

A blue-tinted photograph of industrial machinery, possibly a water treatment plant, featuring large pipes and valves.

# Long Term Capital Planning

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# Session Objectives

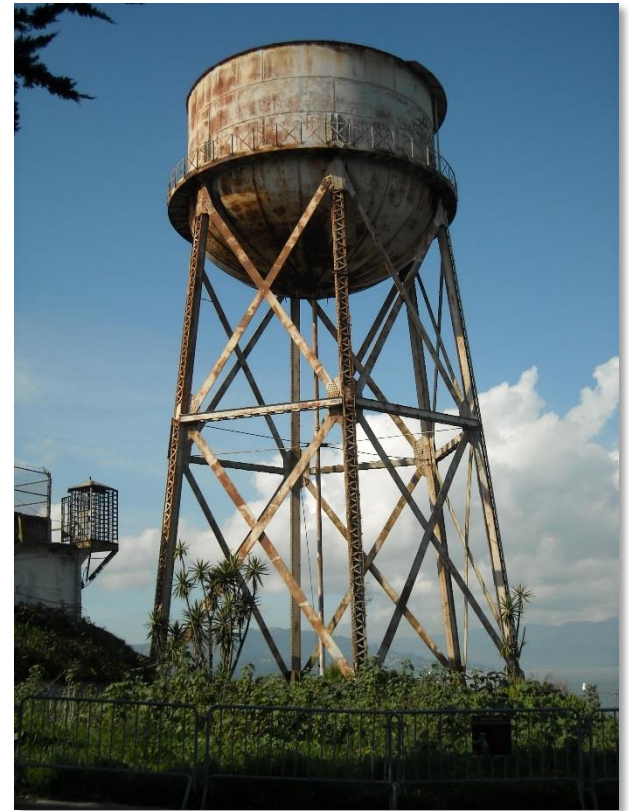
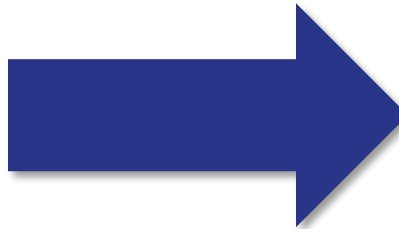
- Learn about two aspects of long-term system planning: asset management and capital planning
- Figure out how to pay for the future needs

# Infrastructure or Capital Assets





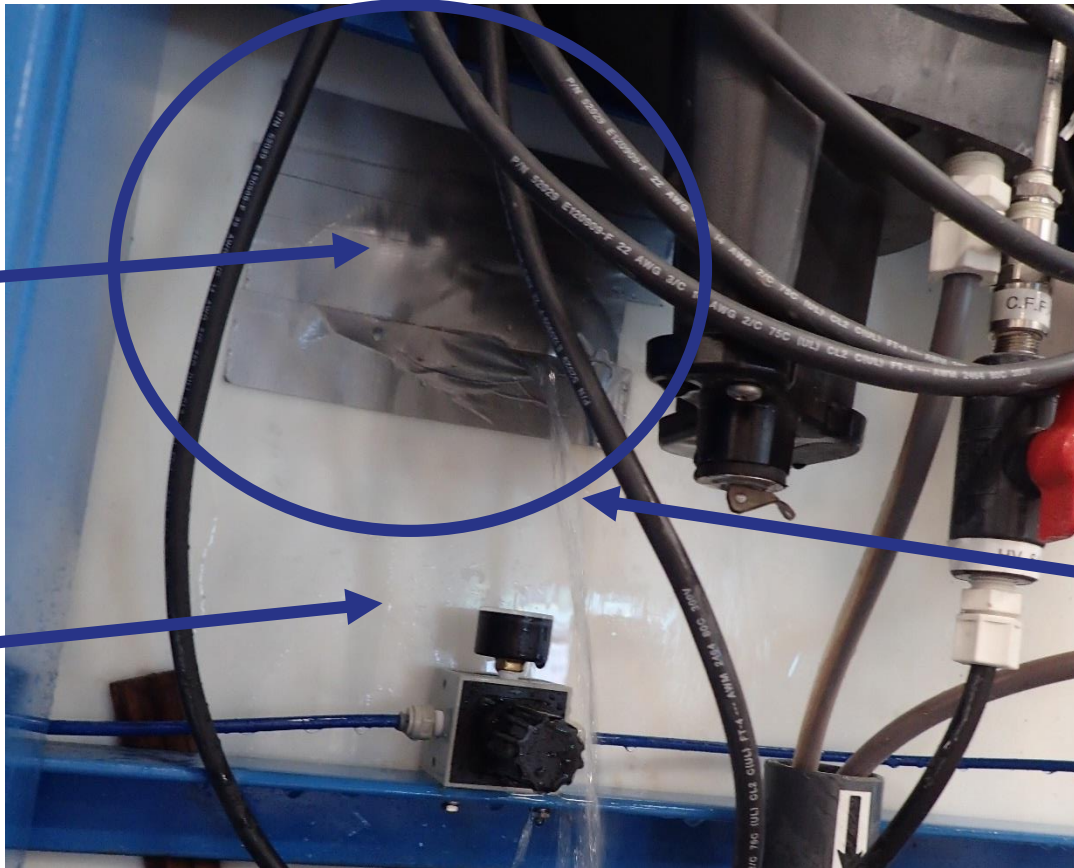
# Infrastructure Wears Out



# 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



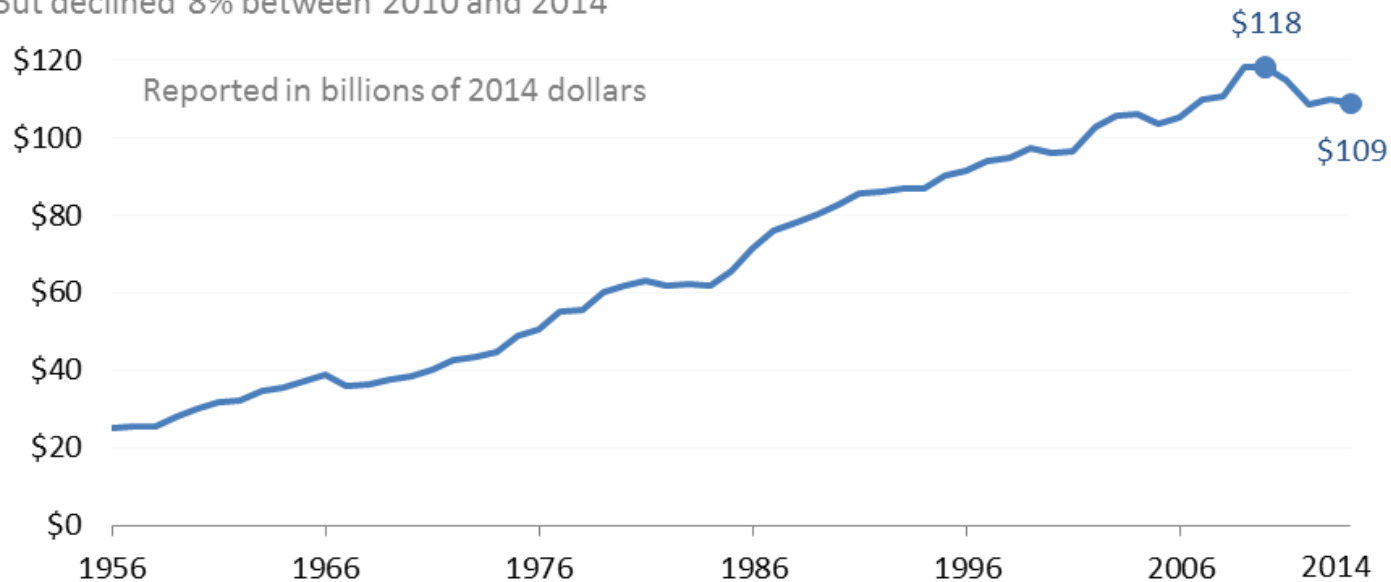
# Capital Finance Today

- 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.

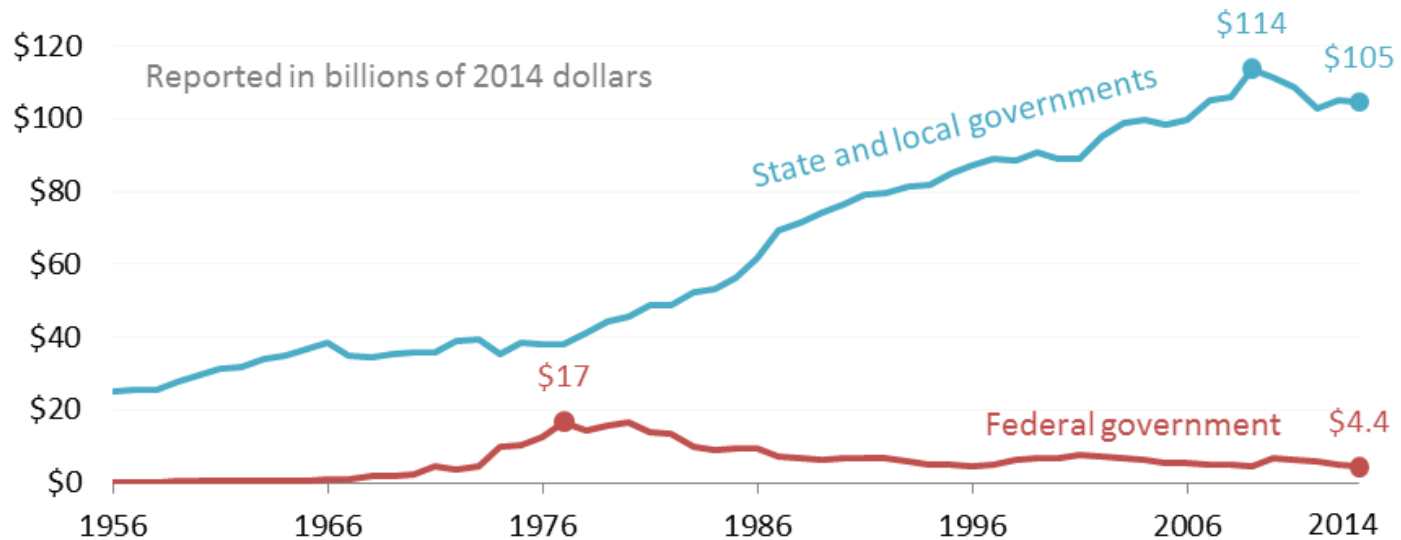
Source: Congressional Budget Office supplemental data for the *Public Spending on Transportation and Water Infrastructure, 1956 to 2014* report (March 2015). Displays public spending on supply systems for distributing potable water as well as wastewater and sewage treatment systems and plants. Real spending 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

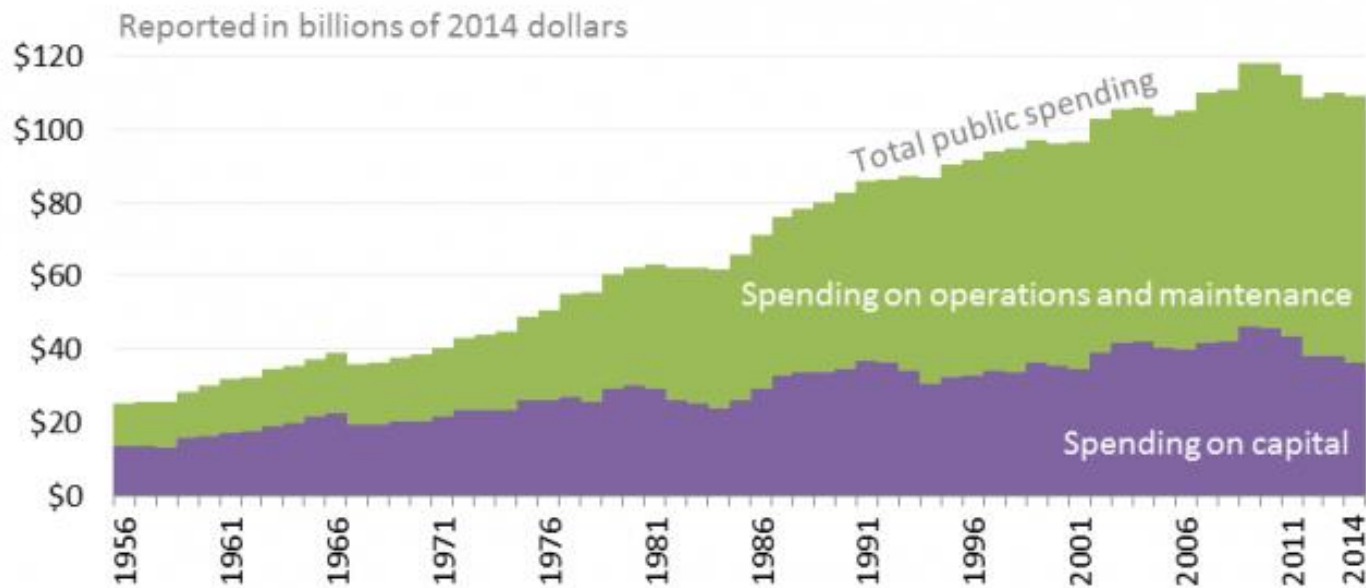


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# ...And Mostly for O&M, not Capital

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



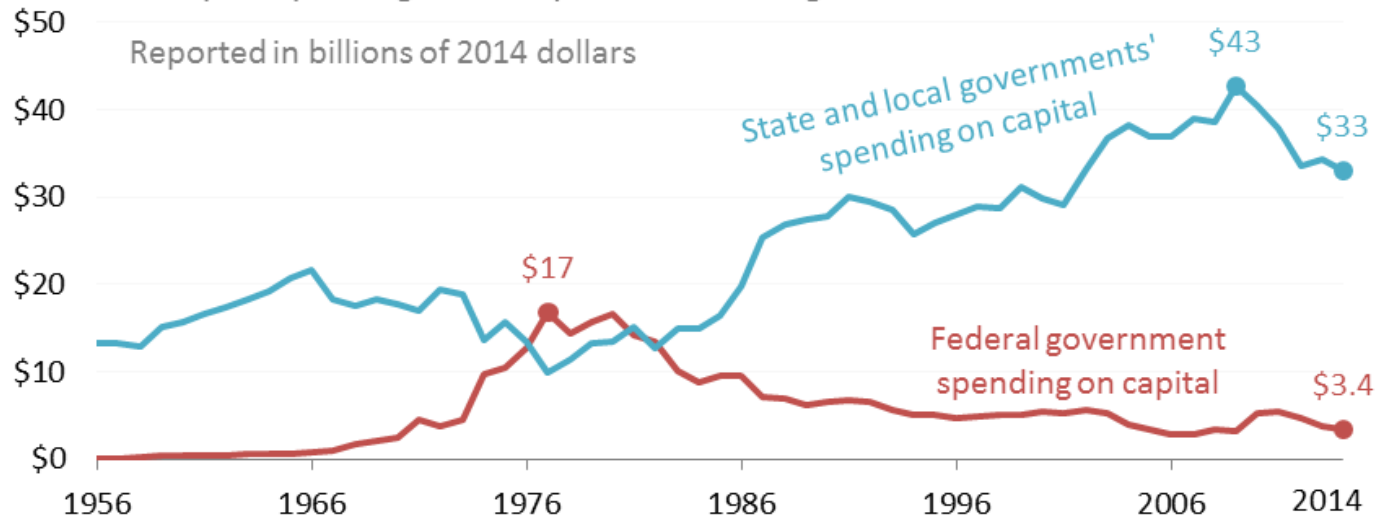
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# Feds Used to Spend More on Capital

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/>

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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

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



# 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 **D+**

Rail **B**

Roads **D+**

Schools **D**

Solid Waste **C+**

Transit **D-**

**Wastewater** **D+**



# 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



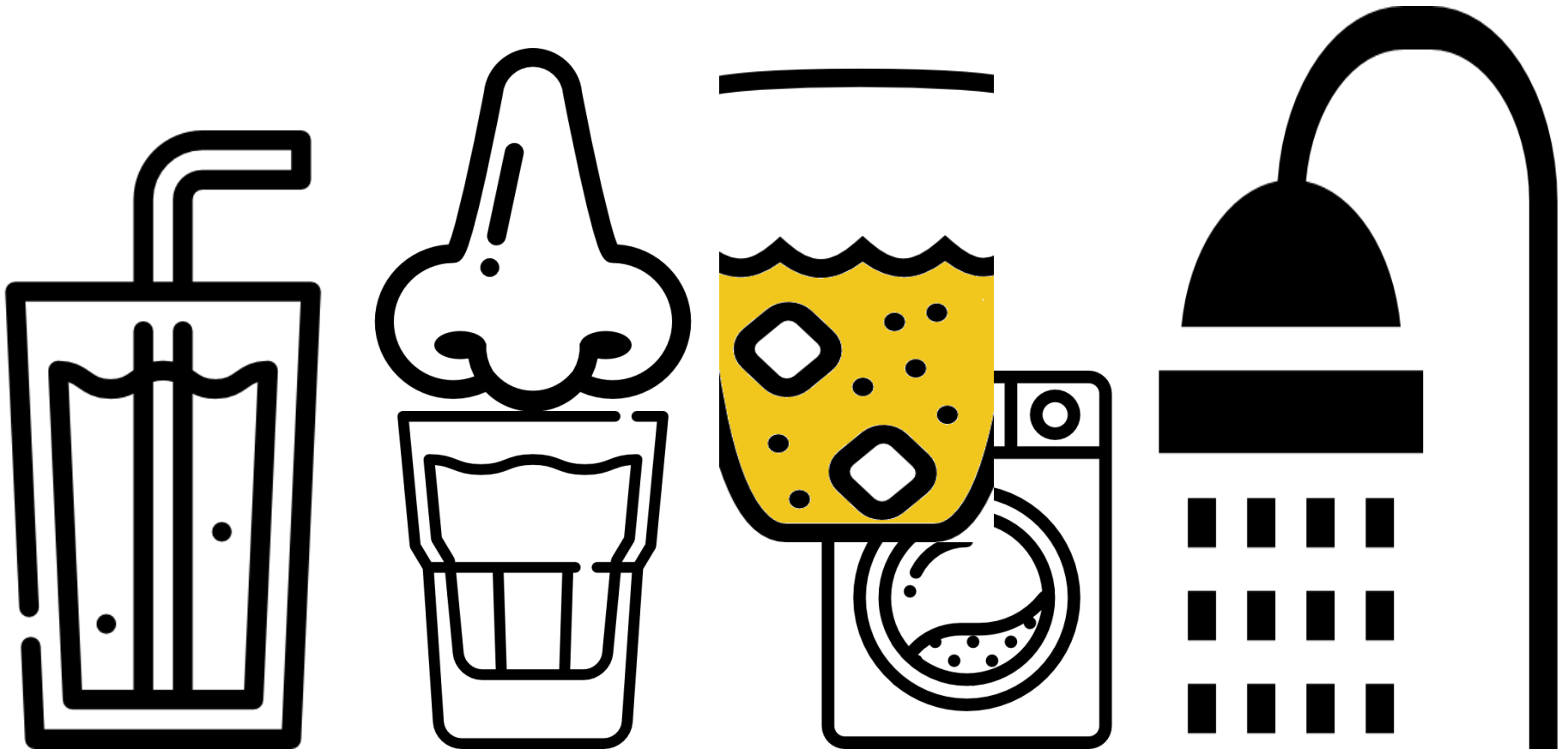
Track Progress  
Towards  
Meeting Goals

Involve  
Staff



What would my customers want?

What do customers care about?



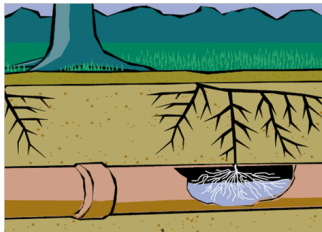


# Asset Criticality

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





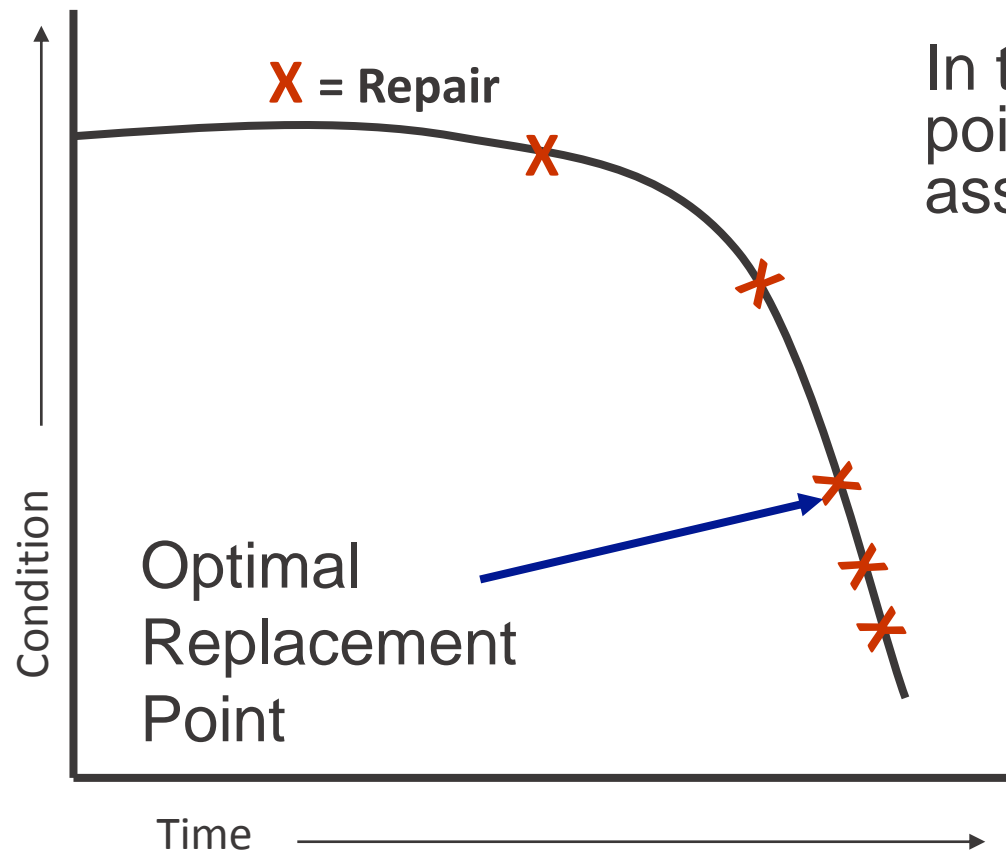
# Quick Exercise—4 Assets

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

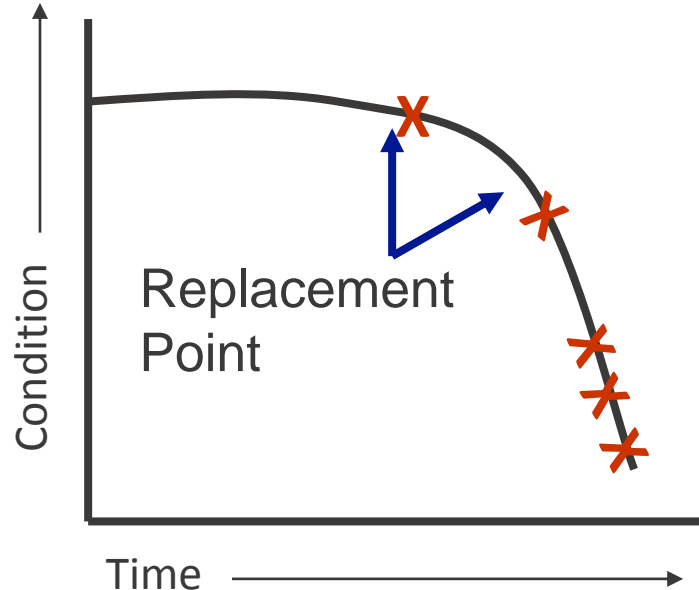
Not possible to know the optimal time to replace every asset

So... need to use the concept of risk

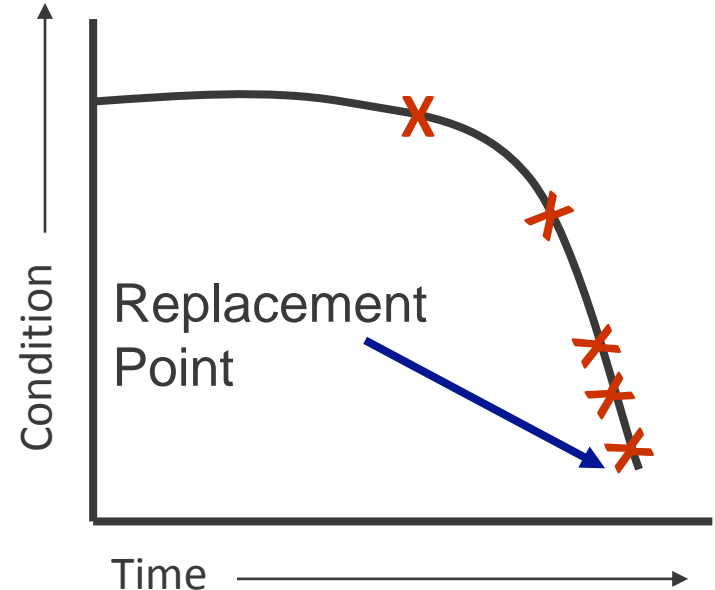


# Life Cycle Costing & Risk

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



# 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.

A blue-tinted photograph of industrial machinery, possibly a pump or engine, with various pipes and mechanical components visible.

# Where Can You Find the Prices?

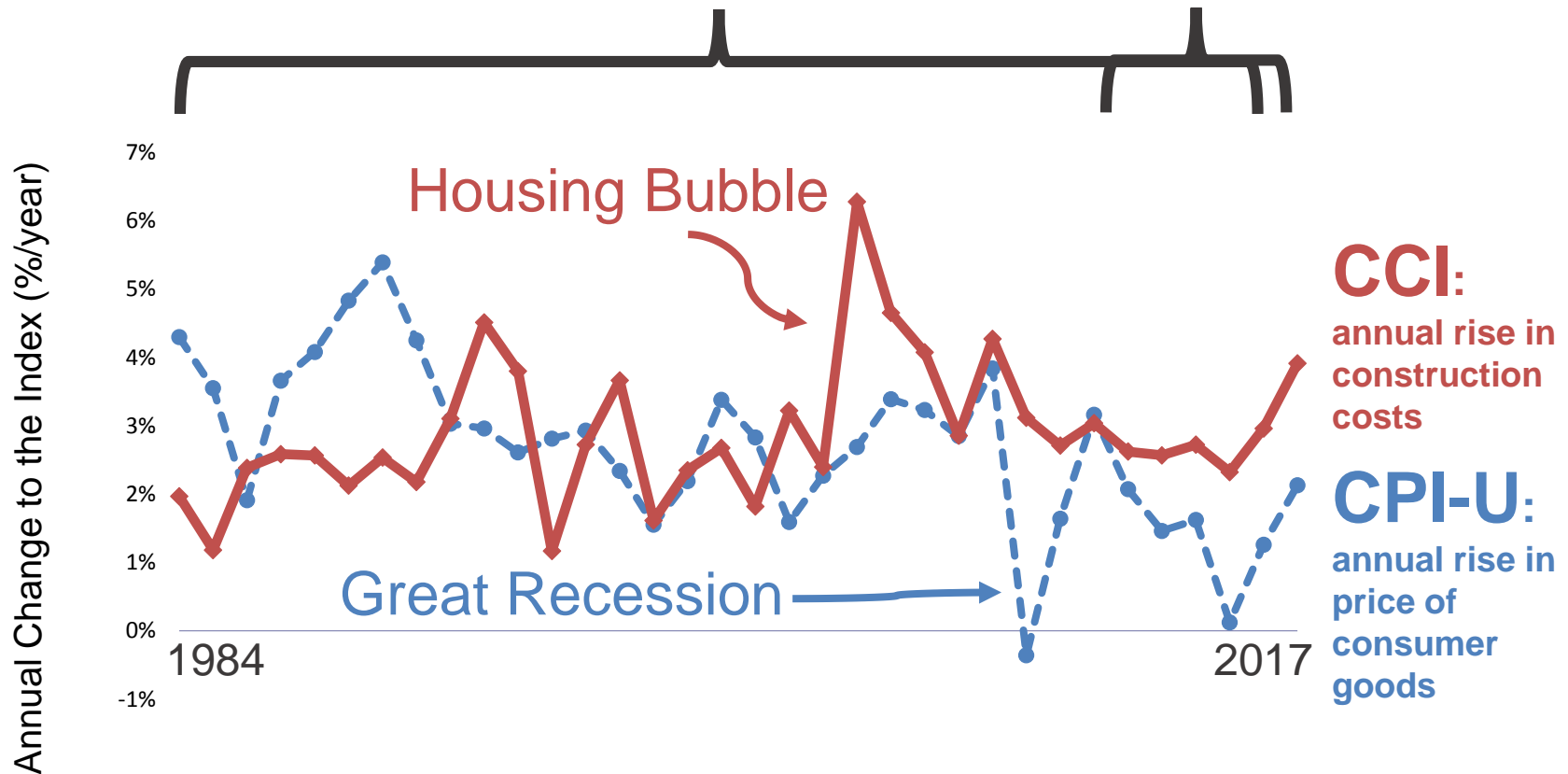
- Call a vendor. Actually, call a few.
- Ask other systems
- Look at past expenses but adjust for increases in costs



# 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

Since 1984: Last 5 Years:  
**CCI: 2.9%/yr.** **CPI-U: 2.9%/yr.** **CPI-U: 1.3%/yr.**



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).

Source: *Environmental Finance* blog post available at <http://efc.web.unc.edu/2012/09/26/using-an-index-to-help-project-capital-costs-into-the-future/>

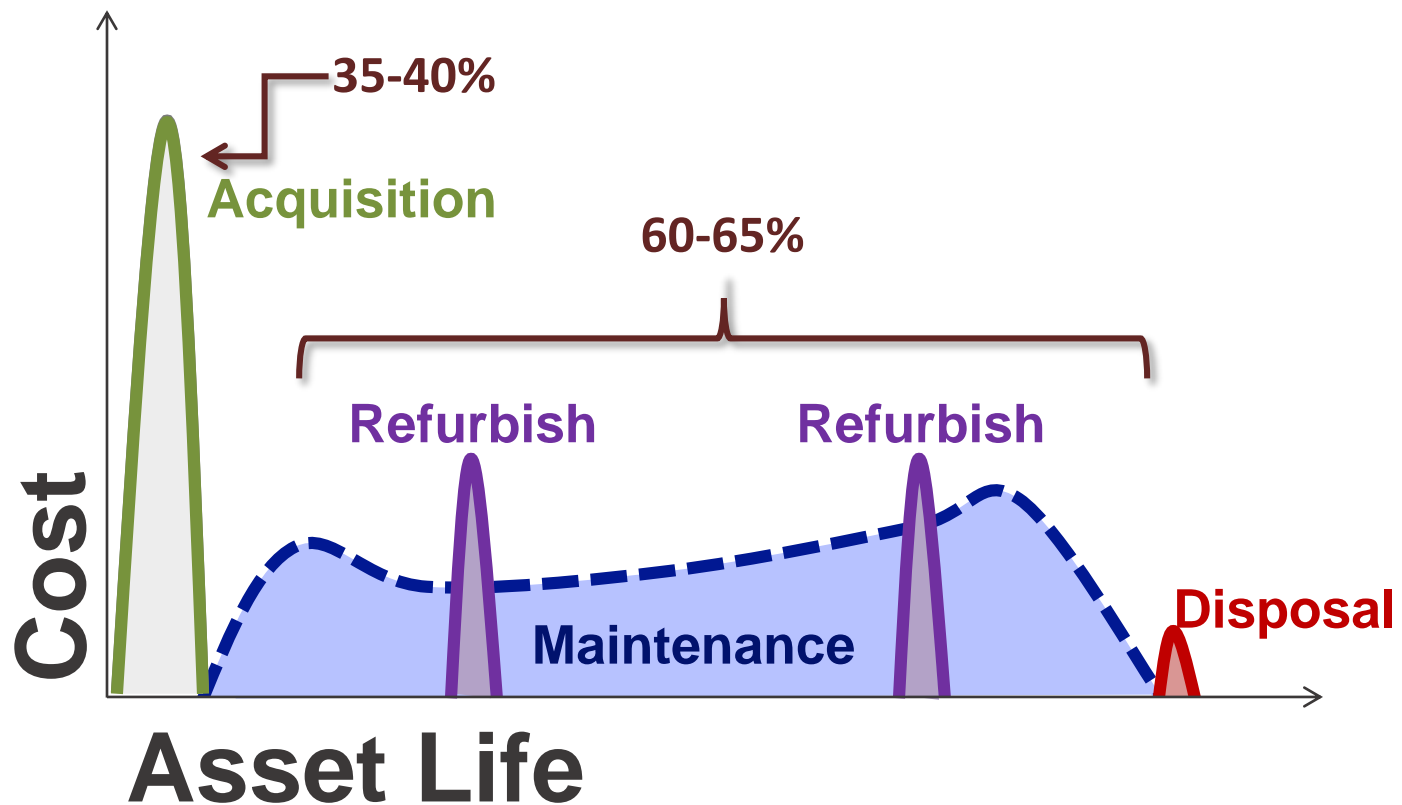


A blue-tinted photograph of industrial machinery, possibly a large pump or engine, with various pipes, valves, and mechanical components visible.

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

**Pre-Exist**  
Input amount incurred for

**Capital Improvement Projects - 20 Years**

Project	Project Description	Project Start Year	Project End Year	Project Cost (\$)	Project Cost (\$/Year)	Project Cost (\$/Gallon)	Project Cost (\$/Gallon/Year)
1	Water main replacement	2015	2016	100,000	100,000	0.10	0.10
2	Water main replacement	2016	2017	100,000	100,000	0.10	0.10
3	Water main replacement	2017	2018	100,000	100,000	0.10	0.10
4	Water main replacement	2018	2019	100,000	100,000	0.10	0.10
5	Water main replacement	2019	2020	100,000	100,000	0.10	0.10

**Expected Revenues and Expenses FY15**

Category	FY15	FY16	FY17	FY18
Operating and Non-Operating Revenues	5,000,000	5,000,000	5,000,000	5,000,000
Operating and Non-Operating Expenses	5,000,000	5,000,000	5,000,000	5,000,000
Net Income	0	0	0	0

**Usage Billed to Customers in FY15**

Category	FY15	FY16	FY17	FY18
Operating and Non-Operating Revenues	5,000,000	5,000,000	5,000,000	5,000,000
Operating and Non-Operating Expenses	5,000,000	5,000,000	5,000,000	5,000,000
Net Income	0	0	0	0

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

Category	FY15	FY16	FY17	FY18
Operating and Non-Operating Revenues	5,000,000	5,000,000	5,000,000	5,000,000
Operating and Non-Operating Expenses	5,000,000	5,000,000	5,000,000	5,000,000
Net Income	0	0	0	0

**Projected Fund Balance**

Category	FY15	FY16	FY17	FY18
Operating and Non-Operating Revenues	5,000,000	5,000,000	5,000,000	5,000,000
Operating and Non-Operating Expenses	5,000,000	5,000,000	5,000,000	5,000,000
Net Income	0	0	0	0

**Financial Reserves (End of Year)**

**Total Capital Expenses**


**Rate Increases**







**Total Cumulative System Investment**

# Software: CUPSS (EPA)

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



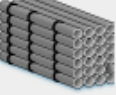







**Check Up Program for Small Systems**Set-up | Switch Utility | Create User | Help | Training | Exit

 **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

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