



# Long Term System Planning

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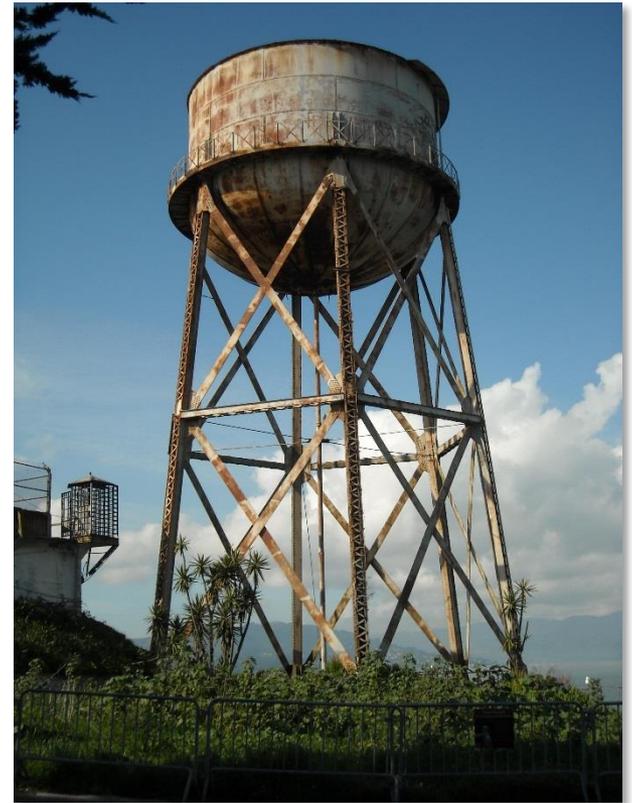
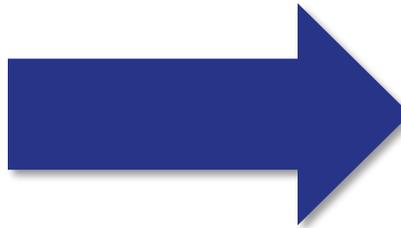
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# Infrastructure or Capital Assets



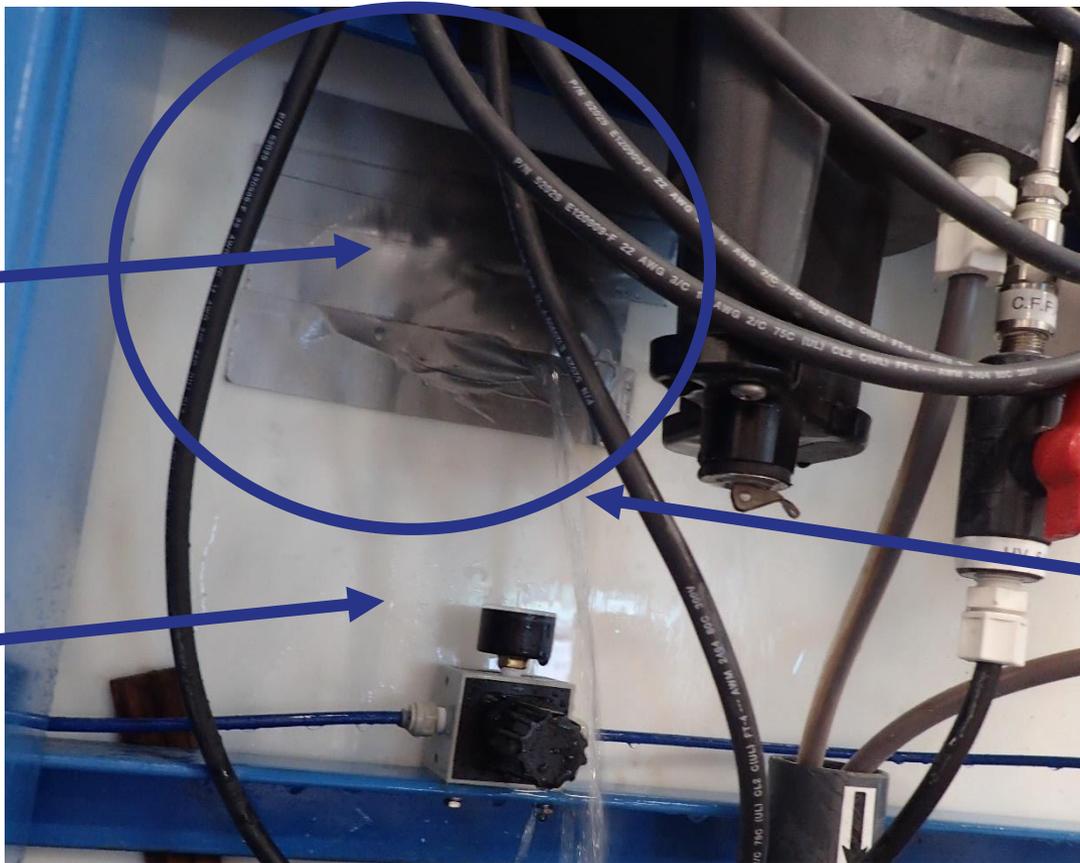
# Infrastructure Wears Out



# Infrastructure Wears Out



Water  
Tank



Leak



There are two ways to keep up  
your infrastructure...

# Ways to Keep Up Infrastructure



Mike Daly · White Cliffs MDWUA, NM

# Ways to Keep Up Infrastructure



Source: <https://www.youtube.com/watch?v=rH867Y-8-VM>

# Two Ways to Fix Things



**Proactively**  
Repair, rehabilitation  
and replacement on  
a set schedule



**Reactively**  
You wait for it to  
break



# Or We Can 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 none



ONION VIDEO





# What's your experience?

- More proactive?
- More reactive?
- Lots of hopes for divine intervention?



# Being Proactive

- Requires long term system planning—  
Asset Management and Capital  
Planning
- Has its advantages, according to people  
in the field...

# Measuring Needs, Not Guessing



Ted Riehle · Old Forge, NY

# Better Board Communication



Chris Jacobs · Somersworth, NH

# Efficient System Management



Doug Powers · Tucumcari, NM

# Fewer Emergencies



Mike Daly · White Cliffs MDWUA, NM

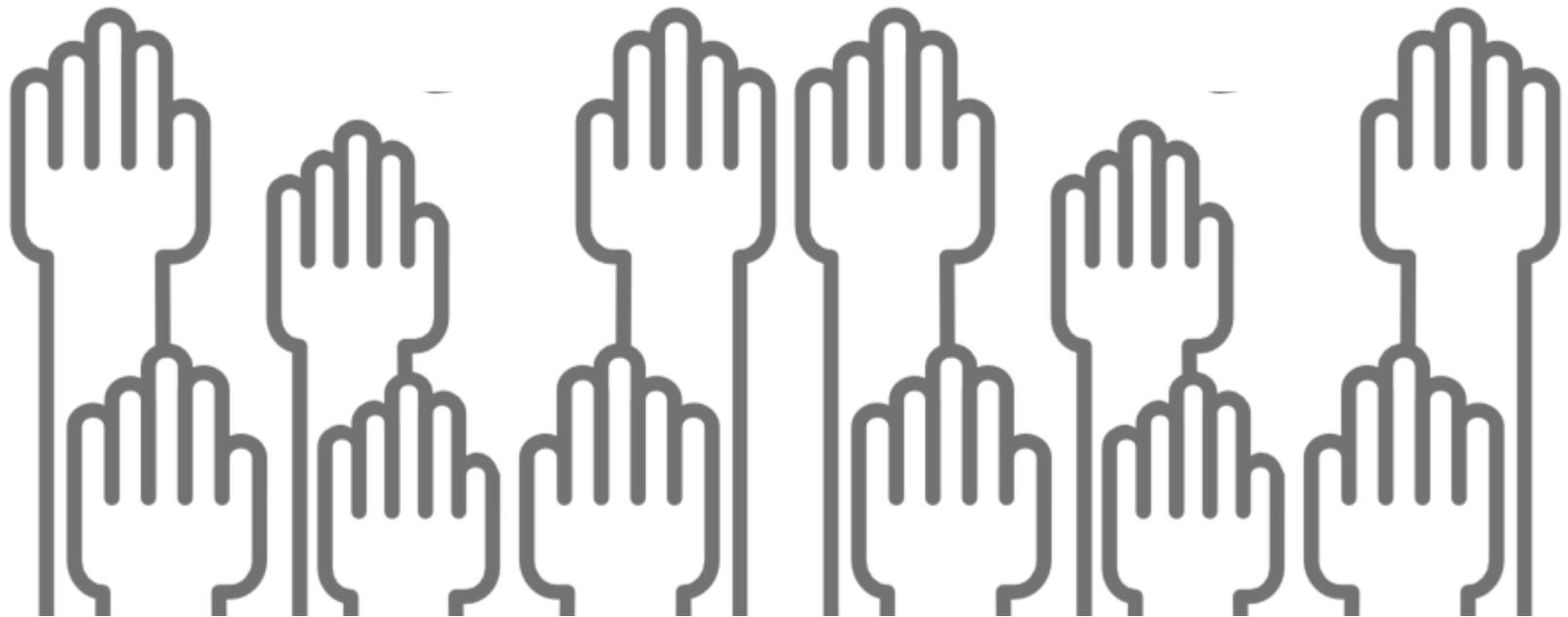
# Justification for Rate Increases



Ted Riehle · Old Forge, NY



Does anyone in the room have experience with asset management?



# 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

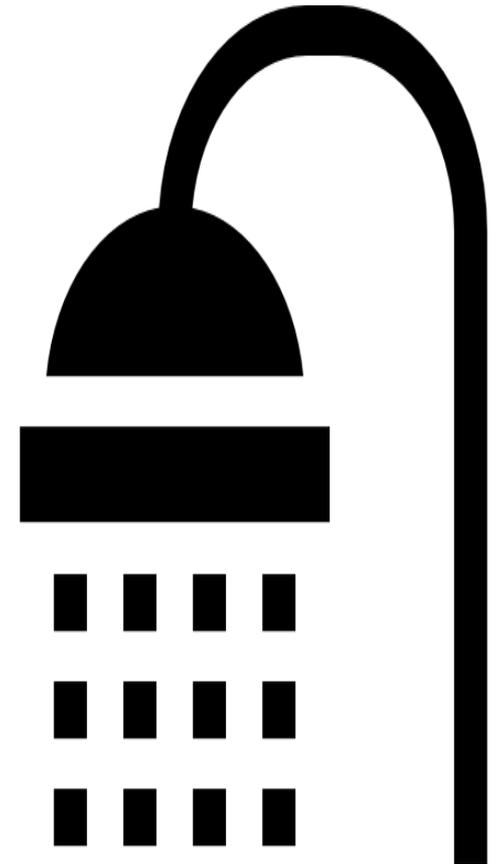
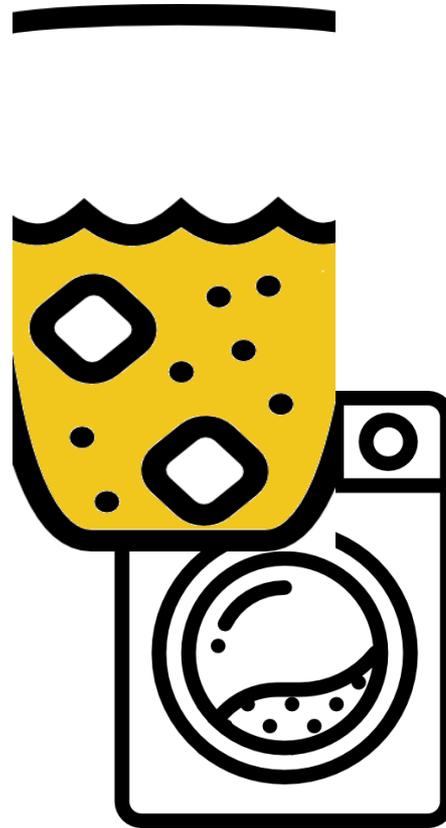
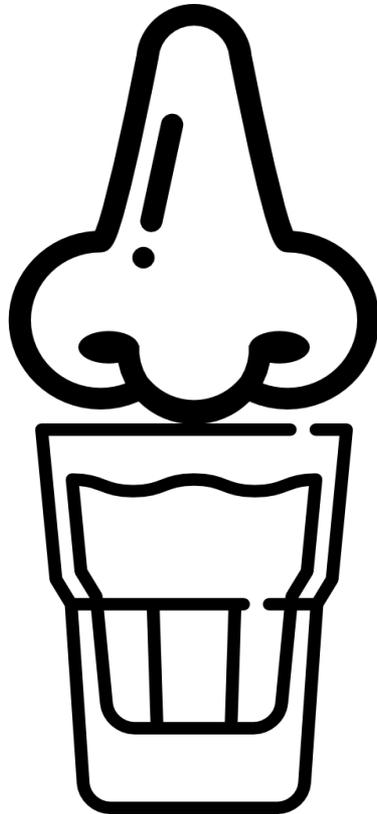
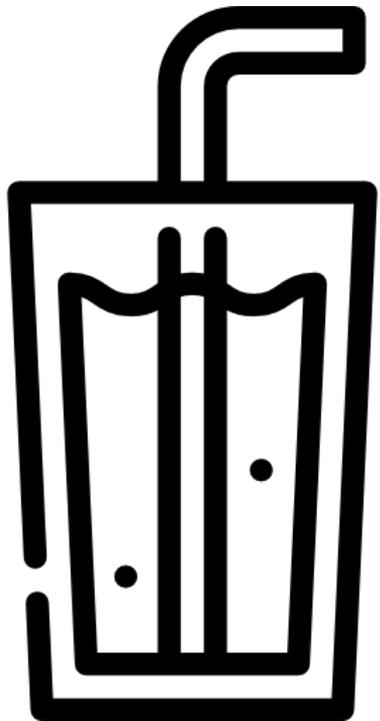
Track Progress  
Towards  
Meeting Goals

Involve  
Staff



What would my customers want?

What do customers care about?



# Level of Service



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

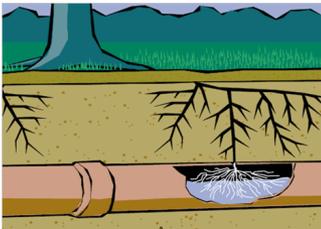


# Asset Criticality

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





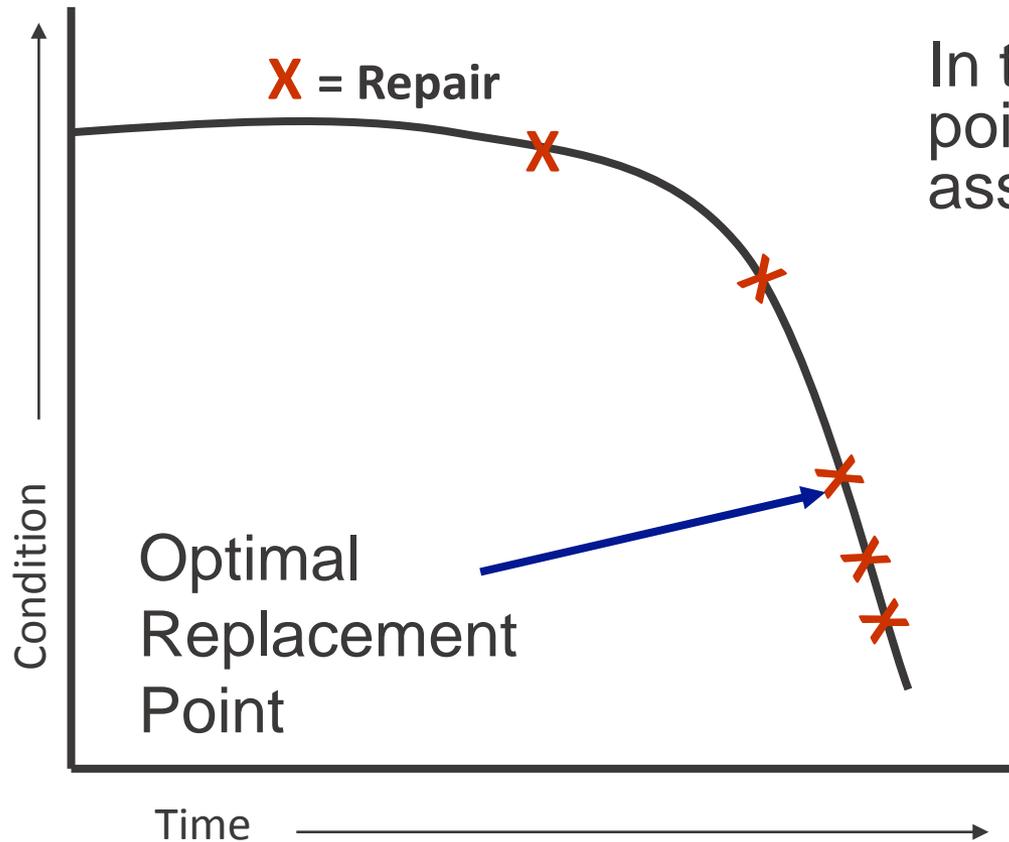
# Quick Exercise—4 Assets

1. Brand new well
2. Aging portable generator used in emergencies in an area with a hospital and a 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



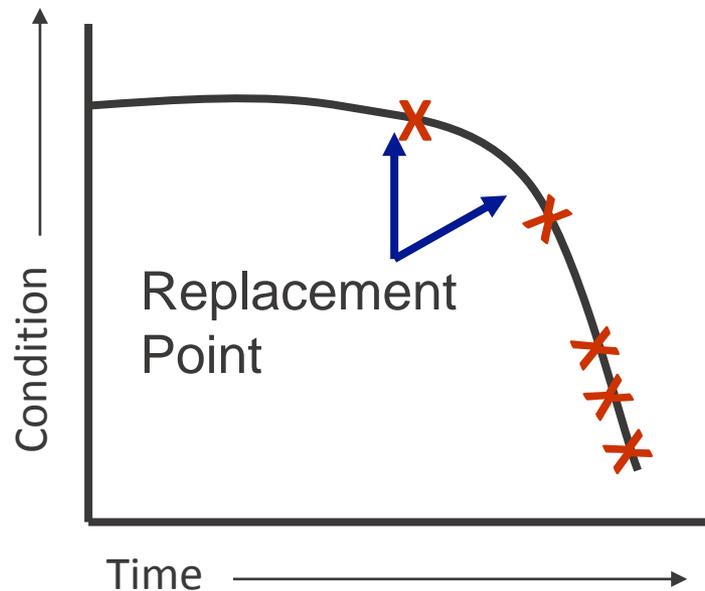
In theory, there is an exact right point at which to replace an asset

Not possible to know the optimal time to replace every asset

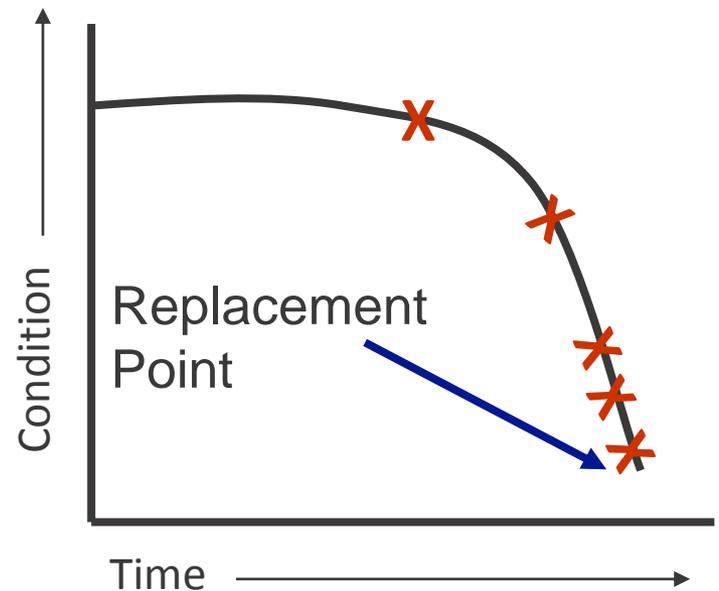
So... need to use the concept of risk

# 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

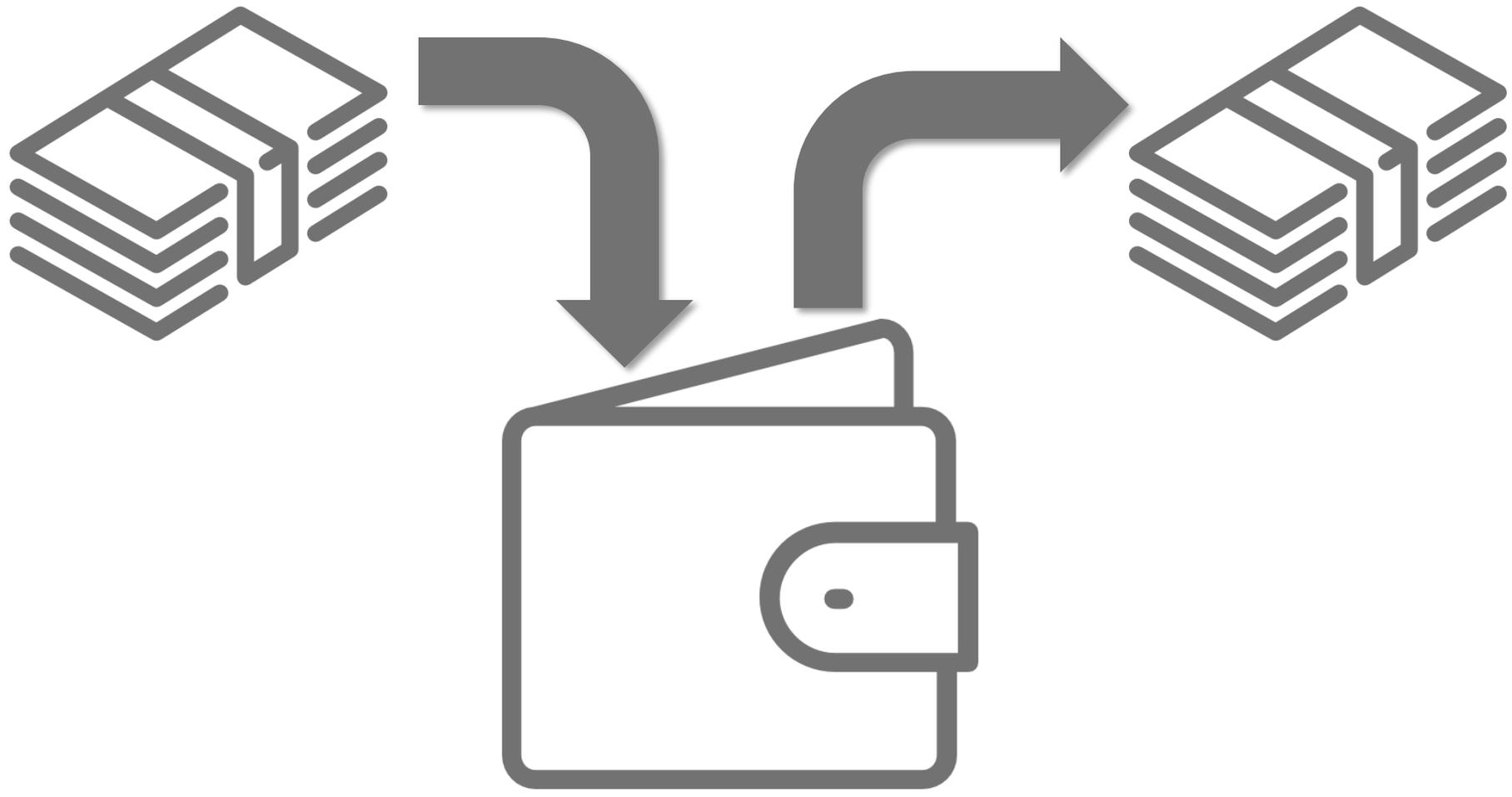
- This is strongly related to asset management
- An official multi-year document that identifies and prioritizes capital projects, identifies funding sources, and sets timelines



# Four approaches to paying for capital improvements

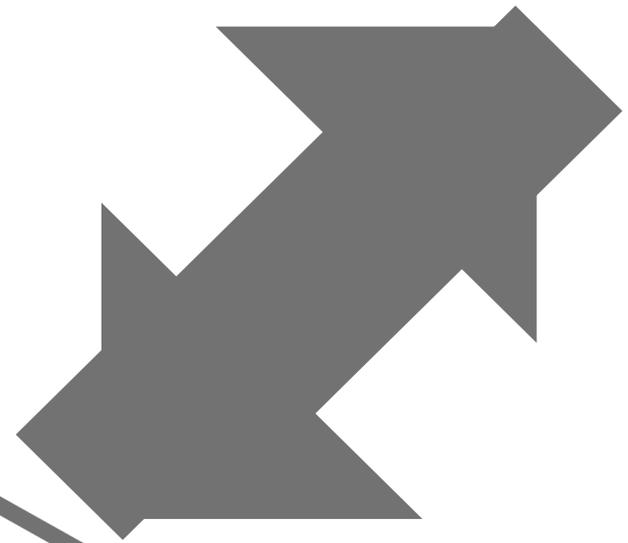
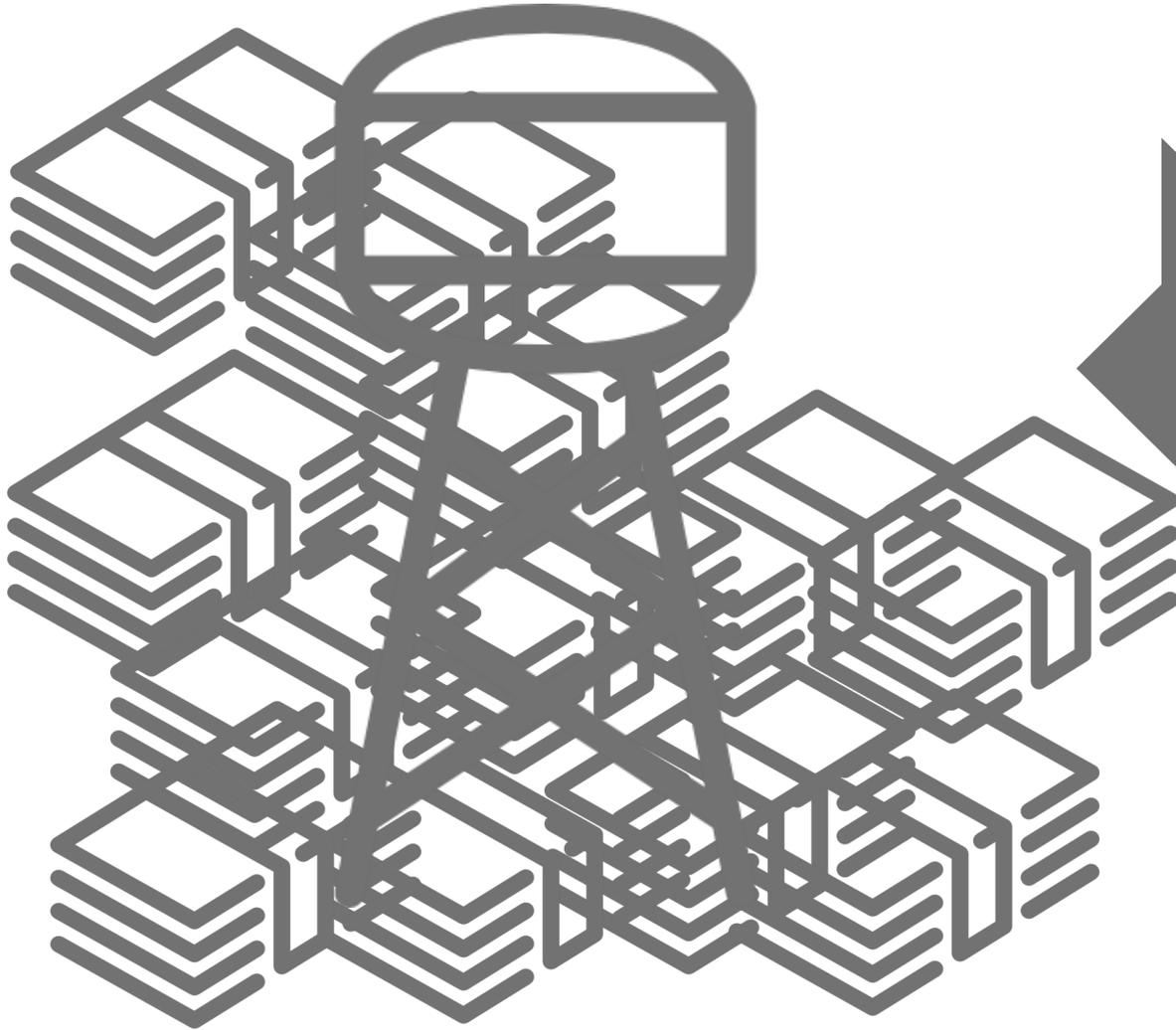


# Pay As You Go



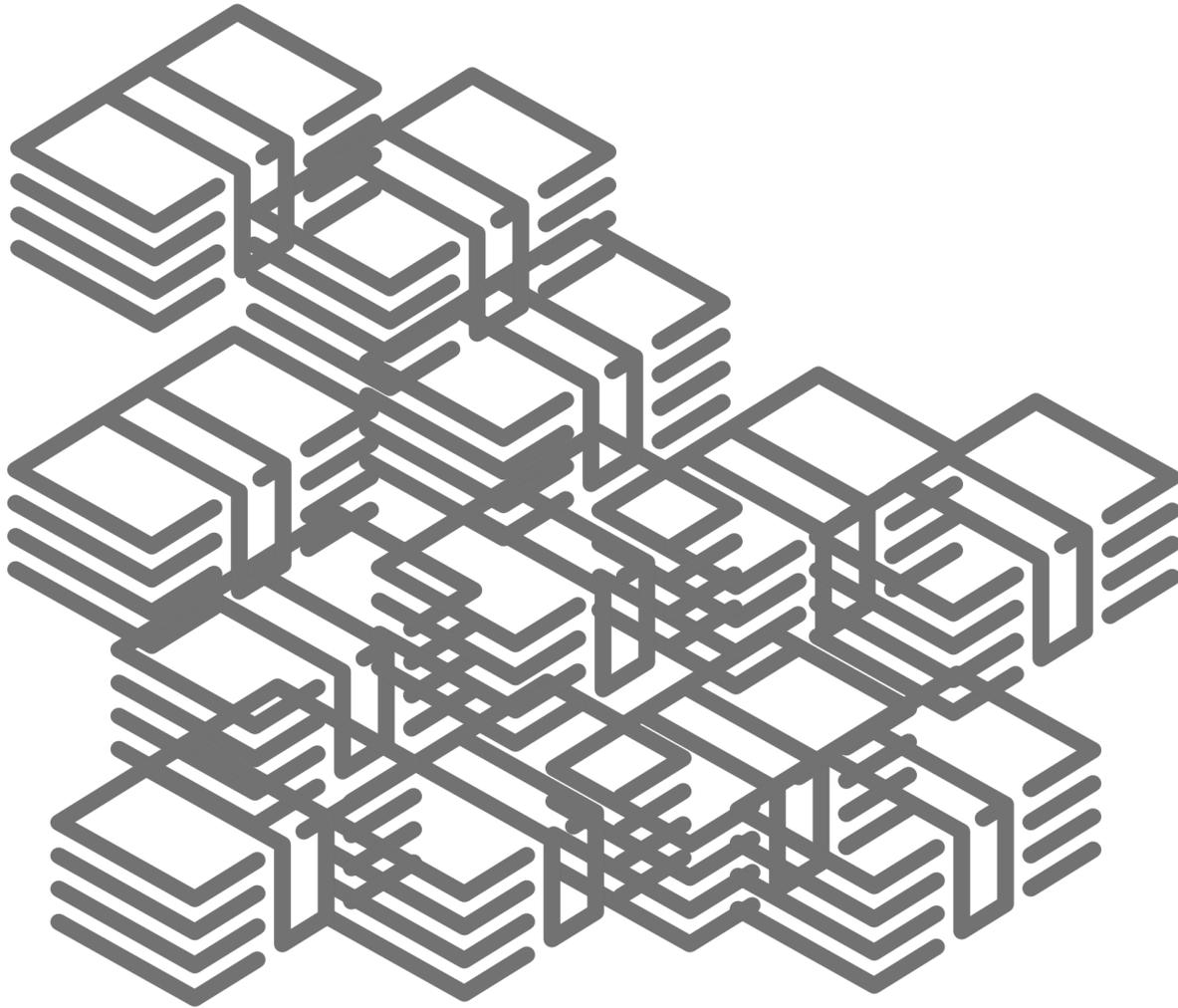


# Save In Advance and Pay





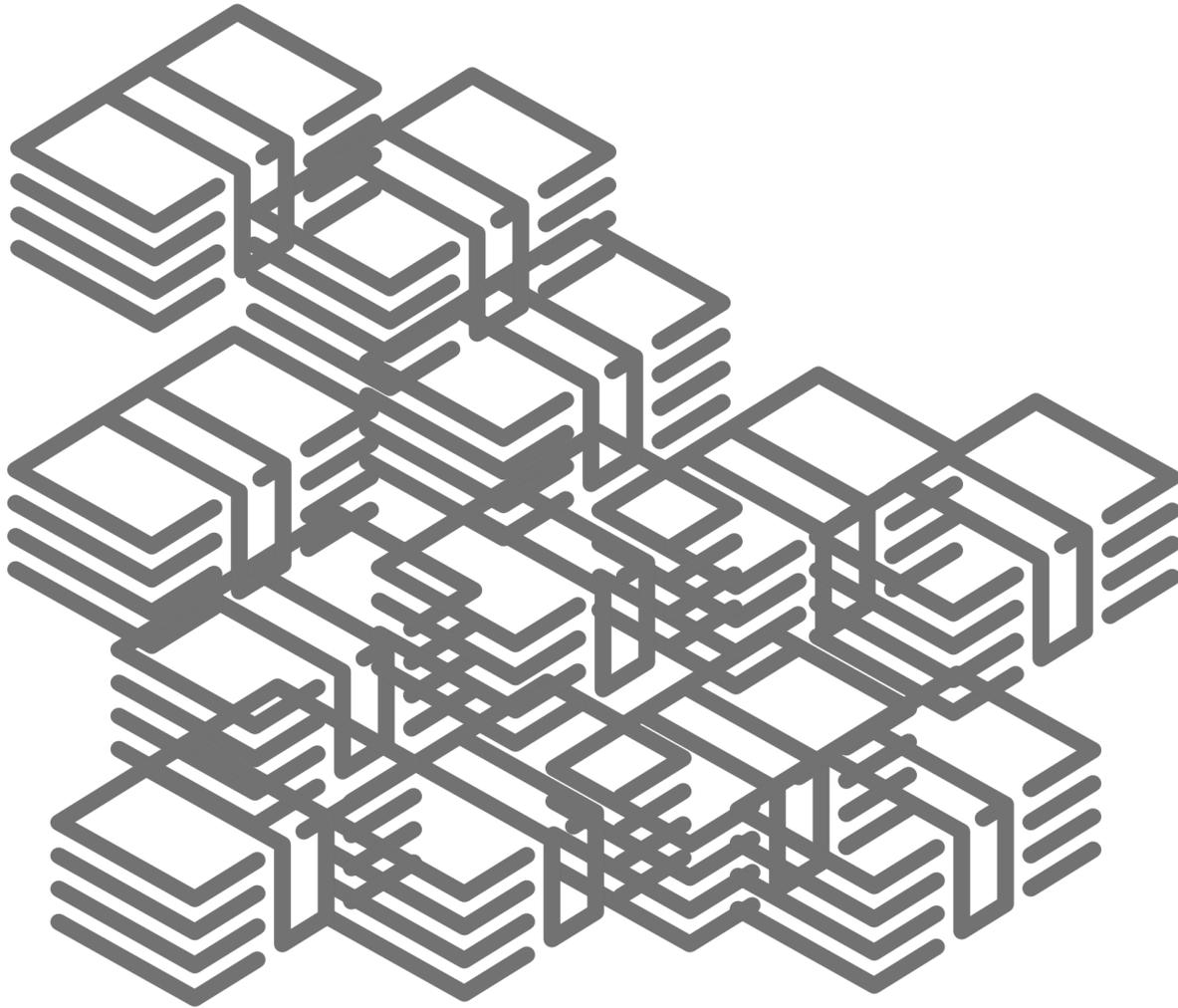
# Borrow and Pay Later



**BANK**



# Get a Grant



**GRANT**



# Ways To Pay

- Pay as you go
- Save in advance and pay
- Borrow and pay later

Money  
from your  
customers

- Grants (let someone else pay)

Not easy to come by





# Find Irvindale's Budget Expenses

What here is related to regular repair and maintenance, if anything?  
(Operating cost)

What here is related to asset rehabilitation or replacement, if anything?  
(Capital cost)

*Note: Don't include salaries*



# Repairs and Maintenance

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



# Rehabilitation and Replacement

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



# Find Irvindale's Financial Statements

On the Statement of Cash Flows, can you see anything here related to capital expenditures?

# Debt and Grants

Customer Deposits Received	12,513
Customer Deposits Returned	(16,239)
<b>Net Cash Provided (Used) by Operating Activities</b>	<b>\$2,785</b>
<b><i>CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES:</i></b>	
Decrease in Due From Other Funds	\$2,417
<b>Total Cash Flows from Noncapital Financing Activities</b>	<b>\$2,417</b>
<b><i>CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES:</i></b>	
Acquisition and Construction of Capital Assets	(\$83,115)
Principal Paid on Bond Maturities	(8,875)
Principal Paid to Jones County	(4,800)
Capital Contributions - Grants	82,222
Other Nonoperating Revenue	2,418
<b>Net Cash Provided (Used) by Capital and Related Financing Activities</b>	<b>(\$12,150)</b>
<b>Net Increase (Decrease) in Cash and Cash Equivalents</b>	<b>(\$6,948)</b>
Cash and Cash Equivalents, July 1	42,716
<b>Cash and Cash Equivalents, June 30</b>	<b>\$35,768</b>



# Find Irvindale's Financial Statements

On the Statement of Revenues, Expenses and Changes in Net Position, what is the annual depreciation on the water system assets?



# Annual Depreciation

## Major Enterprise Fund

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### Water and Sewer Fund

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#### ***OPERATING REVENUES:***

Charges for Services	\$324,180
Water and Sewer Taps	1,500
Other Operating Revenues	13,706
<b>Total Operating Revenues</b>	<b>\$339,386</b>

#### ***OPERATING EXPENSES:***

Personnel	\$176,759
Water and Sewer Operations	148,499
Depreciation	140,087
<b>Total Operating Expenses</b>	<b>\$465,345</b>

<b>Operating Income (Loss)</b>	<b>(\$125,959)</b>
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<https://www.youtube.com/watch?v=d8A7MJXFV1U&t=1115s>



The video player displays a slide with the title "Infrastructure Wears Out". The slide features two photographs of water towers. The left photograph shows a modern, well-maintained water tower with the word "GALVA" on its tank. A large blue arrow points from this tower to the right photograph, which shows a significantly rusted and deteriorated water tower. The video player interface includes a play button, a progress bar showing 7:20 / 1:03:02, the website address www.elcnetwork.org, and various control icons like volume, closed captions, settings, and full screen.

Infrastructure Wears Out

7:20 / 1:03:02  
www.elcnetwork.org

UNIVERSITY OF NORTH CAROLINA

Webinar: Demystifying Depreciation and How to Make Use of It



# What is Depreciation?

- Loss of value of an asset not restored by current maintenance
- An economic fact for any water system
- From both physical factors and functional or non-physical factors



# Causes of Depreciation

## Physical Factors

- Wear and tear resulting from use
- Decay, rot, rust, and corrosion from the passage of time and the elements
- Related to the extent that there is regular maintenance

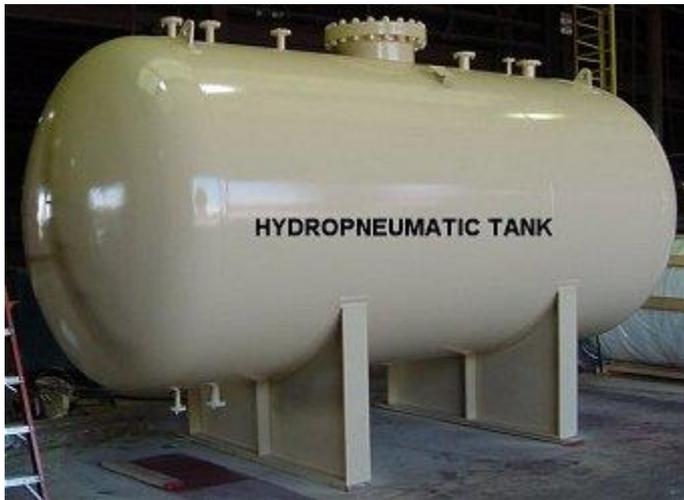


# Causes of Depreciation

## Functional or Non-Physical Factors

- Obsolescence due to new designs, innovations, and other improvements
- Inadequacy to meet current demand
- Changes in regulations

# Straight Line Depreciation Example



Large Hydro-pneumatic Tank

Purchase Price:  
**\$10,000**

Useful Life:  
**10 years**

Annual Depreciation:  
**(\$1,000)**



# “Fully Funding” Depreciation

- By the time the asset is scheduled to wear out, you will have saved the purchase price of the asset
- This isn't as good as doing asset management and capital planning, but it is better than nothing



If Irvindale were to fully fund depreciation, what would it do to the rates?

What concerns might there be?

# With Depreciation

Revenues Needed

from Rates:

~~\$344,500.00~~

\$484,532



# The Rates with Depreciation

\$89.73 ~~\$63.79~~ base

\$14.74 ~~\$10.49~~ per 1,000 gallons

\$80.02 ~~\$54.08~~ base  
\$1.59 per 1,000 gallons

\$25.00 base

\$10.63 ~~\$6.37~~ per 1,000 gallons



# “Fully Funding” Depreciation

- At this point for Irvindale, fully funding depreciation is too little, too late since they have not been doing this
- They would not be able to save enough to pay for existing assets if they start funding depreciation now



# So What Can Irwindale Do?

- Pay as you go
- Save in advance and pay
- Borrow and pay later
- Grants (let someone else pay)
- Defer rehabilitation/replacement

*Tip!  
You can  
mix and  
match  
approaches*



# Exercise

- Using the assets we discussed earlier, come up with a plan of how to pay for their replacement

# 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...

**CAPITAL IMPROVEMENT PROJECTS - 20 YEARS**

Use all known projects for 20 years	Project Completion Year	Project Expenditures (Construction Period)	Estimated Construction Cost (20-year)	Annual Contribution Factor (FY16)	Estimated Cost in the Start Year	End of Year
Project 1 - Water Treatment Plant	2015	\$ 1,000,000	\$ 1,000,000	0.05	\$ 50,000	\$ 1,000,000
Project 2 - Sewer Treatment Plant	2015	\$ 2,500,000	\$ 2,500,000	0.125	\$ 125,000	\$ 2,500,000
Project 3 - Capital reserves replacement	2015	\$ 1,000,000	\$ 1,000,000	0.05	\$ 50,000	\$ 1,000,000
Project 4 - Infrastructure project, Street work	2015	\$ 500,000	\$ 500,000	0.025	\$ 25,000	\$ 500,000
Project 5 - unknown CIP	2015	\$ 3,500,000	\$ 3,500,000	0.175	\$ 175,000	\$ 3,500,000

**Expected Revenues and Expenses - FY15**

Annual Operating and Non-operating Revenues: \$ 5,816,000  
 Annual Non-Capital Expenditures (DM, Admin, etc.): \$ 4,520,000  
 Expected Annual Deficit of Expenditures (FY15): \$ 2,296,000

**Water and Sewer Rates in FY15**

Input the residential customer water & sewer rates at 5,000 gallons/month of use and 2 customers. Convert to monthly rates.  
 Volumetric Rate at 5,000 gallons/month (5-1000 of gallons): \$ 5.42  
 Monthly Rate (Times "Minimum Charge"): \$ 67.14

**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: 500,000; Non-residential: 200,000  
 Annual Customer Rate Growth (%/Year): Residential: 1.2%; Non-residential: 1.2%

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

	FY15	FY16	FY17	FY18
5 Year Increase (Decrease) in Rate (Water and Sewer)	N/A	0.0%	0.1%	2.0%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.00	\$1.51	\$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
Volumetric Rate at 5,000 gallons/month (5-1000 of gallons)	\$5.42	\$5.47	\$5.67	\$6.11
Volume Included with the Base Charge (1,000's of gallons)	2	2	2	2
Approximate Monthly Charge for 5,000 gallons (S)	\$29.35	\$29.35	\$30.86	\$31.65

**Projected Fund Balance**

	FY15	FY16	FY17	FY18
Total Revenues	\$ 5,816,000	\$ 6,003,569	\$ 6,238,367	\$ 6,564,005
Base Charge	\$ 1,718,800	\$ 1,796,322	\$ 1,907,260	\$ 2,069,720
Usage Charge	\$ 3,129,800	\$ 3,094,596	\$ 2,916,508	\$ 2,801,762
Interest Earned from Previous Year's Positive Balance	\$ 0	\$ 9,405	\$ 9,167	\$ 9,007
Revenues from Other Sources (Reserve Charge)	\$ 107,200	\$ 104,266	\$ 106,344	\$ 106,433

**Financial Reserves (End of Year)**

Line graph showing Annual % Increase (left axis, 0% to 7%) and Rate Increases (right axis, \$0.00 to \$0.00) over 20 fiscal years.

**Total Capital Expenses**

Bar chart showing Total Capital Expenses (Construction) over 20 fiscal years.

**Total Cumulative System Investment**

Line graph showing Total Cumulative System Investment over 20 fiscal years.



# Long Term System Planning

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