17	FY18
Total Revenue	\$ 1,910,202	\$ 1,993,589	\$ 2,208,327
Base Charges	\$ 1,776,969	\$ 1,796,322	\$ 1,921,268
Usage Charges	\$ 3,129,840	\$ 3,094,095	\$ 3,216,589
Interest Earned from Previous Year's Positive Balance	\$ 5	\$ 9,455	\$ 9,887
Revenues from Other Sources Besides Charges	\$ 103,200	\$ 104,266	\$ 105,344

**Capital Improvement Projects - 20 Years**

Project Name	Start Year	End Year	Estimated Construction Cost	Annual Construction Cost	Estimated Cost in the Start Year	Estimated Cost in the End Year
Project 1 - Debt Service Reduction	FY17	FY17	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000
Project 2 - Debt Service Reduction	FY17	FY17	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000
Project 3 - Capital Reserve Replacement	FY17	FY17	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Project 4 - Immediate project, Start next year	FY18	FY18	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Project 5 - Immediate project, Start next year	FY18	FY18	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000

**Expected Revenues and Expenses in FY15**

Category	Amount	% of Total
Annual Operating and Non-operating Revenues	\$ 1,910,202	100%
Annual Non-Capital Expenditures (M&A, Admin, etc.)	\$ 432,000	22.6%
Expected Annual Inflation of Expenditures (%/Year)	2.2%	

**Usage Billed to Customers in FY15**

Category	Amount	% of Total
Number of Customers	10,000	2,800
Total Monthly Use (1,000's of gallons)	50,000	20,000
Annual Customer Base Growth (%/Year)	1.0%	1.0%

**Financial Reserves (End of Year)**

**Rate Increases**

**Total Capital Expenditures**

**Total Cumulative System Investment**

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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.

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.





# What the Tool Does

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

