



Long Term Capital Planning

Carol Rosenfeld

Environmental Finance Center

The University of North Carolina at Chapel Hill

919-843-5240

crosenfeld@sog.unc.edu



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

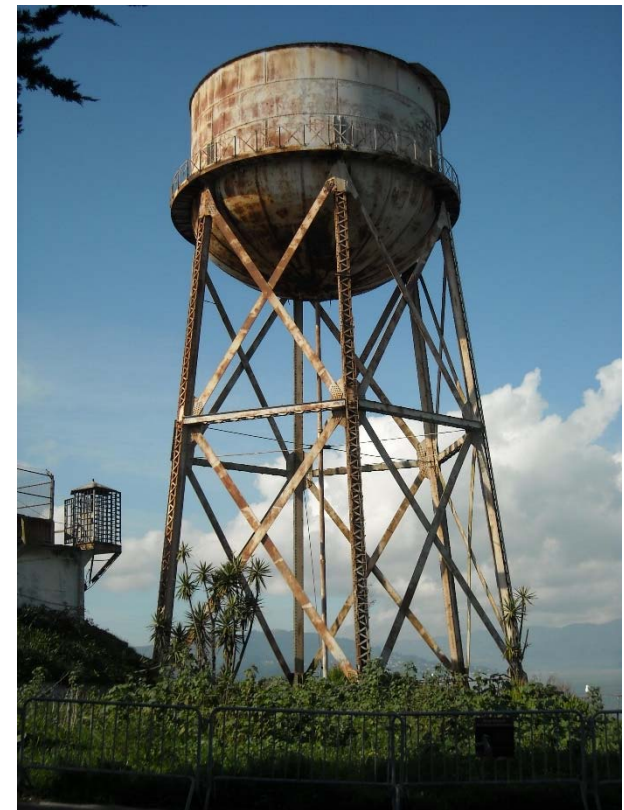
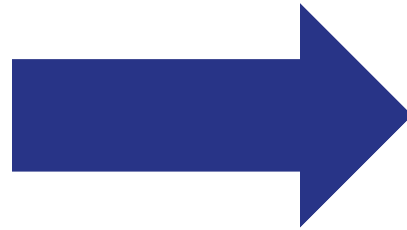


Infrastructure or Capital Assets





Infrastructure Wears Out

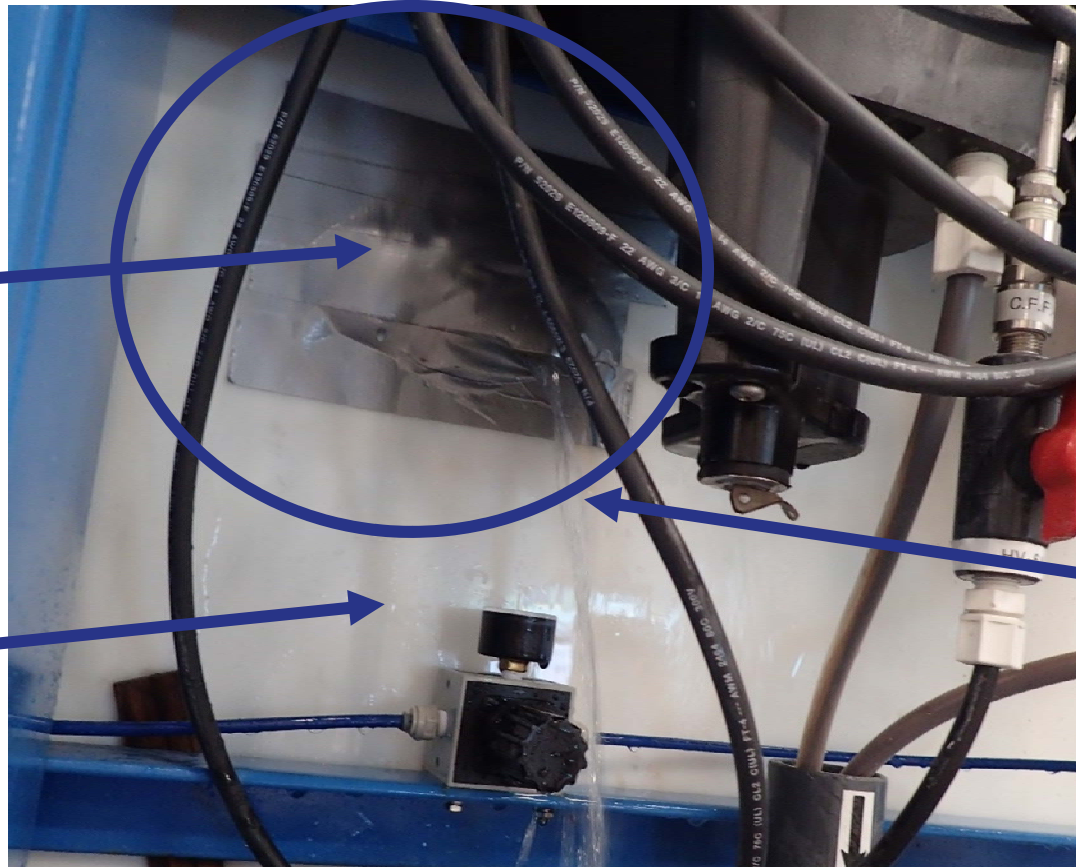




Infrastructure Wears Out



Water
Tank



Leak



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

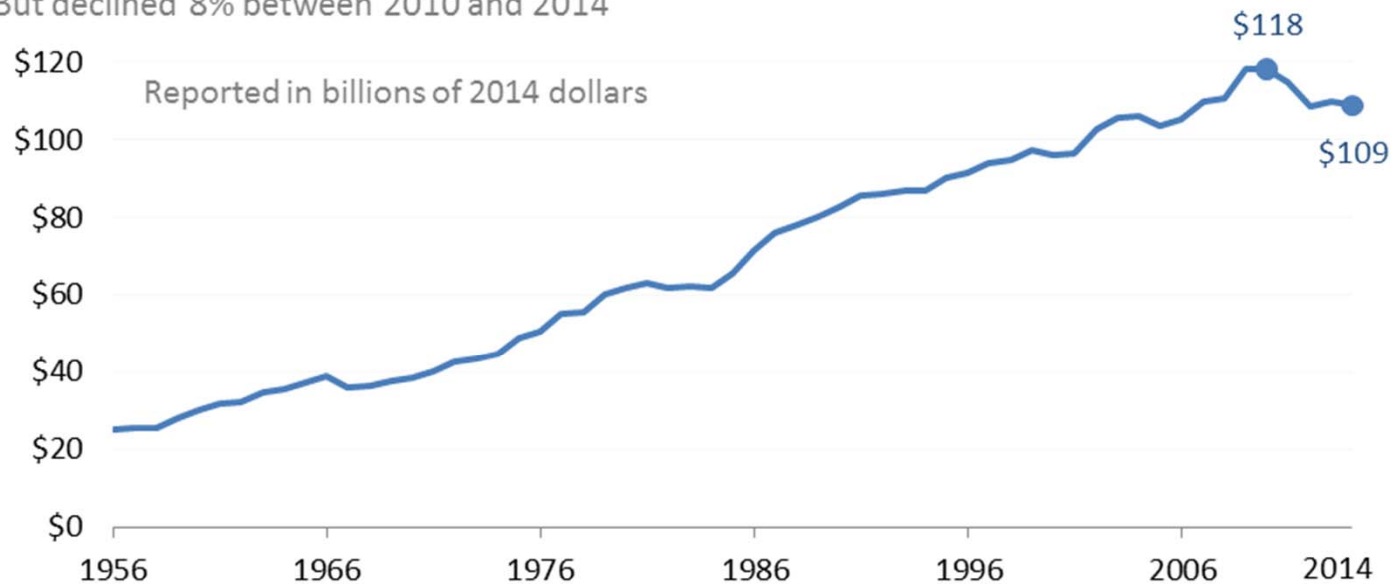
- The money never really was “free”—it came from tax dollars
- Today, there is a different philosophy of how to pay for water system capital improvements



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



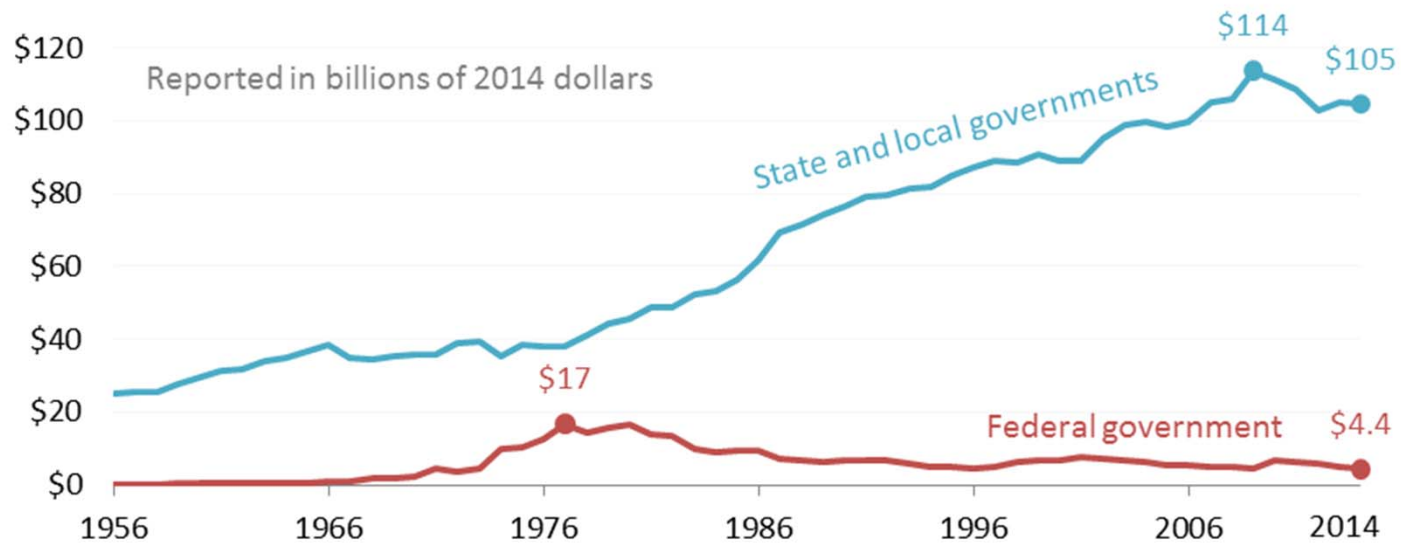
Graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

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 State and Local Governments

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



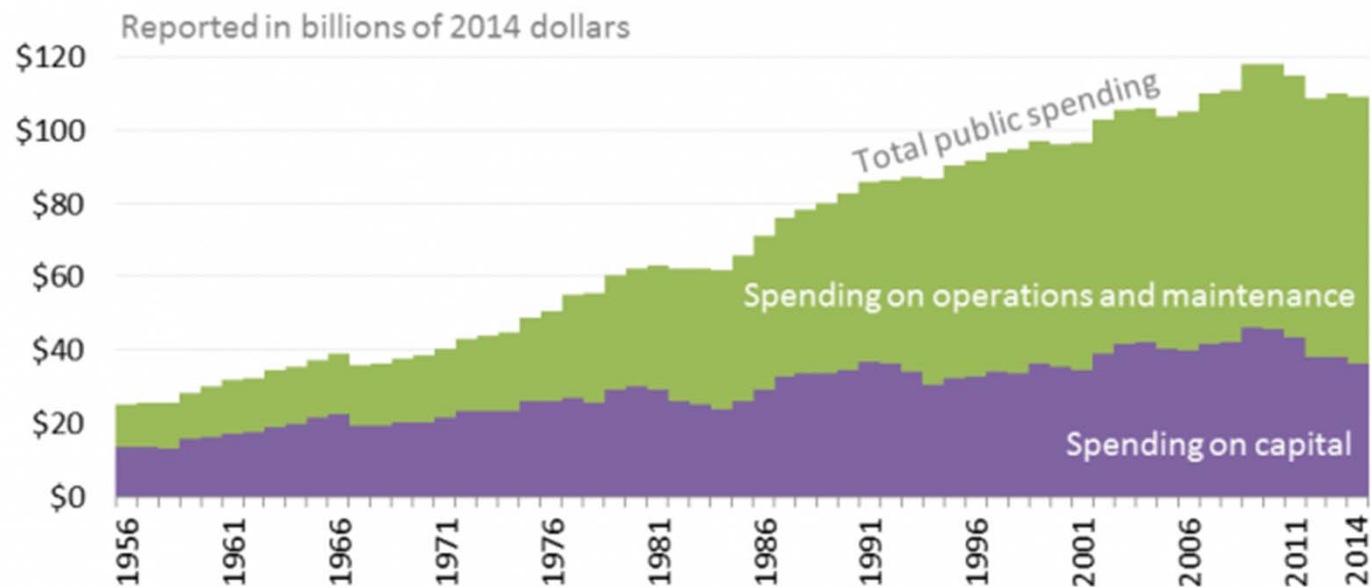
Graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

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.



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

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



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

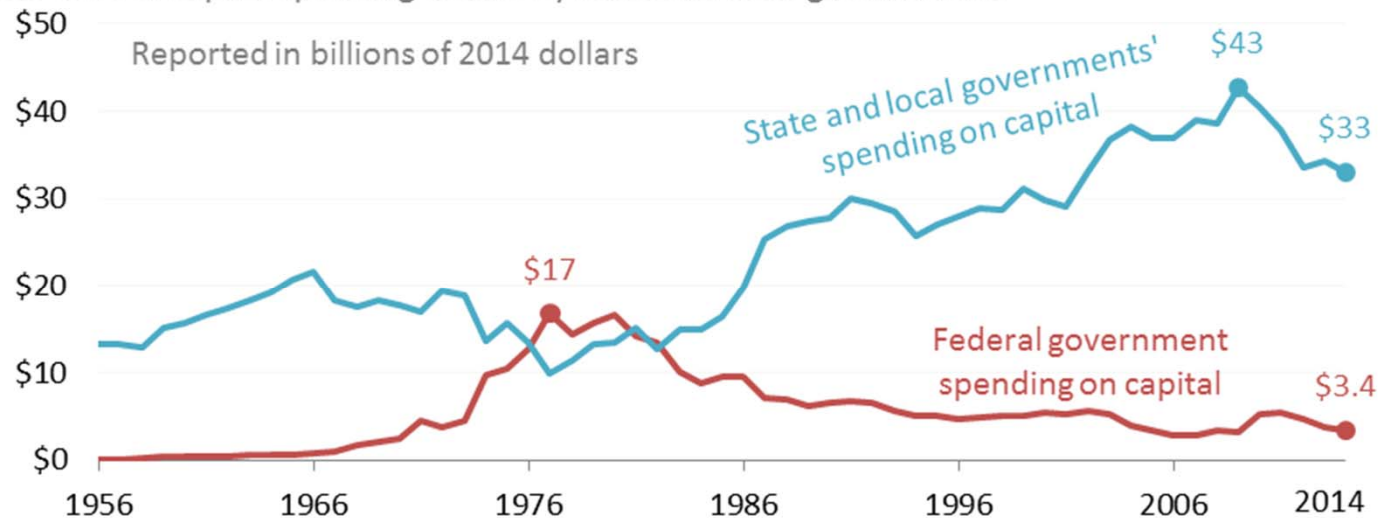
Source: Congressional Budget Office supplemental data for the *Public Spending on Transportation and Water Infrastructure, 1956 to 2014* report (March 2015). Displays public spending on supply systems for distributing potable water as well as wastewater and sewage treatment systems and plants. Real spending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



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

Poor Investment → Poor Infrastructure

2017

INFRASTRUCTURE
REPORT CARD

ASCE

MAKING THE GRADE

AMERICA'S GRADES

STATE BY STATE

SOLUTIONS

THE IMPACT

GET INVOLVED



America's Infrastructure Scores a

D+

GET THE FULL STORY





So what can we do?

Two options...



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





Or... we can figure out how to work **smarter**, *not harder* - the essence of effective asset management

Let's hear from a practitioner...



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



Two Related Concepts:

Asset Management
&
Capital Planning



Asset management helps you have the most impact in your system by spending your limited dollars in the best way possible



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



Asset Management?

- A. We're doing it!
- B. Heard of it but
not doing it
- C. What now?



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

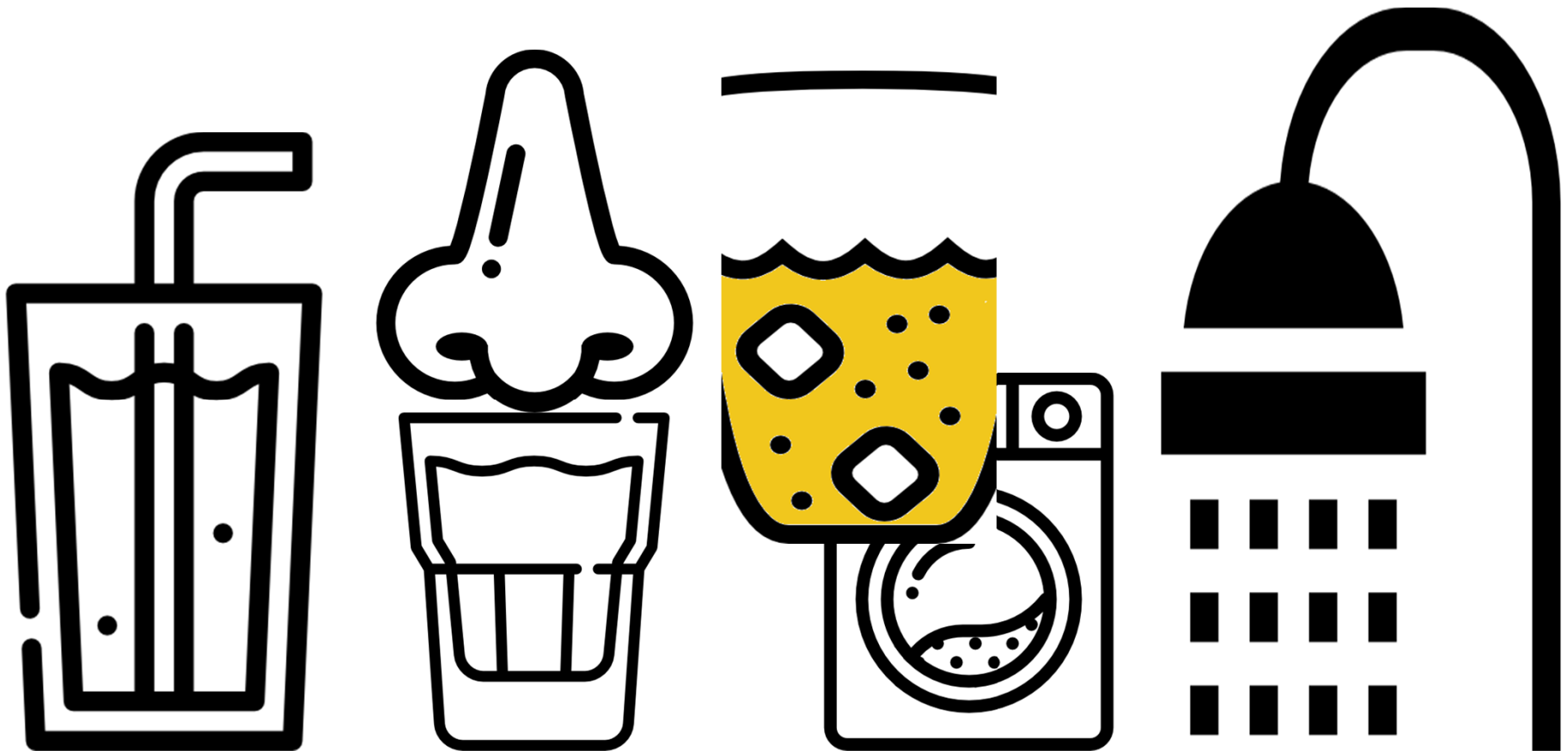
Involve
Staff



What would my customers want?



What do customers care about?





Level of Service



**EPA Releases Annual List Of Cities Where Tap Water
Probably Fine To Drink But Tastes Kinda Off**





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





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

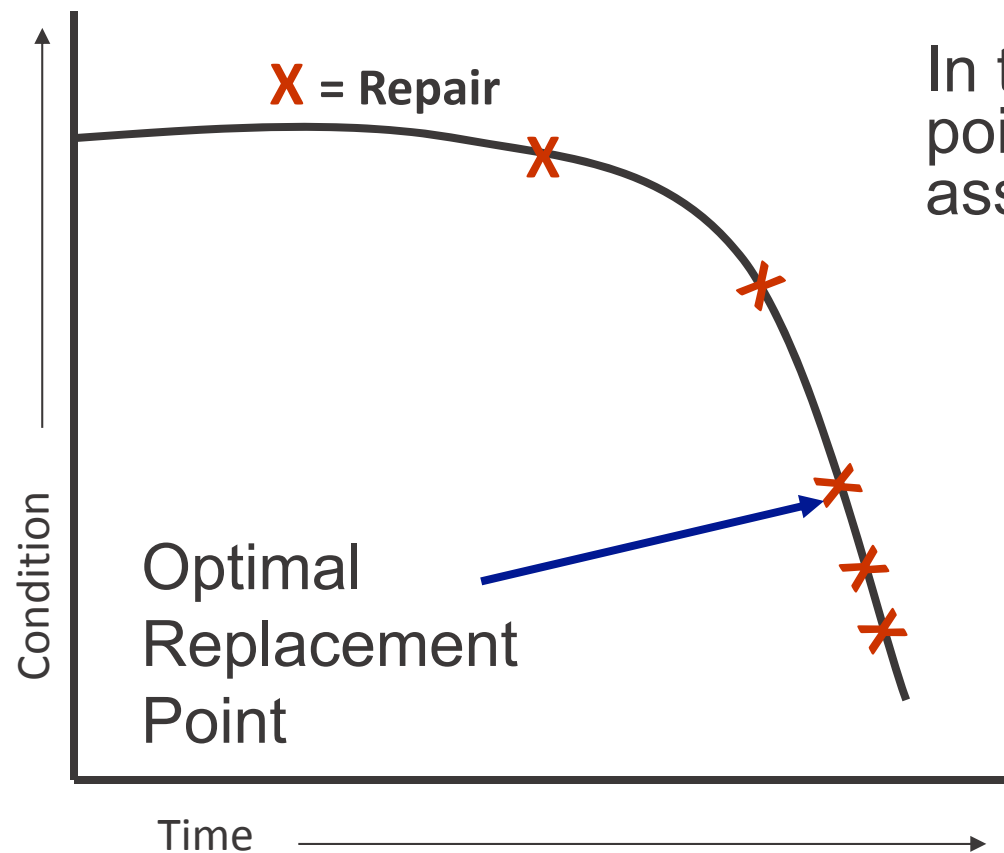


Asset Criticality





Life Cycle Costing: Replacement of Assets



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

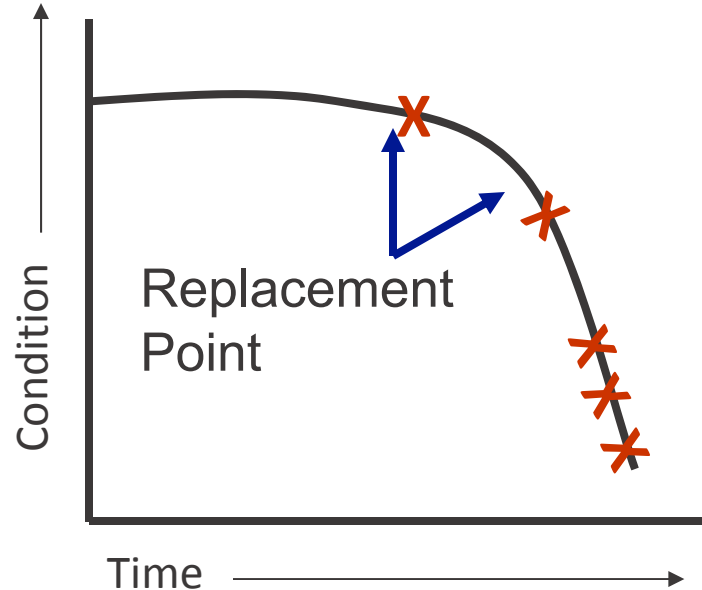
Not possible to know the optimal time to replace every asset

So... need to use the concept of risk

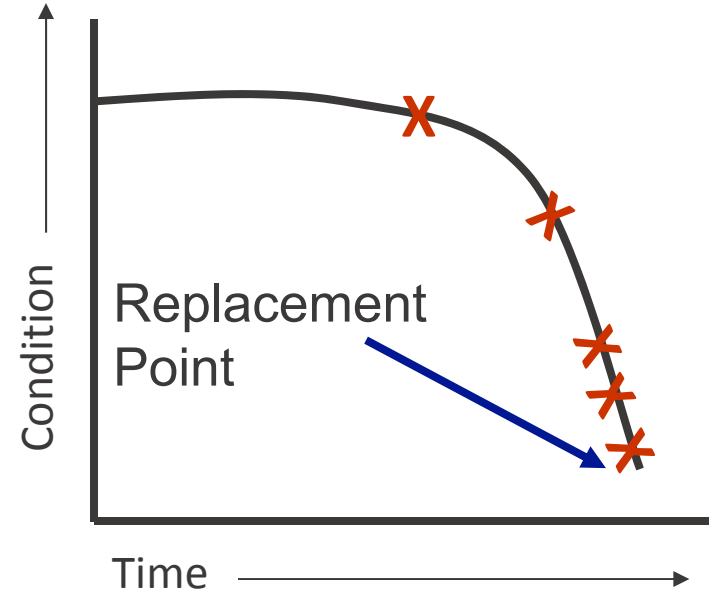


Life Cycle Costing & Risk

High risk assets:
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 Planning?

- A. We're doing it!
- B. Heard of it but
not doing it
- C. 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 population changes (growth, stagnation, decline)
- Identify deferred maintenance problems or where current service is inadequate



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.



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



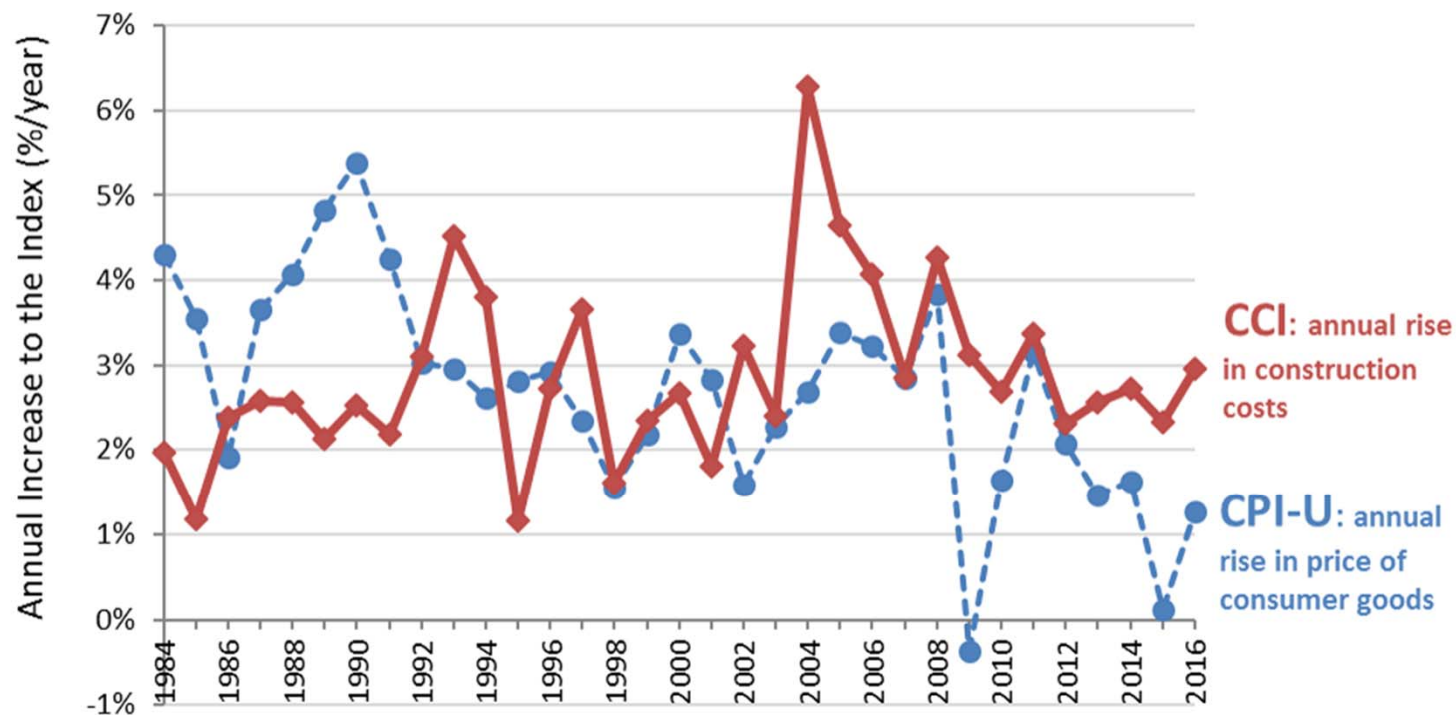
Measures of Inflation

- **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



The **Construction Cost Index (CCI)** has been rising faster than the **Consumer Price Index-Urban (CPI-U)** in recent years

Construction costs (CCI) rose on average of **2.6%/year** in the last five years, while consumer goods (CPI-U) only rose an average of **1.3%/year** in the same period



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

Data Sources: Bureau of Labor Statistics (CPI-U), Engineering News-Record ENR.com (CCI), InflationData.com (CPI-U), USDA Natural Resources Conservation Services (spreadsheet containing CCI and CPI-U).

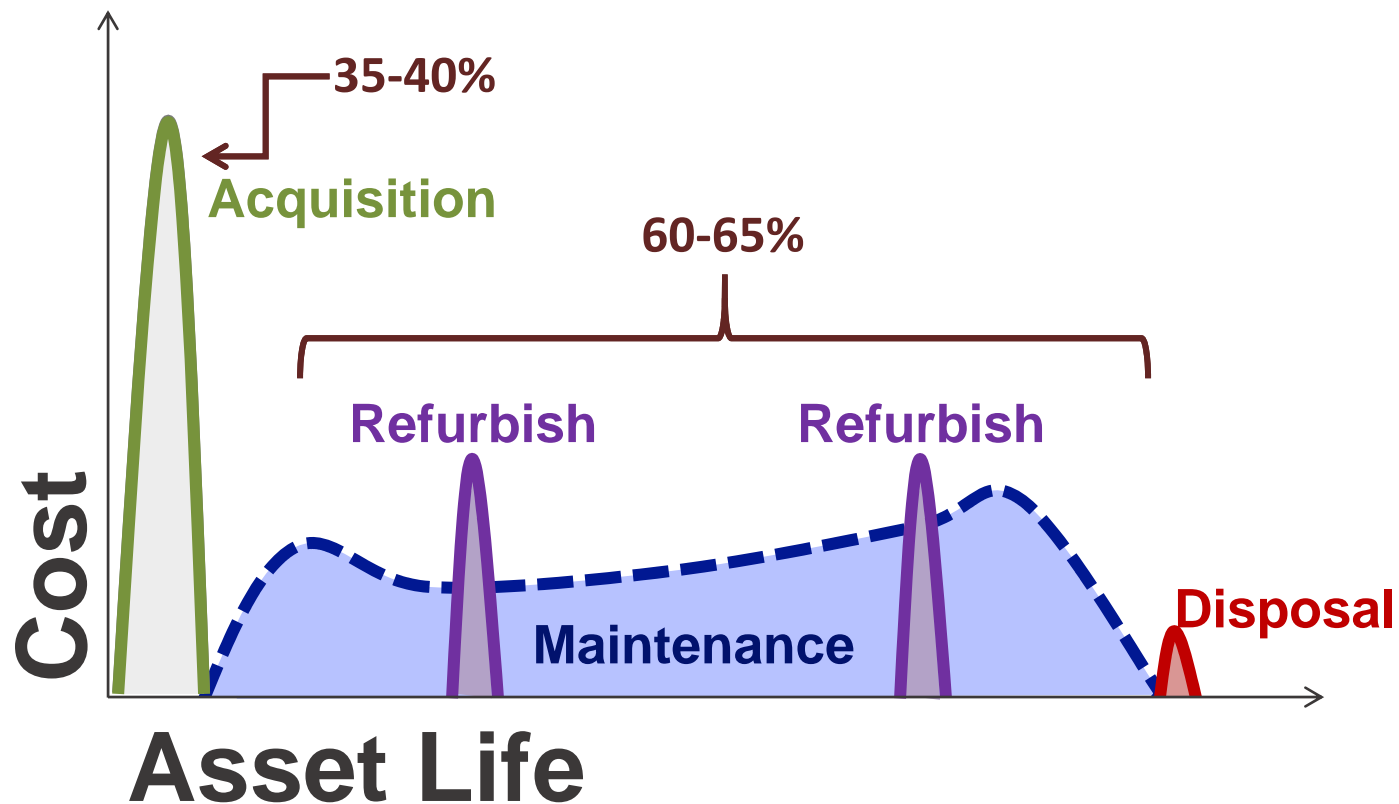


Reminder: Life Cycle Costing

- Purchase Price \neq Total Price



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



Source: Adapted from Steve Allbee, USEPA



Plan to Pay: Scenarios to Fund your C.I.P.

<http://efc.sog.unc.edu> or <http://efcnetwork.org>

Find the most up-to-date version in Resources / Tools

Free, simplified Excel tool allowing you to list your capital projects and plans for funding them, and automatically estimates rate increases

Tool developed by
UNC ENVIRONMENTAL FINANCE CENTER

Plan to Pay: Scenarios to Fund your C.I.P. (Capital Improvement Plan)

Version 2.6 (Updated November 2015)

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

Financed	\$	950,000
Pre-Exist	\$	750,000

Current Fiscal Year

Only capital projects that start next year (i.e., in FY16) for the next 20 years can be included in this Capital Improvement Plan.

Water and Sewer Rates in FY15

Input the residential customer water & sewer rates at 5,000 gallons/month of use and 12 months. Round to monthly rates.

Volume Rate at 5,000 gallons/month (5,000 gallons)	\$	5.47
Monthly Rate (Name "Minimum Charge")	\$	17.14

Expected Revenues and Expenses in FY15

Annual Operating and Non-Operating Revenues

Annual Non-Capital Expenses (Water, Sewer, etc.)	\$	4,525,000
Expected Annual Interest on Revenues (FY15)	\$	3.7%

Usage Billed to Customers in FY15

Residential	Non-Residential
Number of Customers	2,000
Monthly Use (1,000's of gallons)	200
Annual Customer Rate (Monthly Payment)	\$ 194

CAPITAL IMPROVEMENT PROJECTS - 20 YEARS

Project Name	Project Construction Period	Project Construction Cost	Annual Construction Cost	Estimated Cost at the End of the Year
Project 1: Water Main Replacement	FY15 - FY16	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
Project 2: Sewer Main Replacement	FY16 - FY17	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000
Project 3: Water Treatment Plant Upgrade	FY17 - FY18	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000
Project 4: Sewer Treatment Plant Upgrade	FY18 - FY19	\$ 2,500,000	\$ 2,500,000	\$ 2,500,000
Project 5: Water Main Replacement	FY19 - FY20	\$ 3,000,000	\$ 3,000,000	\$ 3,000,000

Estimated Rate Changes Needed to Maintain the Fund Balance

	FY15	FY16	FY17	FY18
Year Increase (Decrease) in Rate (Name and Volume)	N/A	0.0%	0.1%	0.2%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.00	\$1.01	\$0.79
Increase (Decrease) in the Monthly Rate Charge	N/A	\$0.00	\$0.64	\$0.34
Monthly Rate Charge ("Minimum Charge")	\$12.34	\$12.34	\$12.98	\$13.31
Volume Rate at 5,000 gallons/month (5,000 gallons)	\$5.47	\$5.47	\$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 (5)	\$29.35	\$29.35	\$30.94	\$31.65

Projected Fund Balance

	FY15	FY16	FY17	FY18
Total Revenues	\$ 1,010,000	\$ 1,010,000	\$ 1,010,000	\$ 1,010,000
Base Charges	\$ 1,176,960	\$ 1,176,960	\$ 1,176,960	\$ 1,176,960
Usage Charges	\$ 3,175,840	\$ 3,175,840	\$ 3,175,840	\$ 3,175,840
Interest Earned from Previous Year's Positive Balance	\$	\$ 9,405	\$ 9,167	\$ 8,927
Revenues from Other Sources (Reserve Charges)	\$ 103,200	\$ 103,200	\$ 103,200	\$ 103,200

Financial Reserves (End of Year)

Rate Increases

Total Capital Expenses


Total Cumulative System Investment









Software: CUPSS (EPA)

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





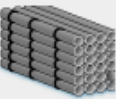





**Check Up Program for Small Systems**Set-up | Switch Utility | Create User | Help | Training | Exit

 **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](#) [Enter a New Task or Work Order](#) [Create or Update My Schematic](#) [Search Asset and Maintenance](#) [Create or Update My Inventory](#) [Enter My Finances](#) [Print My Check Up Reports](#) [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