



Long Term Capital Planning

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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

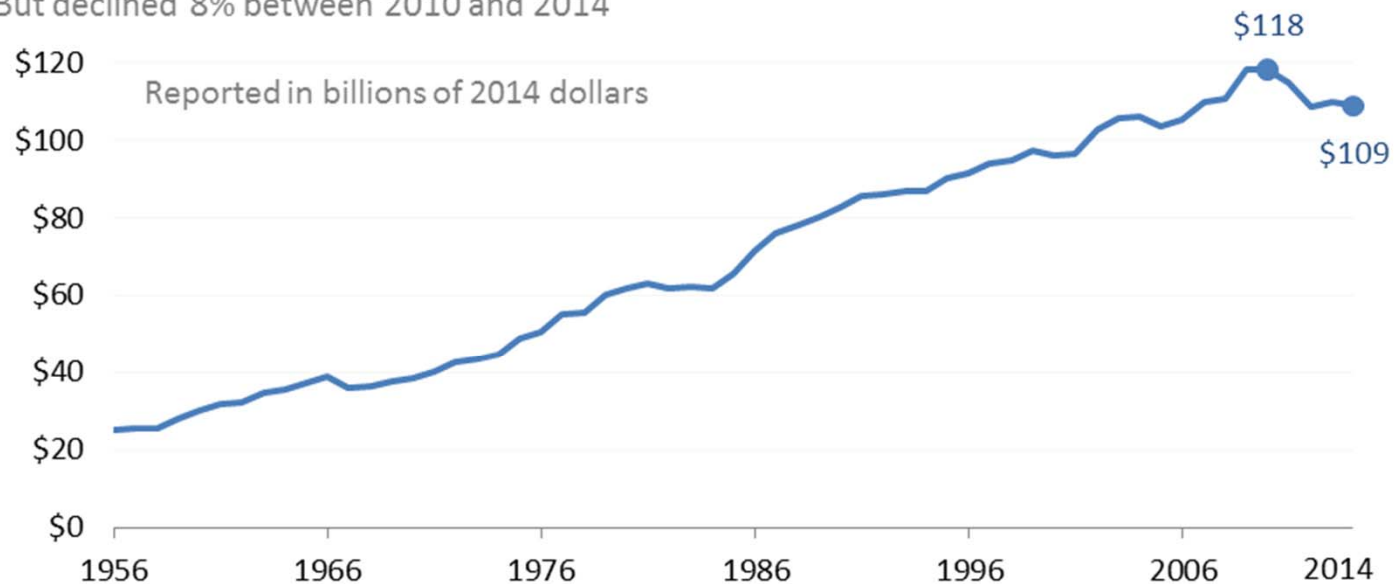
- The money never really was “free”—it came from tax dollars
- Today, there is a different philosophy of how to pay for water system capital improvements



Total Public Spending Has Grown...

Total federal, state and local government spending on water and wastewater utilities grew steadily over time

But declined 8% between 2010 and 2014



Graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

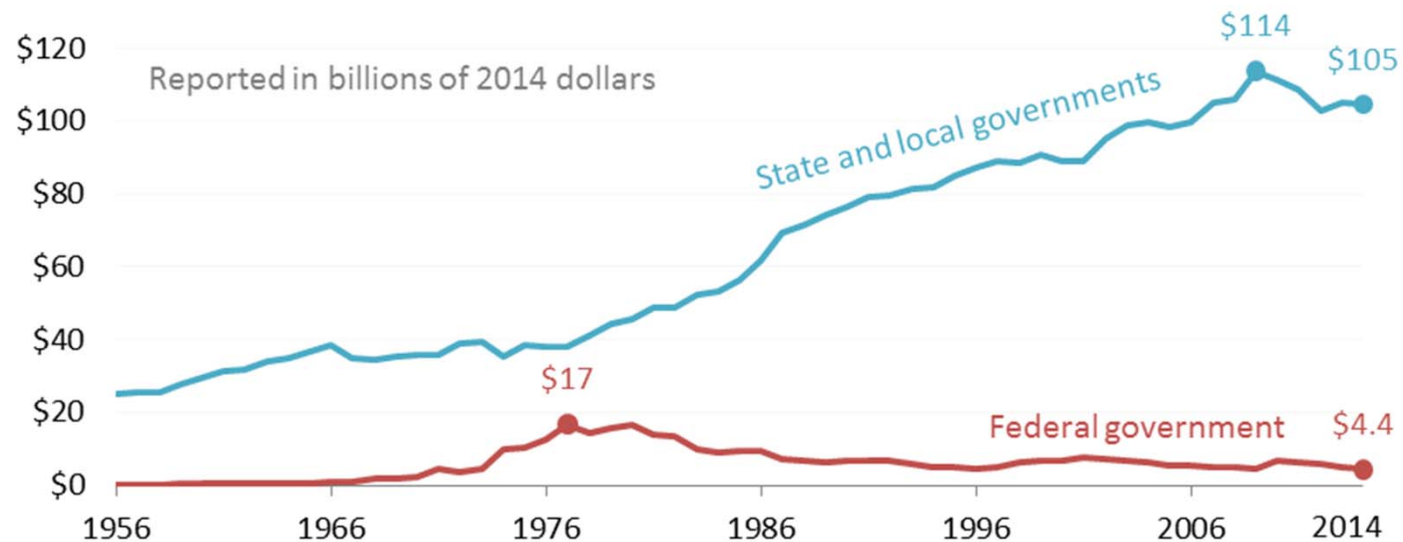
Source: Congressional Budget Office supplemental data for the *Public Spending on Transportation and Water Infrastructure, 1956 to 2014* report (March 2015). Displays public spending on supply systems for distributing potable water as well as wastewater and sewage treatment systems and plants. Real spending is shown after adjusting nominal spending to their 2014 dollar equivalent using infrastructure-specific price indexes.



...Mostly from States and Locals

State and local government spending on water and wastewater utilities continued to grow while **federal spending** declined since the 1980s

State and local governments spent 24 times as much as the federal government in 2014



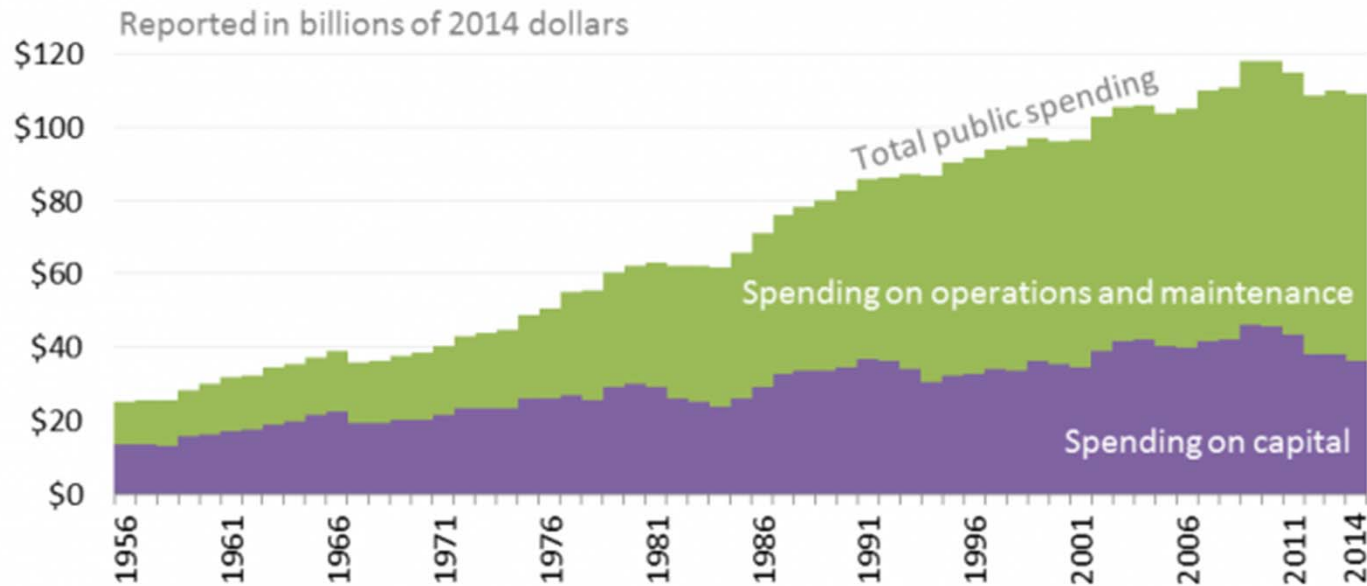
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...And Mostly for O&M, not Capital

Federal, state and local government spending on water and wastewater utilities, 1956 - 2014



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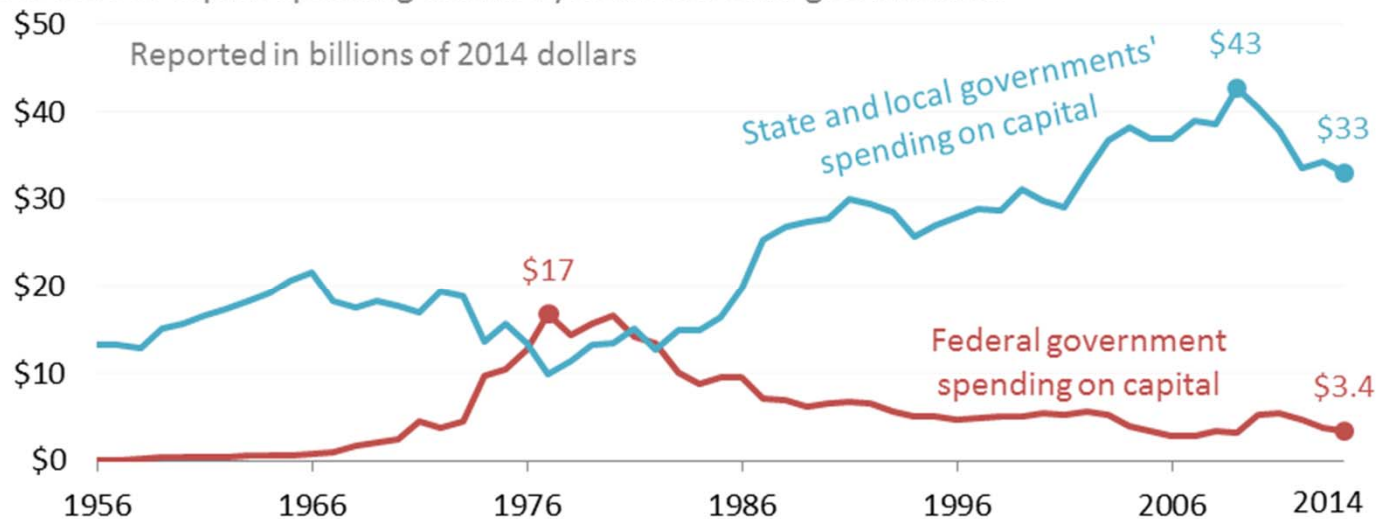
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Feds Used to Spend More on Capital

Spending on capital infrastructure for water and wastewater utilities has increasingly been provided by **state and local governments** while **federal spending on capital infrastructure** declined since the 1980s

Over 90% of capital spending occurs by state and local governments



Graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

Source: Congressional Budget Office supplemental data for the *Public Spending on Transportation and Water Infrastructure, 1956 to 2014* report (March 2015). Displays public spending on supply systems for distributing potable water as well as wastewater and sewage treatment systems and plants. Real spending is shown after adjusting nominal spending to their 2014 dollar equivalent using infrastructure-specific price indexes.



Capital Finance Today

- In other words, you pay (no sense in sugar-coating this)
- The 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



<http://efc.web.unc.edu/2015/09/09/four-trends-government-spending-water/>

Graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
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Four Trends in Government Spending on Water and Wastewater Utilities Since 1956

SEPTEMBER 9, 2015 / SHADI ESKAF / 0 COMMENTS

 Print  PDF

According to data collected and published by the Congressional Budget Office (CBO), federal, state and local governments in the United States spent more than \$2.2 trillion in the last 59 years on operations, maintenance and capital infrastructure of water and wastewater utilities. That equates to more than \$4 131 000 000 000 in 2014 dollars adjusting for inflation of infrastructure-



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!

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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	Ports	C
Bridges	C+	Public Parks	C-
Dams	D	Rail	C+
Drinking Water	D	Roads	D
Energy	D+	Schools	D
Hazardous Waste	D	Solid Waste	B-
Inland Waterways	D-	Transit	D
Levees	D-	Wastewater	D

<http://www.infrastructurereportcard.org/>



Hope for Divine Intervention



Pope Francis Lays Hands On Ailing U.S. Infrastructure

NEWS IN BRIEF

September 25, 2015

VOL 51 ISSUE 38

News · Religion · World
Leaders · Pope



NEW YORK—Treating the frail, long-overlooked structures with an unparalleled display of compassion, Pope Francis reportedly inspired a crowd of onlookers Friday by laying his hands upon the ailing United States infrastructure. “My heart just melted when I watched the pope



ONION VIDEO



www.efcnetwork.org



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Two Related Concepts:

Asset Management & Capital Planning





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

Let's hear from a practitioner...



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



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?



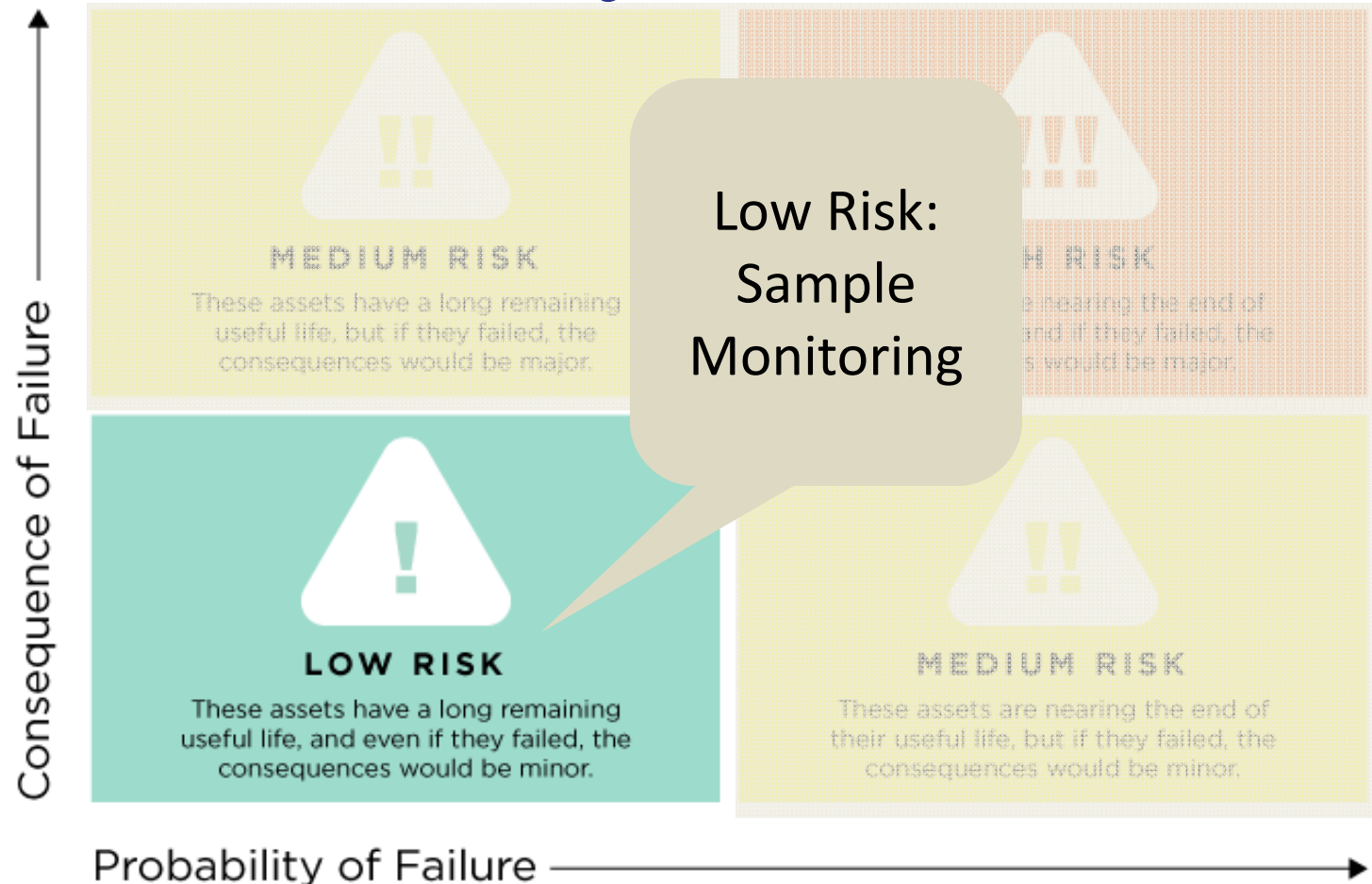


Asset Criticality



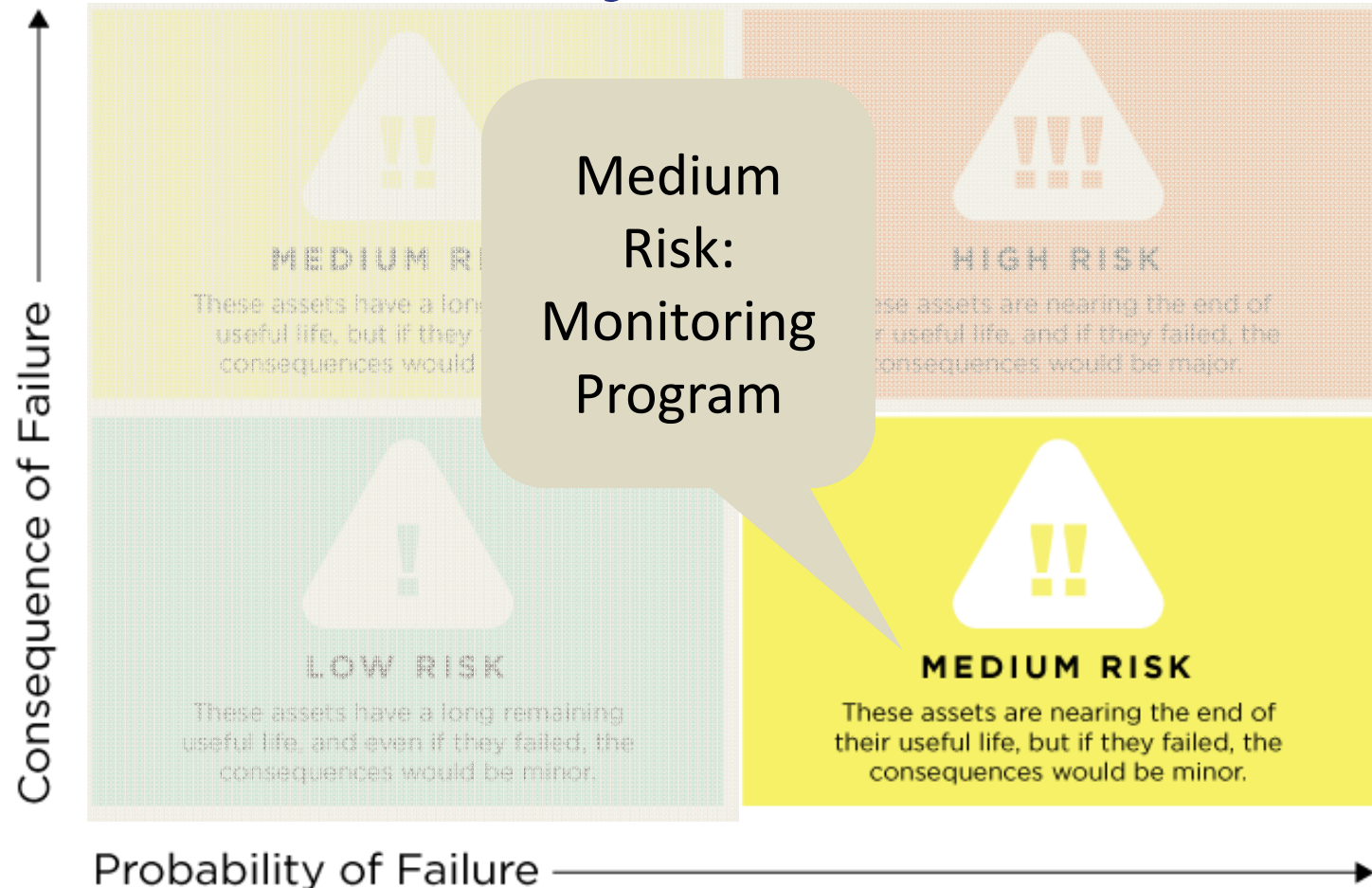


Asset Criticality



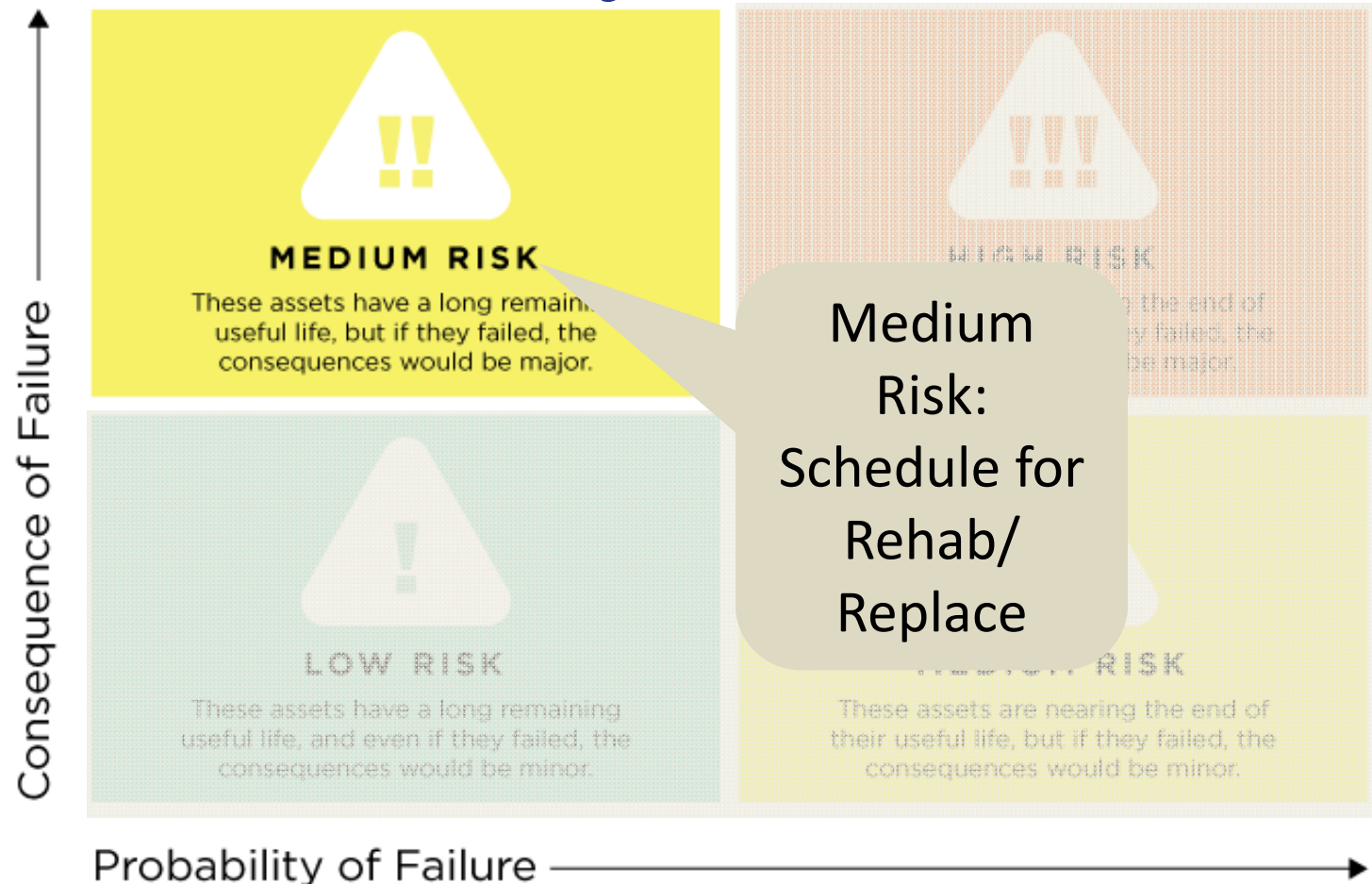


Asset Criticality



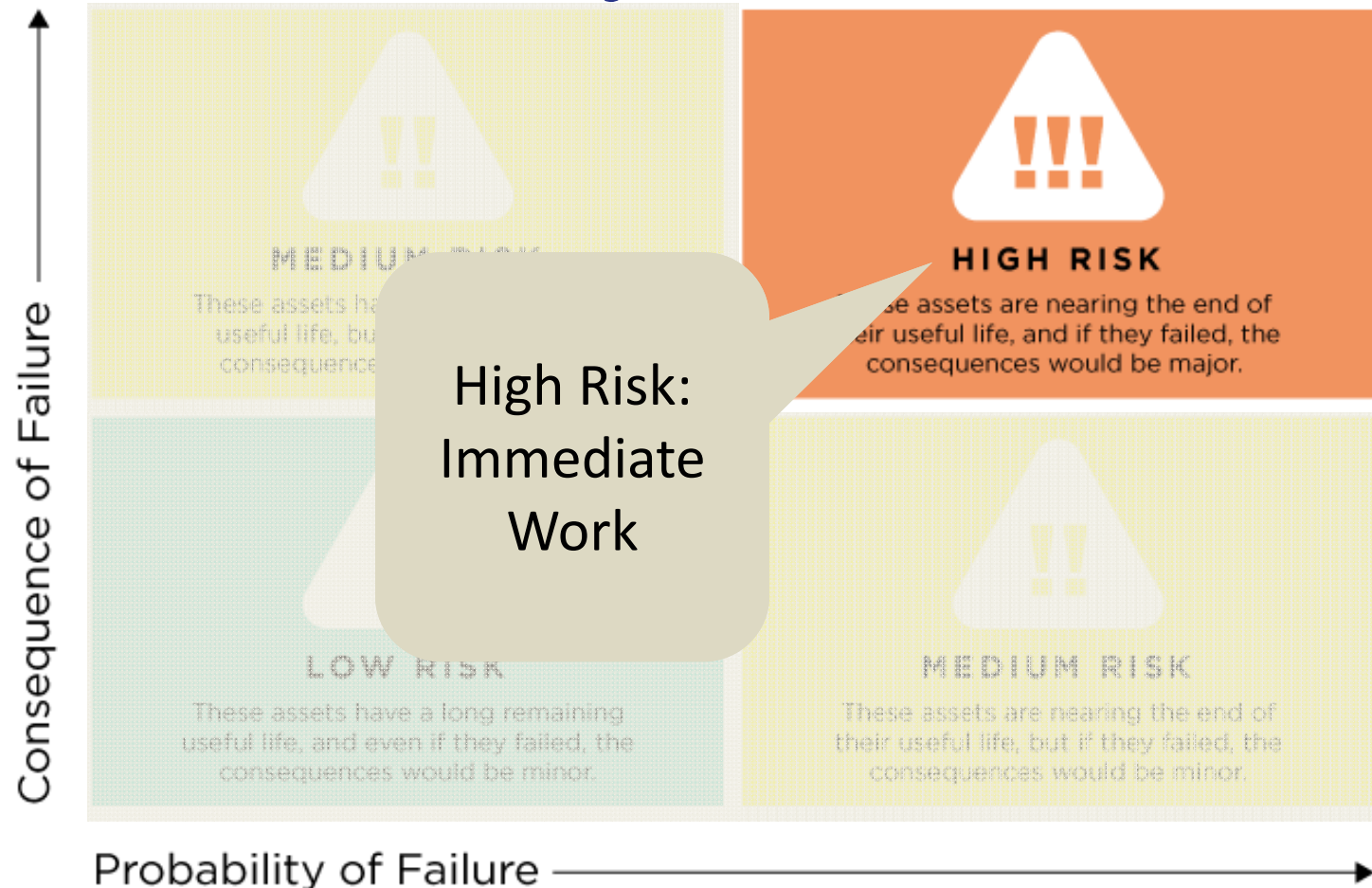


Asset Criticality





Asset Criticality





Quick Exercise—4 Assets

1. Brand new overhead storage tank
2. Aging booster pumps that serve a hospital and neighborhood
3. 20 year old lines on Forest Drive, a typical residential neighborhood
4. 20 year old meters

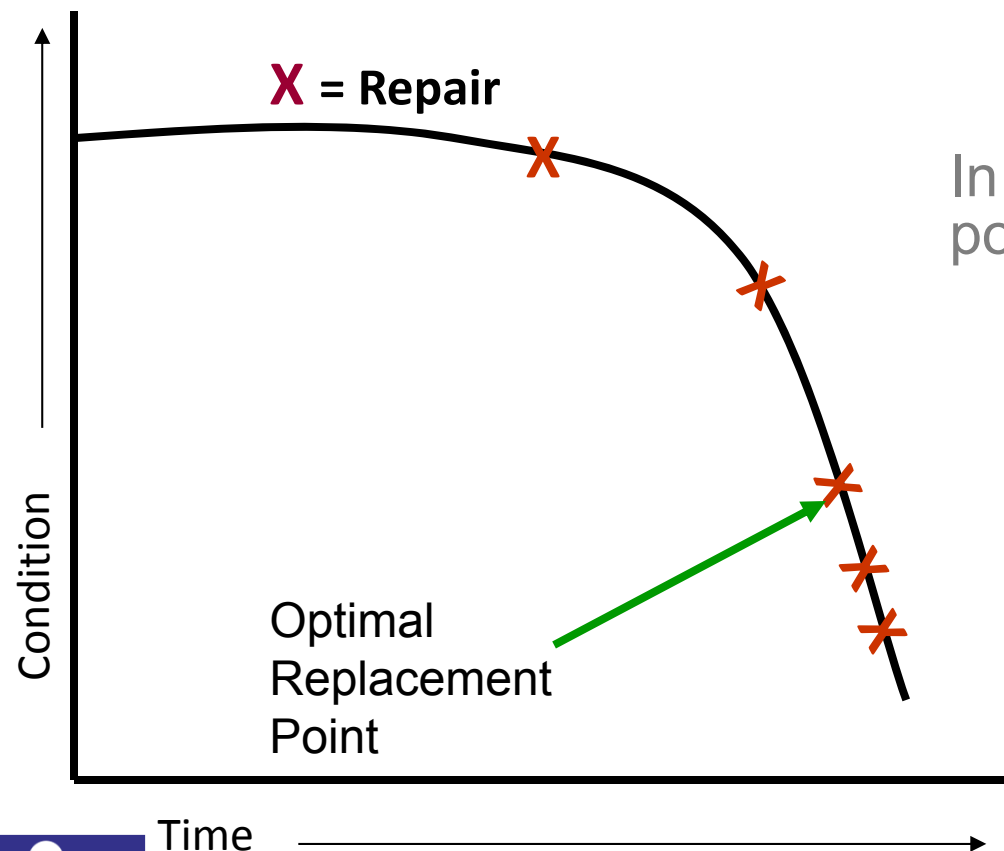


Asset Criticality





Life Cycle Costing: Replacement of Assets



In theory, there is an exact right point at which to replace an asset

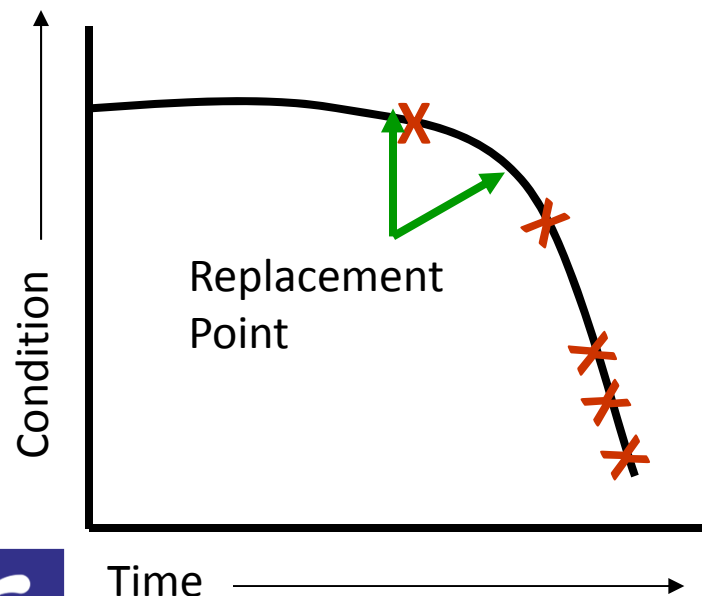
Not possible to know the optimal time to replace every asset

So... need to use the concept of risk

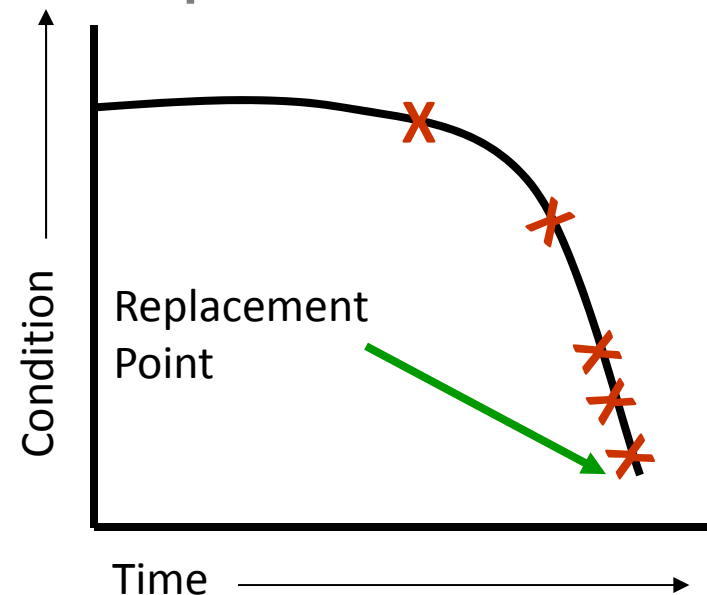


Life Cycle Costing & Risk

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



Capital Improvement Program

- Identify regulatory deficiencies (discuss with regulatory agencies, look at proposed regulations, talk to consultants), in a 10-20 year window
- Identify changes in service population



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.

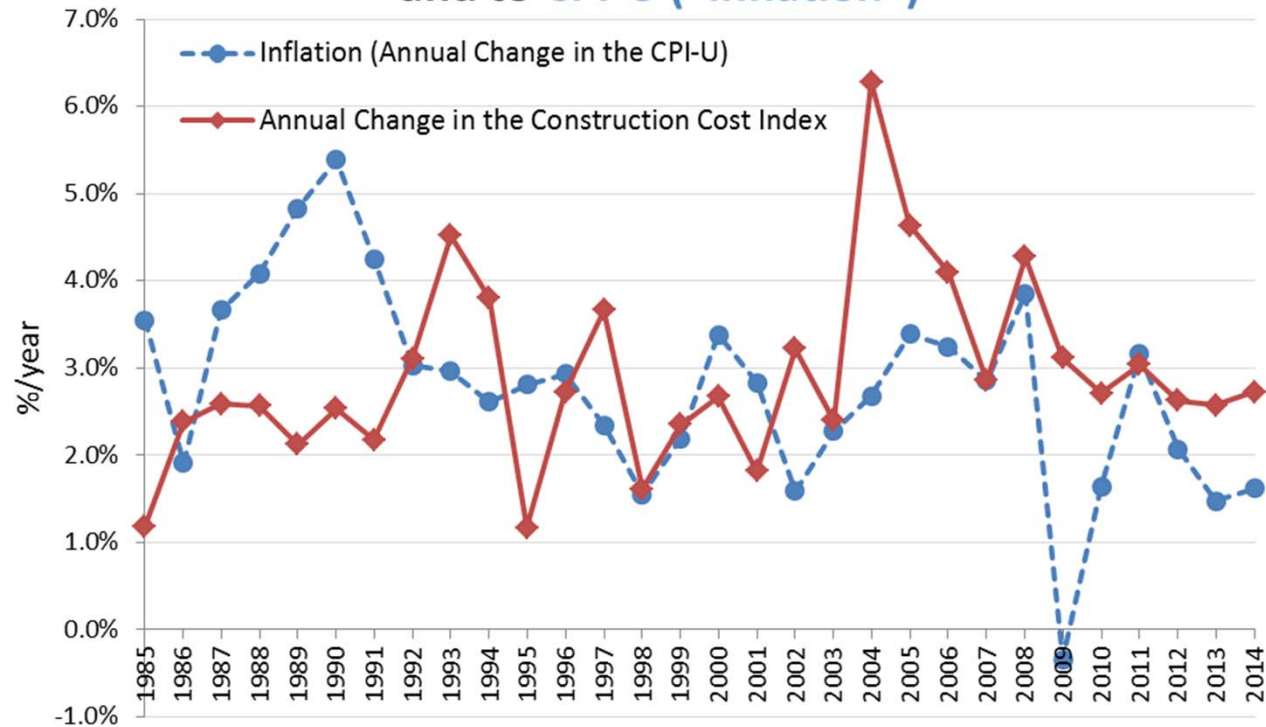


Measures of Inflation

- **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/>

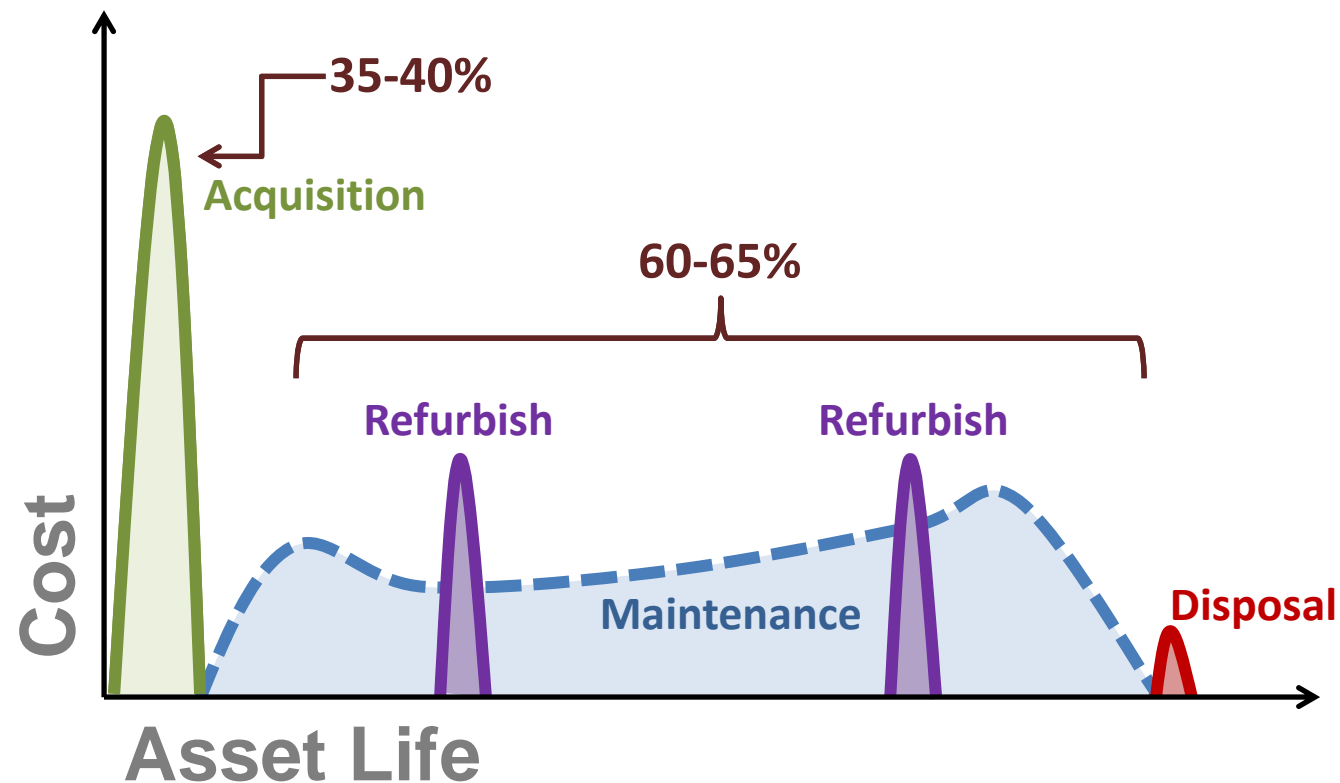


Reminder: Life Cycle Costing

- 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

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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"	DEHM PWS Capacity Development Program	DEHM PWS Loans and Grants	DEHM DWR Construction Grants and Loans	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"/>
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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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"/>	<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



ENVIRONMENTAL FINANCE CENTER



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.

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

FINANCIAL DASHBOARD

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

Financed: \$ 950,000
et: \$ 750,000

Pre-Exist: Input annual incurred for

CAPITAL IMPROVEMENT PROJECTS - 20 YEARS

Project	Construction Start Year	Project Construction Period (Years)	Estimated Construction Cost (\$)	Annual Construction Cost Inflation Factor (%/year)	Estimated Cost at the Start Year	End of Co
Project 1 - Sewer Main Replacement	FY22	5	1,000,000	2.0%	1,000,000	
Project 2 - Wastewater Treatment Plant	FY23	10	2,000,000	2.0%	2,000,000	
Project 3 - Capital Reserve Funded project	FY24	5	500,000	2.0%	500,000	
Project 4 - Immediate project, start now year	FY20	5	1,000,000	2.0%	1,000,000	
Project 5 - Immediate project, start now year	FY20	5	1,000,000	2.0%	1,000,000	

Expected Revenues and Expenses - FY15

Annual Operating and Non-operating Revenues: \$ 5,910,000
Annual Non-Capital Expenditures (O&M, Admin, etc.): \$ 4,525,000
Expected Annual Inflation of Expenditures (%/year): 2.7%

Usage Billed to Customers in FY15

Number of Customers: Residential: 10,000; Non-residential: 2,000
Total Monthly Use (1,000's of gallons): Residential: 10,000; Non-residential: 20,000
Annual Customer Rate (Monthly Rate/Year): Residential: \$ 1.20; Non-residential: \$ 2.40

Water and Sewer Rates in FY15

Input the residential combined water & sewer rate at 5,000 gallons/month of use (or 0.7 cubic feet). Convert to monthly rate.

Volume Rate at 5,000 gallons/month (0.7 cubic feet)	Volume Rate at 1,000 gallons/month (0.14 cubic feet)	Monthly Base Charge (Minimum Charge)
\$ 5.47	\$ 1.09	\$ 1.09

Estimated Rate Changes Needed to Maintain the Fund Balance

	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	\$1.01	\$0.79
Increase (Decrease) in the Monthly Base Charge	N/A	\$0.00	\$0.04	\$0.04
Monthly Base Charge (Minimum Charge)	\$12.34	\$12.34	\$12.98	\$13.31
Volumetric Rate at 5,000 gallons/month (0.7 cubic feet)	\$5.47	\$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 (0.7 cubic feet)	\$29.35	\$29.35	\$30.86	\$31.65

Projected Fund Balance

	FY15	FY16	FY17	FY18
Total Revenues	\$ 5,910,000	\$ 6,063,580	\$ 6,278,347	\$ 6,364,600
Base Charges	\$ 1,776,960	\$ 1,796,322	\$ 1,907,268	\$ 1,976,733
Usage Charges	\$ 3,129,840	\$ 3,094,595	\$ 3,216,588	\$ 3,261,742
Interest Earned from Previous Year's Positive Balance	\$ 0	\$ 9,485	\$ 9,187	\$ 9,497
Revenues from Other Sources Besides Charges	\$ 103,200	\$ 104,268	\$ 105,344	\$ 106,433

Financial Reserves (End of Year)

Rate Increases

Total Capital Expenses

Total Cumulative System Investment

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Development of this tool was funded by the NC Department of Environment and Natural Resources and the U.S. Environmental Protection Agency
[Download this tool at www.efc.unc.edu/tools](http://www.efc.unc.edu/tools)



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