



Long Term Capital Planning



Session Objectives

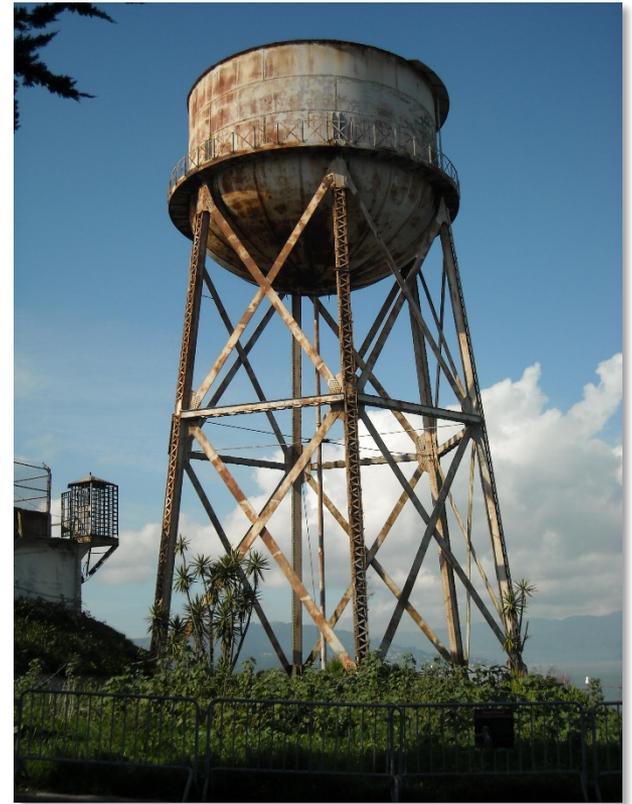
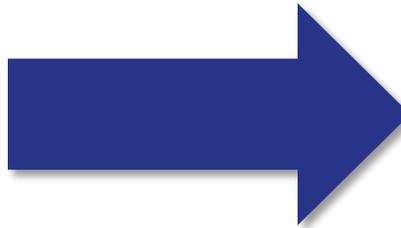
- Learn about two aspects of long-term system planning: asset management and capital planning
- Figure out how to pay for the future needs

Infrastructure or Capital Assets





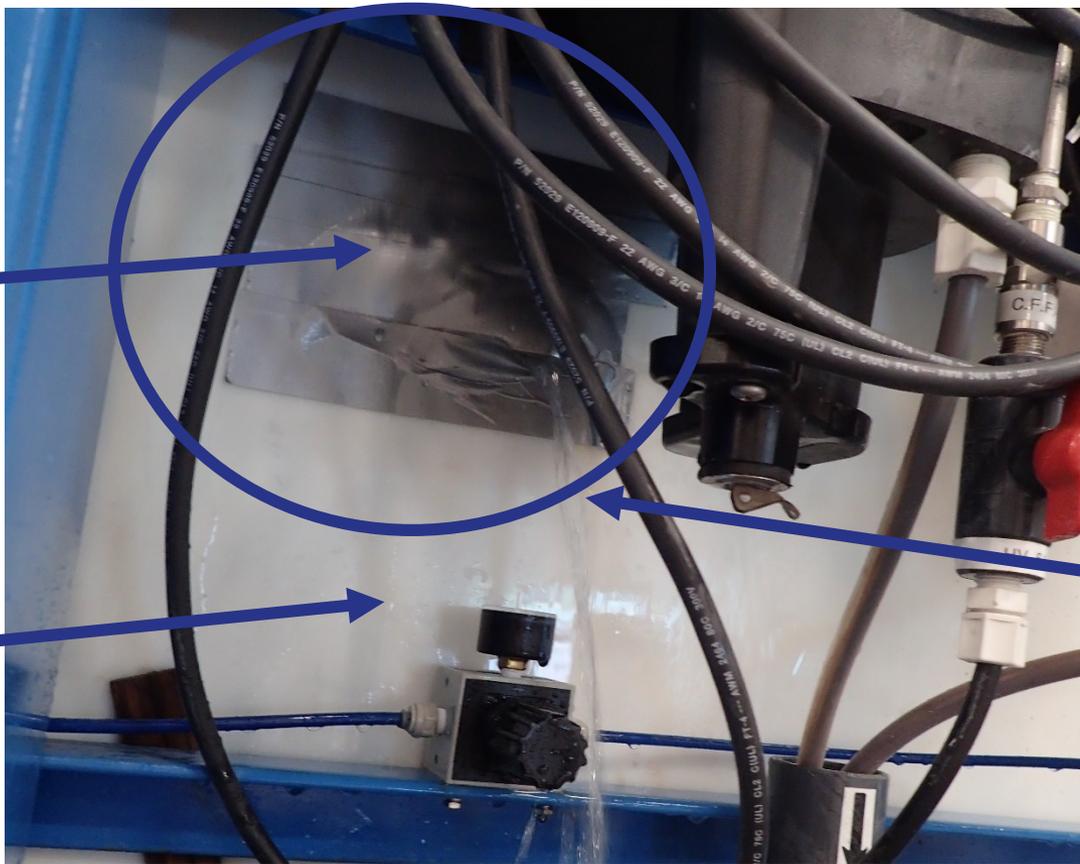
Infrastructure Wears Out



Infrastructure Wears Out



Water
Tank



Leak

Poor Investment → Poor Infrastructure

2017

INFRASTRUCTURE
REPORT CARD

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America's Infrastructure Scores a

D+

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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+**

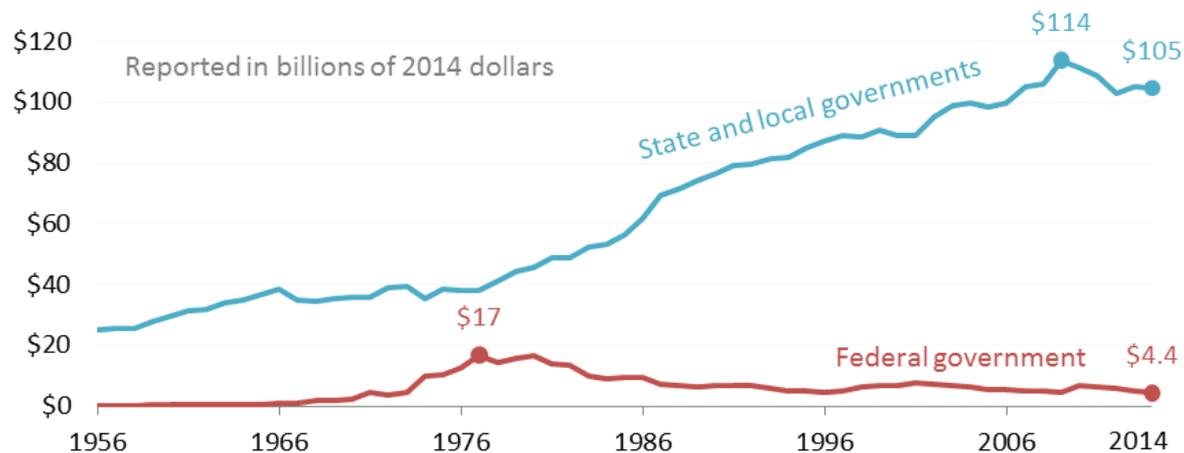


A few hard truths

The onus will continue to be on local governments to pay for their own infrastructure

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.

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

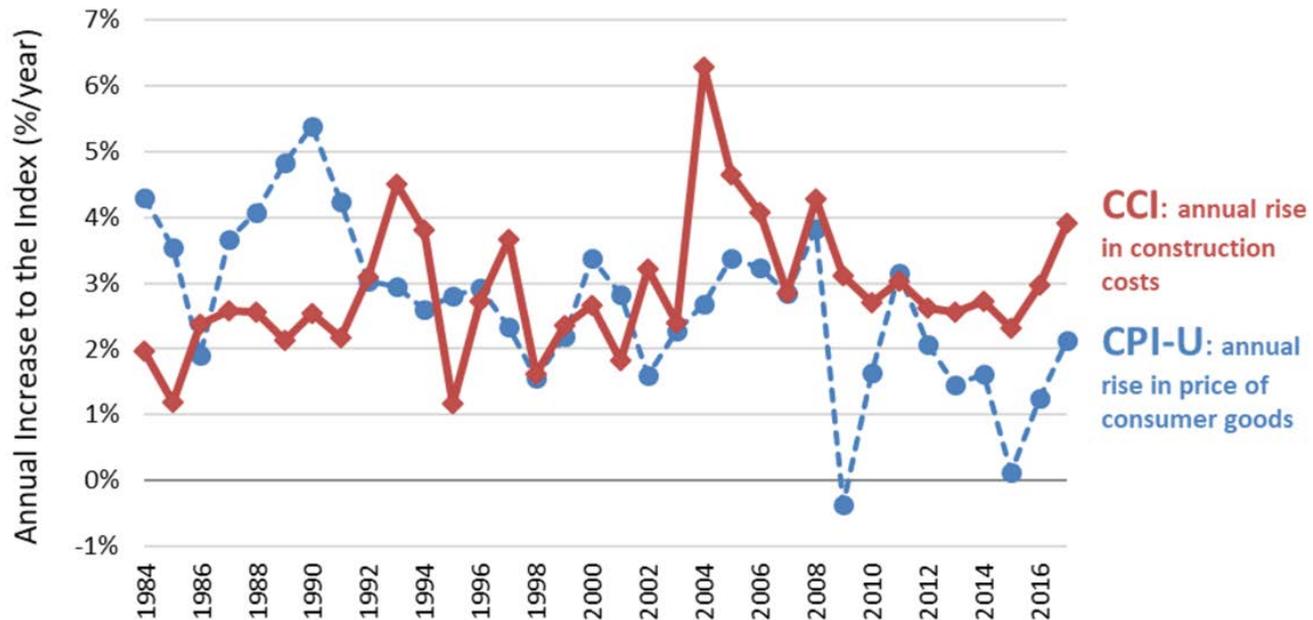
Construction costs will keep going up

Nationally, construction costs are growing at about 3%/year (CCI).

Faster than the “rate of inflation” (CPI-U).

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 **2.9%/year** in the last five years, while consumer goods (CPI-U) only rose an average of **1.3%/year** in the same period

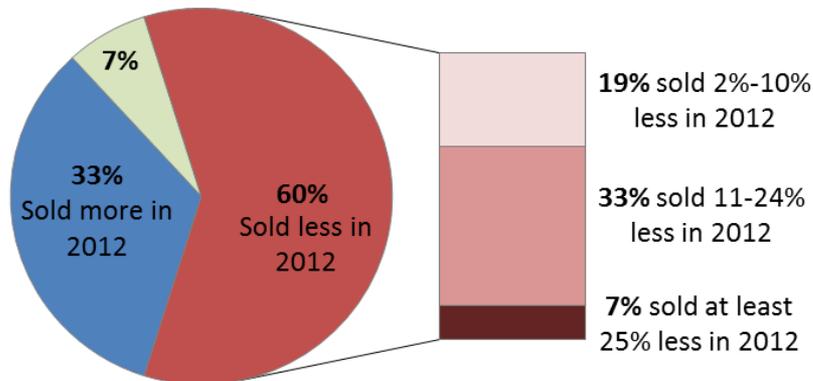


Data graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Data sources: Bureau of Labor Statistics (CPI-U), Engineering News-Record ENR.com (CCI), InflationData.com (CPI-U), USDA Natural Resources Conservation Services (spreadsheet containing CCI and CPI-U).

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

Water use is declining for many systems. Could mean lower revenues.

**Total Water Volume Sales in 2012 Compared to 2006 in
129 Utilities Nationwide**



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Biennial, national AWWA-RFC Water and Wastewater Rate Surveys in 2006 and 2012. Water utilities that reported their total daily gallons sold (MGD) in 2006 and 2012 are included in this analysis. 81% of the sampled utilities increased total number of accounts from 2006 to 2012.

Source: EFC *Environmental Finance* blog post “Even Total Water Demand is on the Decline at Many Utilities”
<http://efc.web.unc.edu/2014/04/15/total-water-demand-on-the-decline/>



A few hard truths

- Local governments need to incorporate capital costs in their budgets – do not rely (solely) on grants.
- Operations and capital costs are going up.
- Water demand (driver of main source of revenue) may be going down for many municipalities.
 - Assess your water billing data and run different (conservative) scenarios when budgeting.



Capital planning efforts

Asset Management Plan: a long-term plan (20+ years) identifying when each existing asset may need to be replaced or rehabilitated.



Capital Improvement Plan: a multi-year plan identifying capital projects in the next few years, their costs, and how they will be funded.

Asset Management...are you doing it?

Heck yeah!

Heard of it, but not
doing it yet!

Yeah...I don't know what
you're talking about



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



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 Asset Management



- 1) Current State of the Assets
- 2) Level of Service
- 3) Criticality
- 4) Life Cycle Costing
- 5) Long-Term Funding



Current state of the assets

List all of your 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?



Example of an Asset Inventory

Asset Inventory

ID Number	Category	Type	Size	Manufacturer	Serial Number	Location	Installation Date	Condition	Energy user Y/N (if Yes, see Energy Inventory)	Comments

Source: A.M. KAN Work!



Level of Service

Involve
Customers



Measurable
Goals: Internal  and External

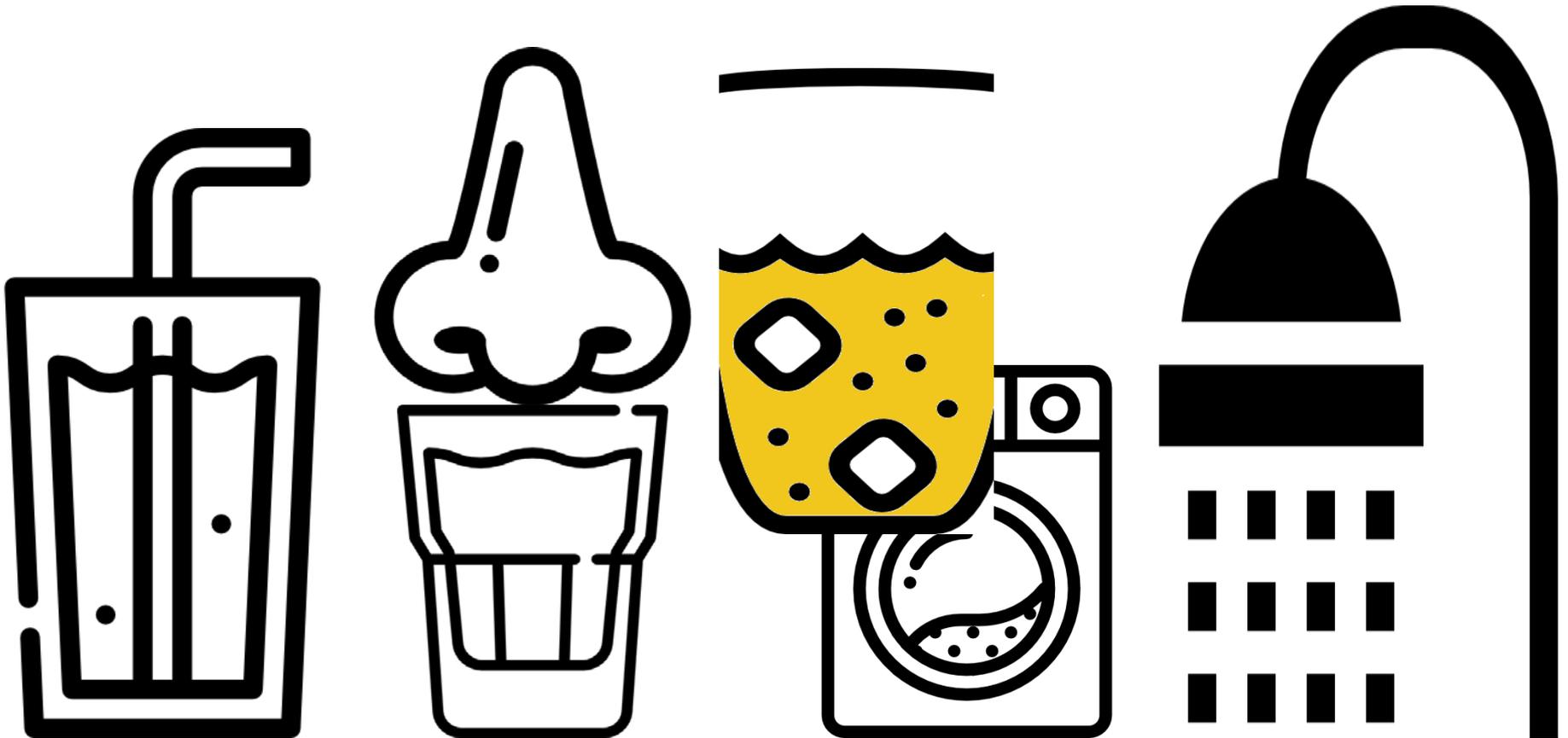
Track Progress
Towards
Meeting Goals

Involve
Staff



What would my customers want?

What do customers care about?



Criticality – 2 parts

What is the **probability or likelihood** that a given asset will fail?

What is the **consequence** if the asset does fail?



Asset Criticality





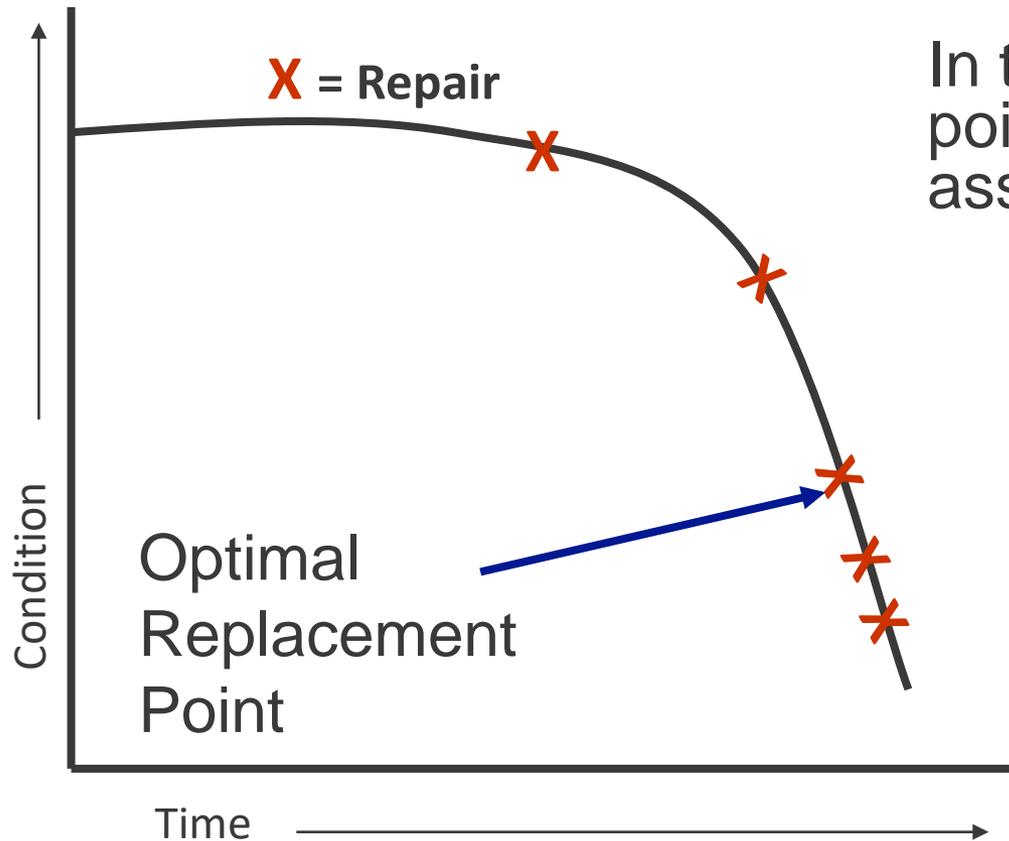
Quick Exercise—4 Assets

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



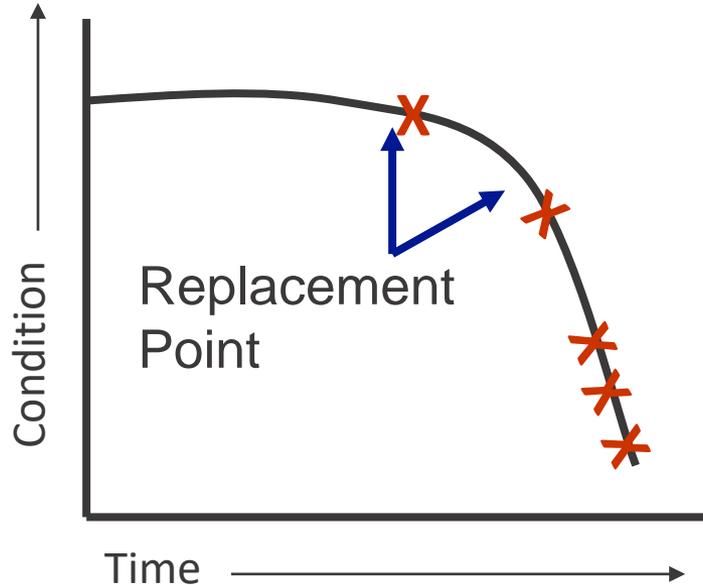
In theory, there is an exact right point at which to replace an asset

Not possible to know the optimal time to replace every asset

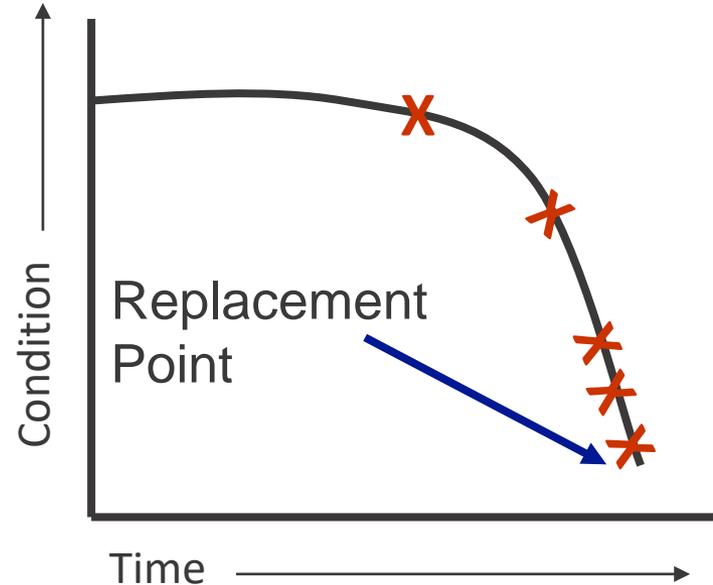
So... need to use the concept of risk

Life Cycle Costing & Risk

High risk assets:
replace assets early,
before failure



Low risk assets:
run to failure and
replace afterwards



Prioritize asset rehabilitation / replacement

Example System Inventory Worksheet							Prioritization Worksheet		
Date Worksheet Completed/Updated: 8/14/02									
Asset	Expected Useful Life	Condition	Service History	Adjusted Useful Life	Age	Remaining Useful Life	Importance	Redundancy	Priority (1 is high)
Well 1 (1993)	30	Good		30	9	21	Needed for service	Other well, but need backup	6
Well 1 pump	10	Good	Rehab (1996)	10	9	1	Needed for service	Other well, but need backup	3
Well 2 (1993)	30	Good		30	9	21	Needed for service	Other well, but need backup	6
Well 2 pump	10	Good	Rehab (1998)	10	9	1	Needed for service	Other well, but need backup	3
Pumphouse (1993)	30	Good		30	9	21	Needed for service	Other well, but need backup	6
Electrical componenty	10	Some corrosion	Rehab (1994)	10	9	1	Needed for control	No redundancy - corrosion	2
Chlorinator (1993)	10	Good	Rehab (1998)	5	3	2	Mandatory	No redundancy - need backup	1
Storage tank 1 (1993)	40	Good	Rehab (2000) - \$17,000	40	9	31	eed for fire flow and demand	Other tanks	6
Storage tank 2 (1993)	40	Good	Rehab (2000) - \$17,000	40	9	31	eed for fire flow and demand	Other tanks	6
Storage tank 3 (2000)	40	Almost new		40	2	38	eed for fire flow and demand	Other tanks	6
Distribution System:									
Hydrants (15)	40	Unknown		40	9	11	Needed for public safety	Other hydrants	5
Valves (45)	40	Unknown	6 valves don't work	40	9	11	Needed for isolation	Other valves, but some are out of service	4
6-inch (PVC)	60	Unknown		60	9	51	Needed for delivery	No redundancy	6
4-inch (PVC)	60	Unknown		60	9	51	Needed for delivery	No redundancy	6
2-inch (PVC)	60	Unknown	Repair breaks (2/year)	60	9	51	Needed for delivery	No redundancy	6

Source: EPA's "Asset Management: A Handbook for Small Systems"



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



Asset Management Plan – the summary

1. Inventory all of your assets
2. Assess their age, condition, and when do you expect the asset will need to be rehabilitated or replaced
3. Assess the criticality of each asset: likelihood of failure, and consequence of failure
4. Prioritize the assets into a timeline of when the system should aim to rehab/replace them
5. Focus on next few years and create a C.I.P.
6. Keep updating! Repeat steps 2-5.



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 Planning...are you doing it?

Heck yeah!

Heard of it but not
doing it yet!

yeah...I don't know what
you're talking about



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 Plan (CIP)

An official multi-year document that identifies and prioritizes capital projects in the near future, identifies funding sources, and sets timelines for projects.

May include projects not listed in the Asset Management Plan.

Example of a simple Capital Improvement Plan

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



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.

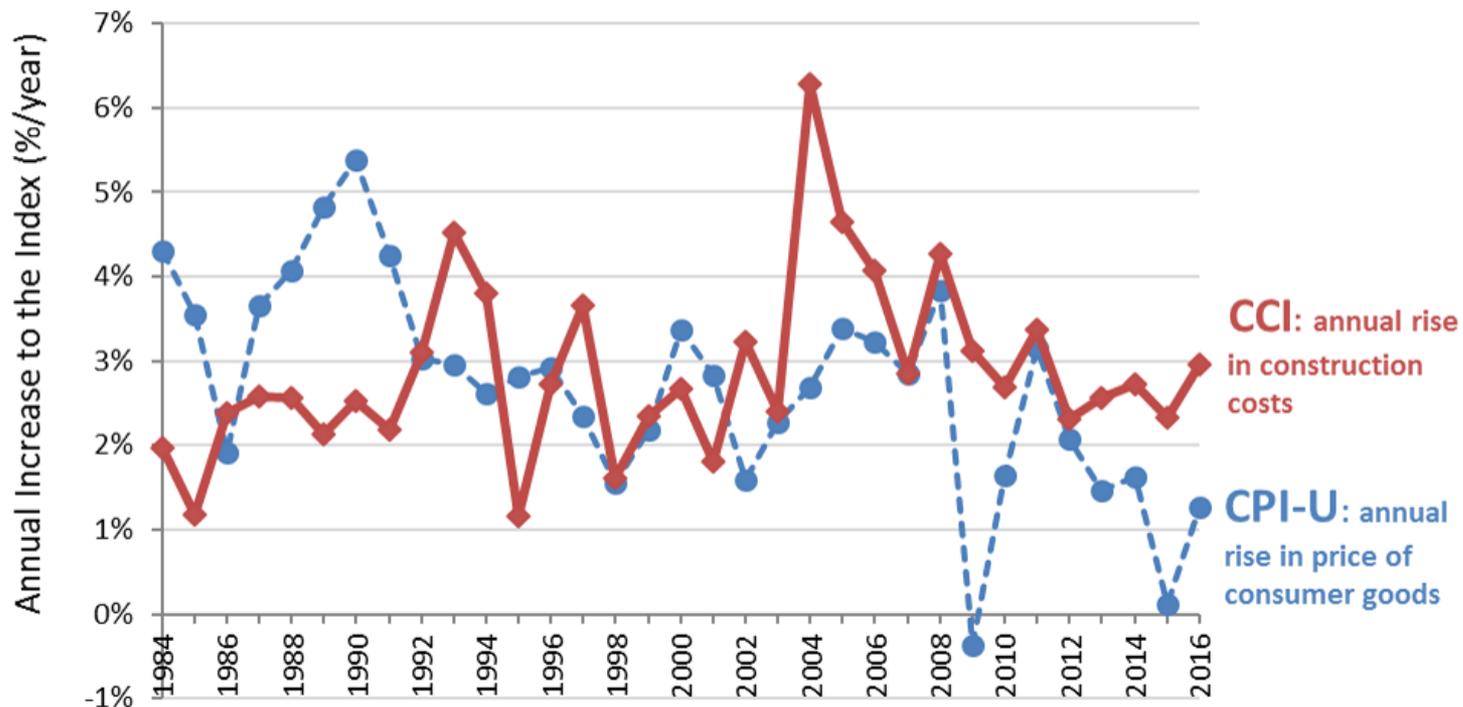


Measures of Inflation

- **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.

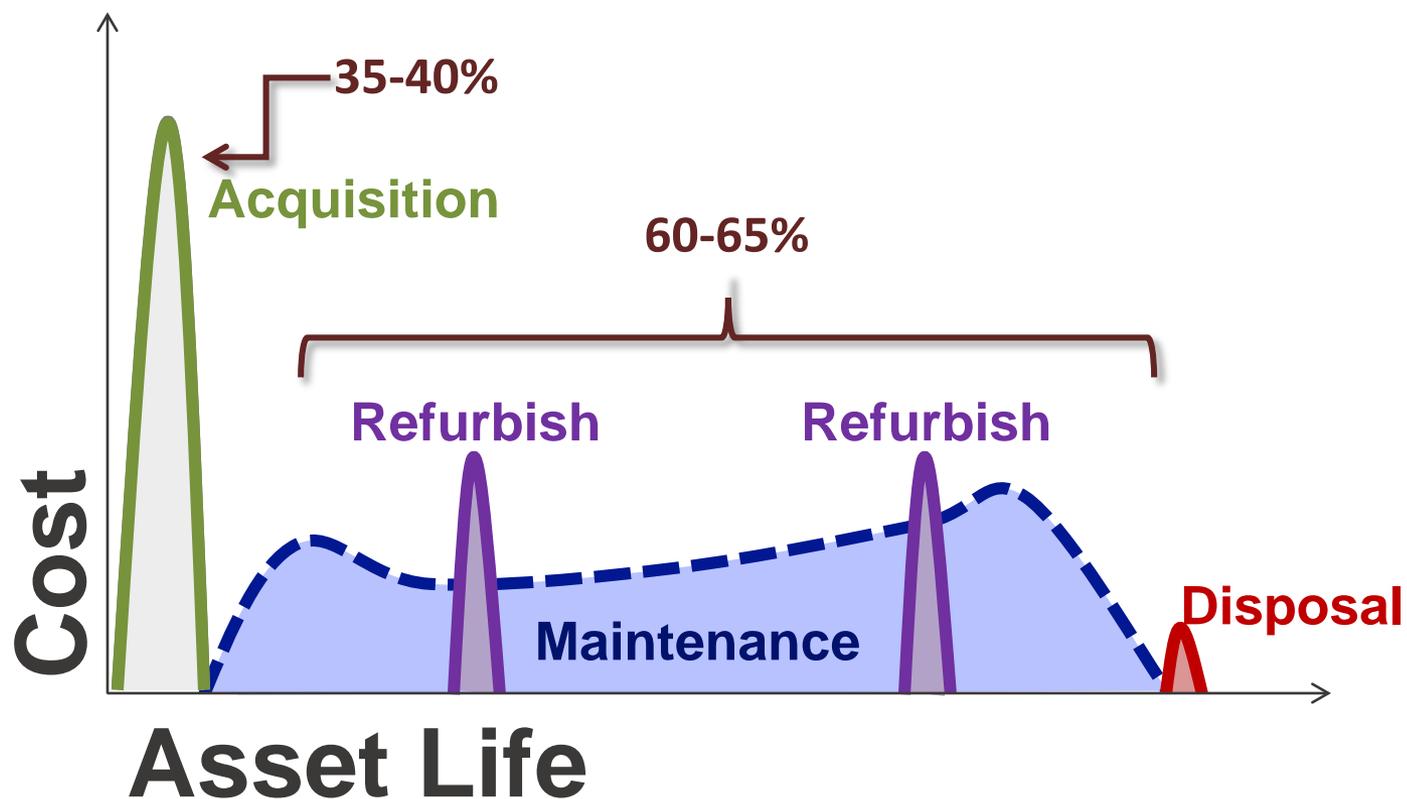
Data Sources: Bureau of Labor Statistics (CPI-U), Engineering News-Record ENR.com (CCI), InflationData.com (CPI-U), USDA Natural Resources Conservation Services (spreadsheet containing CCI and CPI-U).

A blue-tinted photograph of industrial machinery, including pipes and valves, serves as the background for the top portion of the slide.

Reminder: Life Cycle Costing

- Purchase Price \neq Total Price

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



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

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

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

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

Pre-Exist: input amount incurred for the year

CAPITAL IMPROVEMENT PROJECTS - 20 YEARS

Project Name	Project Completion Year	Project Construction Period (Years)	Estimated Construction Cost (Million \$)	Annual Contribution Factor (Percent)	Estimated Cost in the Start Year	End Year
Project 1 - Water Treatment Plant	2015	1	100.000	2.0%	1,000,000	2015
Project 2 - Sewer Treatment Plant	2017	1	200.000	2.0%	2,000,000	2017
Project 3 - Capital reserves replacement	2015	1	100.000	2.0%	1,000,000	2015
Project 4 - Distribution project, Street main	2015	1	100.000	2.0%	1,000,000	2015
Project 5 - unknown CIP	2015	1	300.000	2.0%	3,000,000	2015

Expected Revenues and Expenses FY15

Annual Operating and Non-operating Revenues: \$ 5,810,000
 Annual Non-Capital Expenditures (DM, Admin, etc.): \$ 4,520,000
 Expected Annual Balance of Expenditures (Percent): 2.2%

Usage billed to Customers in FY15

Residential: 100,000
 Non-Residential: 2,000
 Total Monthly Use (1,000's of gallons): 102,000
 Annual Customer Rate (Monthly): 1.2%

Estimated Rate Changes Needed to Maintain the Fund Balance

	FY15	FY16	FY17	FY18
5 Year Increase (Decrease) in Rate (Base and Volumetric)	N/A	0.1%	1.1%	2.0%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.09	\$1.51	\$0.79
Increase (Decrease) in the Monthly Base Charge	N/A	\$0.00	\$0.64	\$0.34
Monthly Base Charge ("Minimum Charge")	\$12.34	\$12.34	\$12.98	\$13.31
Volumetric Rate at 5,000 gallons/month (5,000 gallons)	\$5.67	\$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 (\$)	\$29.35	\$29.35	\$30.94	\$31.65

Projected Fund Balance

	FY15	FY16	FY17	FY18
Total Revenues	\$ 5,810,000	\$ 6,003,000	\$ 6,238,367	\$ 6,564,000
Base Charges	\$ 1,710,000	\$ 1,796,322	\$ 1,907,260	\$ 2,048,720
Usage Charges	\$ 3,120,000	\$ 3,206,678	\$ 3,318,108	\$ 3,519,280
Interest Earned from Previous Year's Positive Balance	\$ -	\$ 9,405	\$ 9,167	\$ 9,007
Revenues from Other Sources (Reserve Charges)	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000

Financial Reserves (End of Year)

Total Capital Expenses

Total Cumulative System Investment

EFC SW Resources



SOUTHWEST
ENVIRONMENTAL
FINANCE CENTER

- Link to switchboard: <https://swefcamswitchboard.unm.edu/am/>
- Link to AM resources: <http://southwestefc.unm.edu/asset-management-resources/>

Asset Management – Resources

Asset Management Switchboard

The Southwest Environmental Finance Center has partnered with EPA to create a repository of documentation and tools related to Asset Management.

Whether you are new to the Asset Management process or just need a refresher on a specific topic, the resource you are looking for is probably here. If you're unable to find what you're looking for, reach out and tell us about it.

[Visit the SW EFC Asset Management Switchboard](#)



General

- Level of Service: Guidelines, Categories, and Example Goals | [download](#)
- Level of Service: Goal Measurement | [download](#)
- Criticality of Assets | [download](#)

How does your system fund capital projects? (select all that apply)

Whatever unexpected excess
revenue is generated

Debt service

Funding depreciation

CIP and established funding
sources

Grants

None of the Above/We don't
have capital projects



How to pay for capital improvements

- Pay as you go (current receipts)
- Save in advance and pay (reserve funds)
- Pay later (someone loans you money)
- Grants (let someone else pay)

Account	Budget	
19	30-810-01 W/S PROF. SERVICES	\$500.00
20	30-810-02 TOWN MANAGER SALARY	\$28,499.99
21	30-810-03 W/S EMPLOYEE SALARY	\$57,200.00
22	30-810-04 CLERK SALARY	\$37,251.88
23	30-810-05 FICA EXPENSE	\$8,703.00
24	30-810-06 W/S EMPLOYMENT TAX	\$975.00
25	30-810-07 W/S OVERTIME	\$4,500.00
26	30-810-08 MERIT BONUS	\$3,000.00
27	30-810-09 HOLIDAY/EMPLOYEE APREC	\$1,200.00
28	30-810-10 POSTAGE	\$2,700.00
29	30-810-11 Office Supplies/Repairs	\$4,700.00
30	30-810-12 PHONE	\$3,400.00
31	30-810-13 W/S UTILITES	\$30,000.00
32	30-810-14 TRAINING	\$2,400.00
33	30-810-15 Employee Screening	\$105.00
34	30-810-16 MAINT/REPAIR:SYST-EQUIP	\$30,000.00
35	30-810-17 Mayor Salary	\$1,800.00
36	30-810-18 Board Salary	\$10,500.00
37	30-810-20 W/S UNIFORMS	\$2,000.00
38	30-810-30 GAS AND OIL FOR VEHICLES	\$4,500.00
39	30-810-31 TIRES FOR VEHICLES	\$600.00
40	30-810-32 REPAIRS TO VEHICLES	\$1,000.00
41	30-810-33 SUPPLIES & MATERIALS	\$3,000.00
42	30-810-34 CHEMICALS AND SALT	\$20,000.00
43	30-810-45 CONTRACTED SERVICES	\$36,500.00
44	30-810-46 STATE PERMITS	\$1,700.00
45	30-810-48 DUES/SUBSCRIPTIONS	\$1,500.00
46	30-810-50 DEPRECIATION	\$0.00
47	30-810-54 INSURANCE	\$13,608.00
48	30-810-55 HOSPITAL INSURANCE	\$22,443.00
49	30-810-57 MISC EXPENSE	\$500.00
50	30-810-60 W/S - LGERS	\$9,272.00
51	30-810-70 WATER STUDY EXPENSES	\$24,000.00
52	30-810-74 Online Payments SVC	\$1,600.00
53	30-810-75 ARRA LOAN PRINCIPAL	\$8,875.00
54	30-810-76 PURCHASE WATER BILL	\$2,400.00
55	30-810-79 Banking Fees	\$500.00
56	30-810-89 CAPITAL OUTLAY NEW EQUIP	\$0.00
57	30-810-90 TRANSFER TO OTHER FUND	\$0.00
58	30-810-95 FINES AND PENALTIES	\$1,500.00
		\$382,932.87



Example from an actual budget of expenses

Note: the budgeted
revenues were also
\$382,932.87



What not including money for capital looks like





How to budget for cash capital expenses

- ~~Don't budget for it ... NO!~~
- ✓ • Have a CIP, know how much cash you will need and when for capital projects in the next few years, break it up into each year's budget, then budget for those amounts to build up (and spend down) your reserves for capital projects
- ✓ • Know how much you expect to spend – on average – every year for capital projects and budget that annually
- ✓ • Budget for depreciation



Depreciation

- A “cost” every year of your infrastructure wearing out; a percentage of its value.
- Accounting tool. May not be reflective of actual conditions.
- Depreciation underestimates replacement costs.
- Depreciation can and should be adjusted over time, but how often does that happen?
- At best, is an imperfect (likely low) method to budget for capital costs.
- Ignores possibility that you might use debt to pay for replacement.



Using depreciation as a mechanism to budget for cash capital expenses

- If you are not doing any capital improvements in the next year and don't use another method to budget for future capital costs, you should at least include depreciation in your budget.
- If you are implementing a CIP and budgeting for it directly, you don't necessarily need to include depreciation in your budget, except for assets that are not planned for in the AMP or CIP.



Using depreciation as a mechanism to budget for cash capital expenses

- By including depreciation into rates, you collect revenues for future cash capital improvements
 - Could put it all into fund balance and keep track of it with a spreadsheet
 - Better is to put it into a capital reserve fund that is separate and only for capital projects
- Capital costs higher than depreciation, so maybe budget for a little more than depreciation

Recorded webinar on depreciation for water systems

<https://www.youtube.com/watch?v=d8A7MJXFV1U&t=1115s>



Webinar: Demystifying Depreciation and How to Make Use of It



Typical sources of external funding

Bonds

Revenue bonds, GO bonds

Loans

From banks, or can be subsidized:
e.g. WIFIA, USDA, SRFs (EPA/State), State agencies

Grants

From agencies:
e.g. CDBG (HUD), EDA, State agencies