Asset Management and Financial Forecasting for Small Drinking Water Systems in California

Tuesday, September 20 2022

ENVIRONMENTAL FINANCE CENTER AT SACRAMENTO STATE

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- **You must attend the entire session**
- **You must register and attend using your real name and unique email address – group viewing credit will not be acceptable**
- **You must participate in polls**
- **Certificates will be sent via email within 30 days and are for your personal records. Again, we cannot guarantee that our webinars will meet your CEU or PDH requirements.**

If you have questions or need assistance, please contact smallsystems@syr.edu.

About Us

The Environmental Finance Center Network (EFCN) is a university-based organization promoting innovative and sustainable environmental solutions while bolstering efforts to manage costs.

EFCN
environmental finance center network

Building TMF Capacity for Small Water Systems

Our Building Technical, Managerial, and Financial Capacity Programs for Small Water and Wastewater Systems provide free training and technical assistance across every state, territory, and tribal nations. Technical assistance is available on a first-come, first-served basis.

The Small Systems Water and Wastewater Teams

Great Lakes Environmental Infrastructure Center
Environmental Finance Center for Region 5

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Wichita State University
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Small System Training Available!

https://efcnetwork.org/training-events

- Asset Management
- Financial Planning
- Building Resilience
- Controlling Energy Costs
- Access to Funding Sources
- Mapping & Data Collection
- Regulatory Compliance
- Operator Certification
- Strategic Planning Tools
- Effective Communication
- The Power of Partnerships: Sharing Resources with Neighboring Systems
- Attracting & Retaining Workforce
- Rate Setting & Affordability
- Basic Water Math

Technical Assistance Available!

https://efcnetwork.org/get-help/

- Adaptation & Resiliency Planning
- Asset Management
- Community Engagement
- Data Collection & Analysis
- Maintenance Practices
- Disseminating Information
- Fiscal Planning
- GIS Programming/Planning
- Infrastructure Funding
- Infrastructure Planning & Design
- Operator Training & Certification
- Management/Board Support
- Rate Payer/Citizen support
- Sustainability & Resiliency
- Partnerships & Collaboration
- Water Efficiency & Reuse
- Work Force Development

Asset Management

Asset Management: Answering the Questions

- What is asset management?
- Why do it?
- What's involved?
- How do I get started?
- What then?
- Are there examples to share? Yes!

We'll take breaks 45 minutes (or so)!

Asset Management: What is it?

Simply put…

https://swefc.unm.edu/home/amkan/Chapter1Videos/IN-2.m4v

The Car Analogy

ne-np.facebook.com, bankrate.com

- Flat Tire Options
  - Fix tire
  - New tire
  - New car
  - Used car

- Cracked Engine Block Options
  - Fix engine
  - New engine
  - New car
  - Used car

Some Definitions…

A method for maintaining a system's *assets* at a desired *level of (customer) service* at the *most appropriate cost*

- *Assets: What you have that has value*
- *Level of service: What you want your asset to provide*
- *Most appropriate cost: Lowest life cycle cost (not free!)*

EPA's Definition

USEPA (2020)

> *A process "utilities can use to make sure that planned maintenance can be conducted and capital assets (pumps, motors, pipes, etc.) can be repaired, replaced, or upgraded on time and that there is enough money to pay for it."*

EPA's Five Core Components

1. Asset Inventory
What assets do you have & what is their condition?

2. Level of Service
What are the service goals for your system?

3. Criticality
Which are the most important assets to maintain?

4. Life Cycle Costs
How much will it cost for O&M (including asset replacement)?

5. Long Term Funding
How are you going to pay for it all?

EPA's Five Core Components

https://www.youtube.com/watch?v=BgfFtV9mLJ0

Asset Management: Why do it?

Lots of Competing Demands

- Regulatory compliance
- Cost efficiency
- Health & safety
- Resiliency
- Investment decisions
- Long-term planning
- Risk management
- Services & outputs

- Efficiency & effectiveness
- Communication
- Aging infrastructure
- Competition for funding
- Upgrading outdated tech

Lots of Decisions

- What are the benefits of a project?
- What are the risks of not doing the project?
- What do customers really want?
- What financing is available for a project?
- Does a project meet a critical need?
- How do we prioritize projects?
- What is the best expenditure of funds?
- What are the alternatives?

A basis for making good decisions

- Asses, Document, & Communicate
  - Assets owned
  - How long they will last
  - Repair/Replacement Costs
  - Revenue sufficiency

A Guide for:

- Tracking O&M
- Prioritizing O&M Needs
- Planning for Replacements
- Estimating Costs
- Selecting Funding/Financing Options
- Communicating Intent, Plans, & Progress

Experiences

https://swefc.unm.edu/home/amkan/Chapter1Videos/IN-12.m4v

In Summary, Asset Management…

- Addresses multiple needs
- Makes management decisions easier
- Directs spending to achieve desired results

Questions?

Asset Management: What's involved?

Five Core Components…Five Steps

1. Build an Asset Inventory
2. Define Level of Service Goals
3. Identify Critical Assets
4. Estimate Life-Cycle Costs
5. Evaluate Long-Term Funding/Financing

Five Components…Five Steps…Common Sense

https://swefc.unm.edu/home/amkan/Chapter1Videos/IN-3.m4v

Step 1: Build an Asset Inventory

- **More Questions**
  - What assets do we have?
  - Where are they located?
  - What's their condition?
  - What's the expected remaining life?
  - What's their energy use?
  - What's their value?
  - How do I organize all this?!

What assets do we have?







How do we define Assets?

- Use a dollar amount threshold
- Whether it requires a work order

Asset

Component

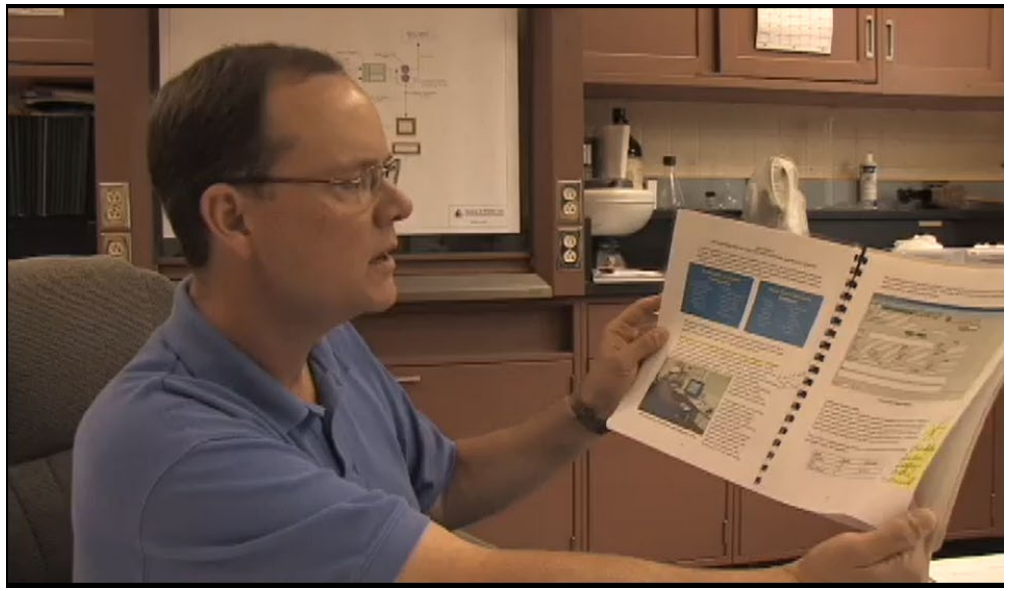
$500?

$1000?

$3000?

Selecting Assets

https://swefc.unm.edu/home/amkan/Chapter3Videos/IV-2.m4v



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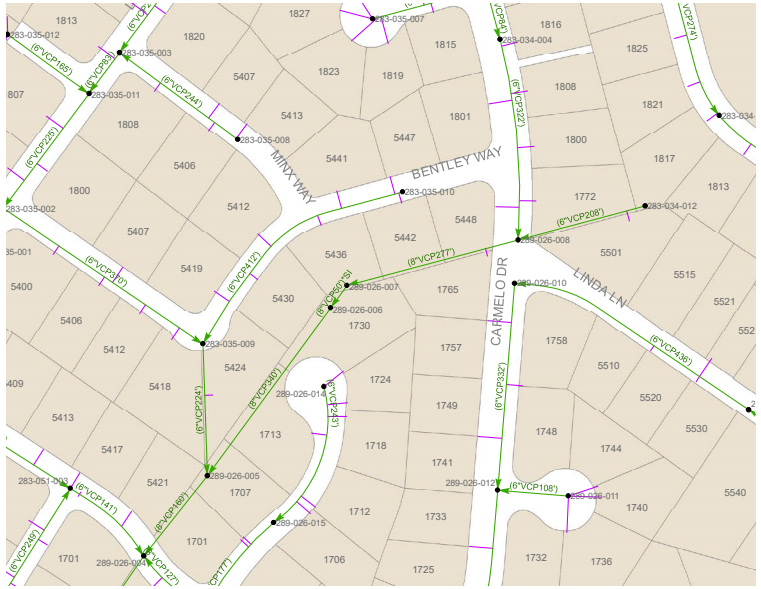
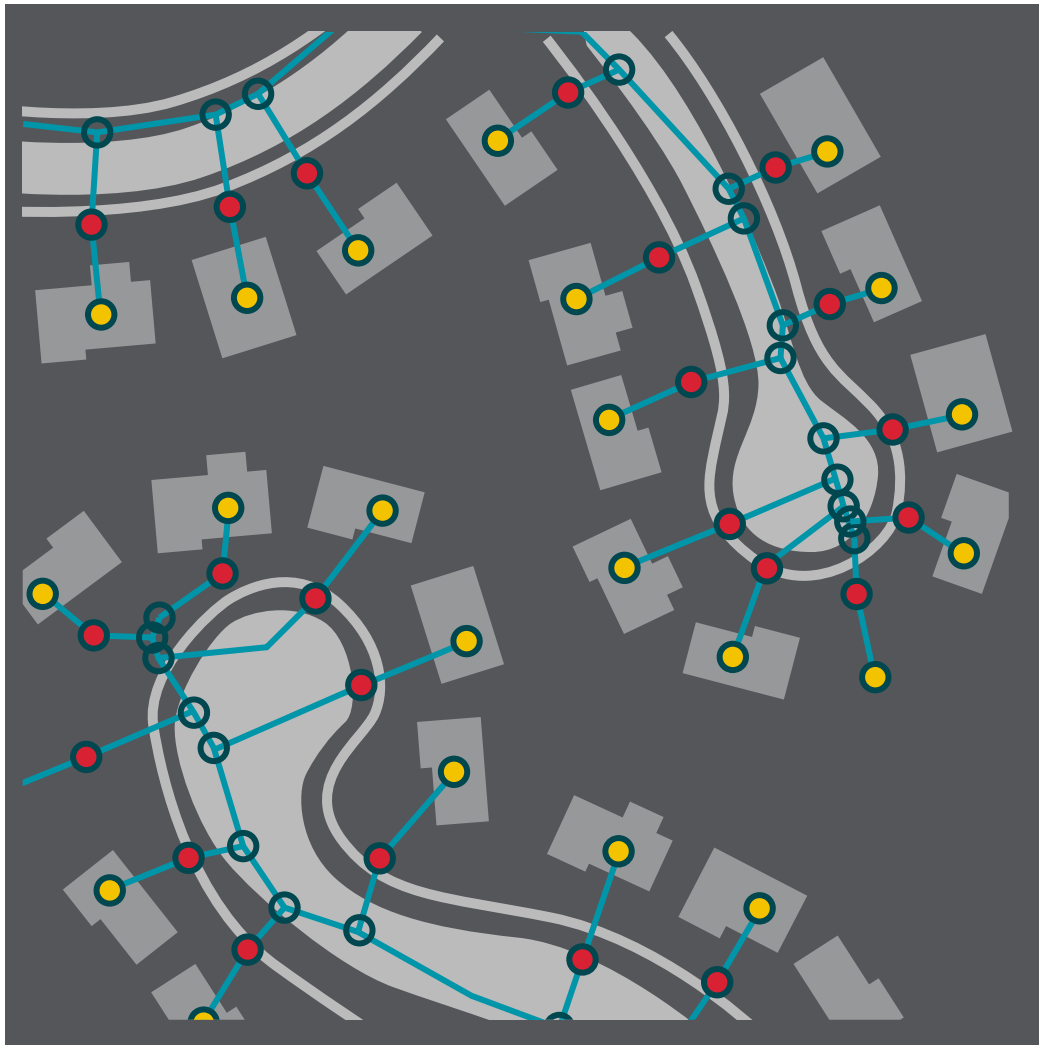
Where are the assets located?

- Create a visual picture
  - Hand drawn maps
  - Google Maps
  - GIS Systems



Where are the assets located?

- Data Sources
  - Existing Knowledge
    - As Builts/Maps
    - Operators
  - New Knowledge
    - Site Visits
    - GPS Devices



esri.com

Where are the assets located?

https://swefc.unm.edu/home/amkan/Chapter3Videos/IV-4.m4v

What's their expected remaining life?

Remaining Life = Estimated Useful Life - Age

- Age & useful life are good starting points
- Then consider site-specific conditions (usage, install, material quality)

How Long Will It Last?
Typical Life Expectancies of Water Supply equipment.

Component	Worksheet	Useful Life
Walls and Springs	Drinking Water Source	25 years
Intake Structures		35 years
Pumping Equipment		10 years
Disinfection Equipment	Treatment System	5 years
Hydropneumatic Tanks	Tanks	10 years
Concrete and Metal Storage Tanks		30 years
Transmission Structures (Pipes)	Distribution System	35 years
Valves	Valves	35 years
Mechanical Valves		15 years
Computer Equipment/Software	Electrical Systems	5 years
Transformers/Switchgears/ Wiring		20 years
Motor Controls/ Variable Frequency Drivers		10 years
Sensors		7 years
Buildings	Buildings	30 years
Service Lines	Service Lines	30 years
Hydrants	Hydrants	40 years

Note: These expected useful lives are drawn from a variety of sources. The estimates assume that assets have been property maintained. The adjusted useful life of an asset will be equal to or less than typical useful life

What’s their condition?

Condition Monitoring Approaches

- Vibration
- Temperature
- Power or Oil Use
- Efficiency Change
- Run Time
- TV Inspection
- Pressure Testing
- Leak Testing
- Visual Inspection
- Life Expectancy Review

Rating Conditions

Rating	Condition Description	Age Description
Excellent	New or fairly new; No known or suspected issues	>90% of useful life remaining
Very Good	No known or suspected issues, but no longer a new asset	75-89% of useful life remaining
Good	A few known or suspected issues	40-74% of useful life remaining
Fair	Known/suspected issues that may impact asset's ability to continue to perform in the next several years	5-34% of useful life remaining
Poor	Known/suspected issues that may impact asset's ability to continue to perform in the next 1-2 years	<5% of useful life remaining

What's their monetary value?

- Historic Value
  - Cost at install
- Current Value
  - Depreciation
- Replacement Value
  - Cast iron pipe vs PVC
- Asset vs system replacement

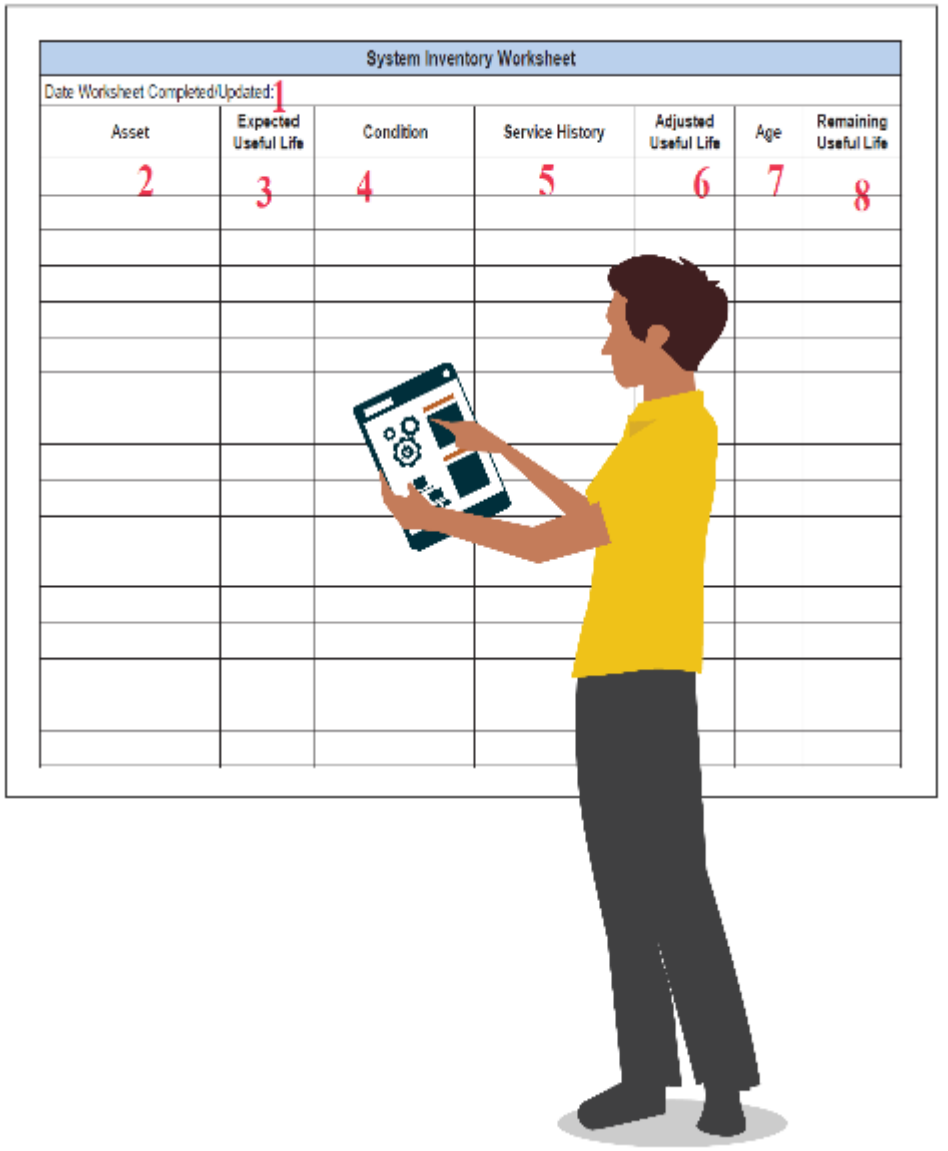
Name of cost	Item name	Item character	Total cost($)
Civil cost	Treatment room	Area – 200 m^2	7,035
Mechanical cost	(i) Tank	Volume – 50 m^3	2,500
	(ii) Pipe	Pipeline length – 200 m	2,200
	(iii) Valve and others (pc)	2,000	3,000
Electrotechnical cost	(i) Rotameter (pc)	1	600
	(ii) Pressure gauges (pc)	2	180
	(iii) Pump (pc)	2	46,000
Membrane module cost	SS – membrane module (pc)	870	177,000
Total capital cost ($)			197,115

Cost resources

- Recent utility projects
- Neighboring utilities
- Publications

How do I organize all this?!

- Multiple formats
  - Paper
  - Spreadsheets
  - Commercial Product



Questions?

“It’s a great thing to break.”

-James Taylor

Five Core Components…Five Steps

1. Build an Asset Inventory
2. **Select a Level of Service**
3. Identify Critical Assets
4. Estimate Life-Cycle Costs
5. Evaluate Long-Term Funding/Financing

What is Level of Service?

"…the quality or expected reliability that must be provided…

to meet a community's basic needs and expectations"

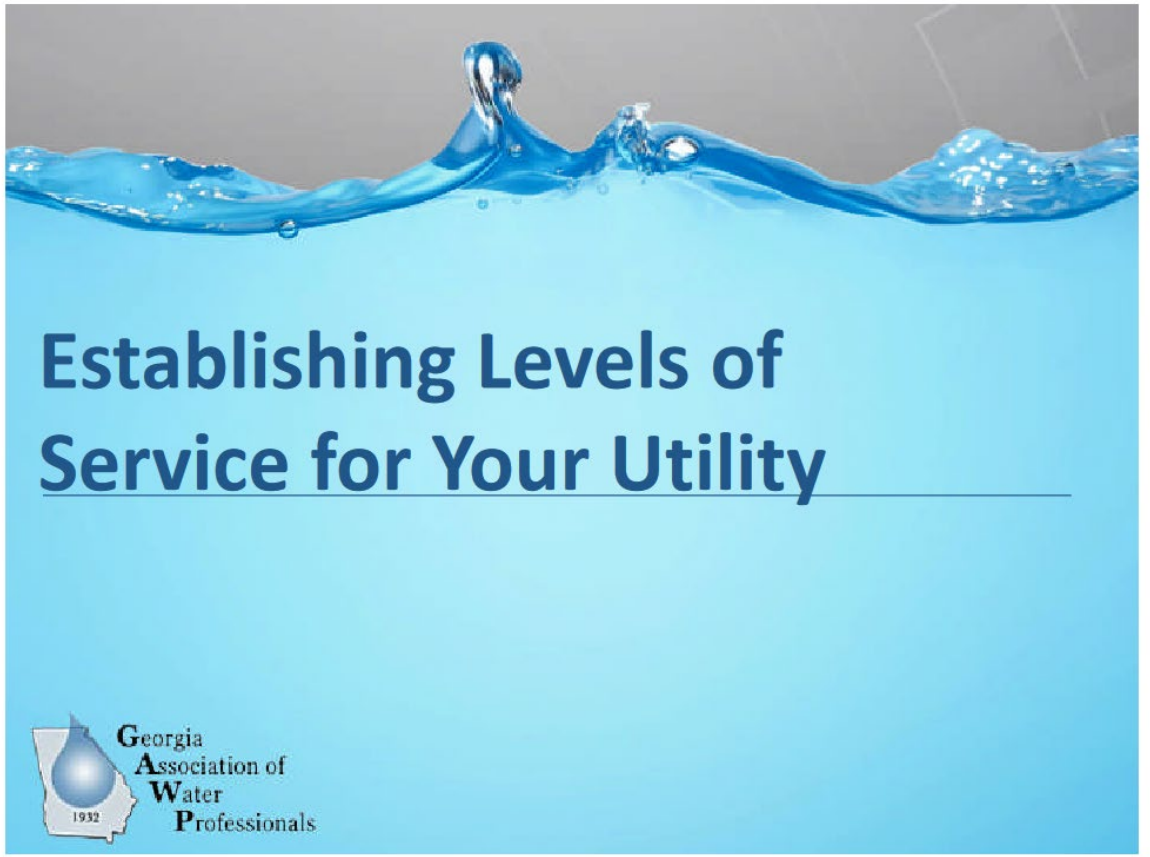
-Grand Rapids, MI 2016

Level of Service Agreement

- Benefits
  - Communicates operation to the customers
  - Assists in identifying critical assets
  - Provides a means of assessing overall utility performance
  - Provides a direct link between costs and service
  - Serves as an internal guide for management and operations staff
  - Communicates energy efficiency and water conservation goals

The LOS Process

- Identify SMART Goals
- Involve Customers & Staff
- Track Progress



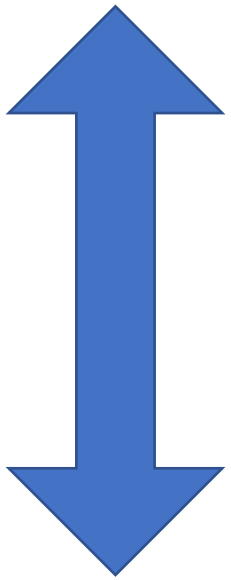
Source: Georgia Association of Water Professionals

Develop Goals

- Goal Categories
  - Energy Efficiency
  - Water Efficiency/Conservation
  - Social Considerations
  - Environmental Considerations
  - Customer Service
  - Regulatory Requirements

LOS

Maximum Level = Highest capabilities of all assets



Your Choice

Minimum Level: Meet all regulatory requirements

Internal & External Goals

Internal

- Don’t impact customers
- Set by utility staff
- Examples
  - Maintenance Scheduling
  - Energy Efficiency

External

- Impact customers
- Set with customer input
- Examples
  - Response for sewer back-ups
  - Response time for other customer complaints

SMART Goals

Specific	Details exactly what needs to be done
Measurable	Achievement or progress can be measured
Achievable	Objective is accepted by those responsible for achieving it
Realistic	Objective is possible to attain (important for motivational effect)
Time Bound	Time period for achievement is clearly stated

https://www.assetivity.com.au

Examples of SMART Goals

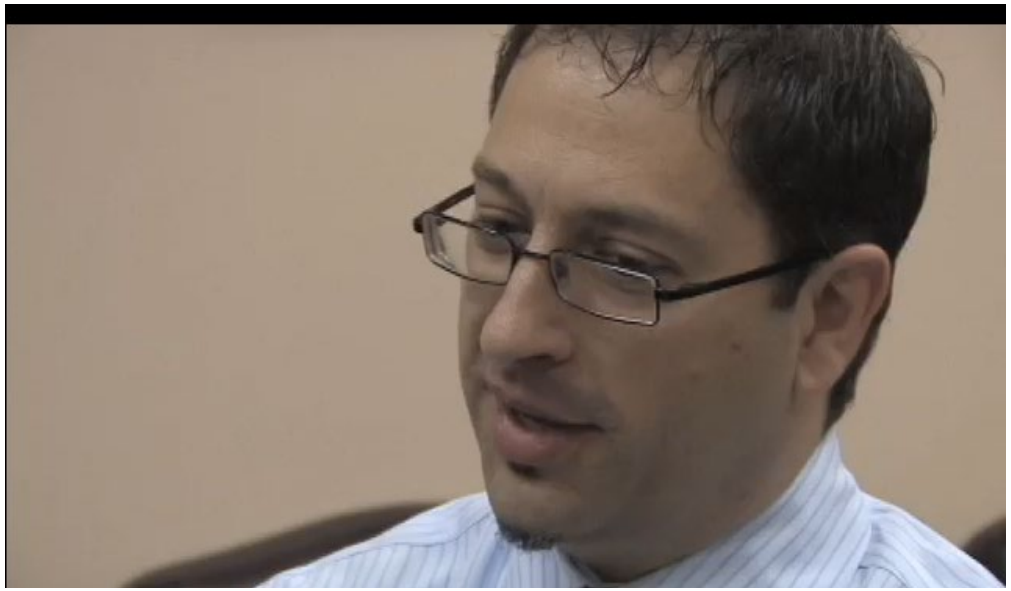
- Fewer than 10 taste complaints per quarter related to WTP
- Minimum water pressure of 50 psi throughout system, 95% of the time
- Customer service line available from 8 am – 5 pm, 5 days per week
- Customer complaints addressed within 1 business day, 95% of the time
- 75% planned maintenance, 25% reactive maintenance
- Reduce energy consumption by 10% at the water treatment plant

An LOS Worksheet

LOS Goal	Criteria Assessment
System will meet all State and Federal regulatory standards.	Is it measurable? *Yes* How will it be measured? C*ompliance reports* How often will it be measured? *Monthly*
Less than 10 taste complaints per year.	Is it measurable? *Yes* How will it be measured? *Review of customer complaint logs* How often will it be measured? *Annually*
Reduce energy consumption by 10%.	Is it measurable? *Yes* How will it be measured? *Review of energy usage* How often will it be measured? *Annually*

Involve Customers

- Door to door
- Annual meetings
- Focus groups
- Surveys
- Internet polls
- Social networking
- Customer call/complaint logs



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Balancing LOS & Cost

- Higher LOS: ↑ Costs
- Customer willingness to pay

https://swefc.unm.edu/home/amkan/Chapter4Videos/LS-6.m4v

Tracking Progress

- **Consider these questions:**
  - How frequent will the data I need be available?
  - How much time will it take to get the data for tracking?
  - How often do I need to report this type of information to elected officials or the board?
  - How often do I need to communicate with my customers on meeting this goal?
  - How often will it be possible to make adjustments if I find I'm not meeting the goal?

Questions?

Five Core Components…Five Steps

1. Build an Asset Inventory
2. Select a Level of Service
3. Identify Critical Assets
4. Estimate Life-Cycle Costs
5. Evaluate Long-Term Funding/Financing

Critical Assets

- High Risk of Failure
  - Probability of Failure (condition or age)
  - Consequence of Failure (major expense, system failure, safety concerns)

- Questions to ask
  - How can assets fail?
  - How do assets fail?
  - What is the likelihood (probability) of failure?
  - What are the consequences of failure
  - What are the cost for repairing/replacing the asset?
  - What are other associated costs?

Probability of Failure

- Modes of Failure
  - Mortality: asset physically fails through collapse, rupture, or otherwise
  - Financial Inefficiency: asset costs so much to operate and maintain that it is no longer economical to keep it in operation
  - Capacity: asset still operates, but not at the capacity needed
  - Level of Service: asset still operates, but doesn't meet the required LOS

Probability of Failure

- Factors & Ratings
  - Asset Age
  - Asset Condition
  - Repair History
  - O&M History
  - Historical Knowledge
  - Experience

Consequence of Failure

- Factors & Ratings
  - Cost of repair/replacement
  - Social impacts or costs
  - Environmental impacts or costs
  - Costs/impacts related to collateral damage from failure
  - Legal costs associated with asset failure
  - Public health impacts or costs
  - Reduction in Level of Service
  - Any other costs or impacts related to the asset failure

1	Very Low
2	Low
3	Moderate
4	High
5	Very High

Redundancy Reduces Risk

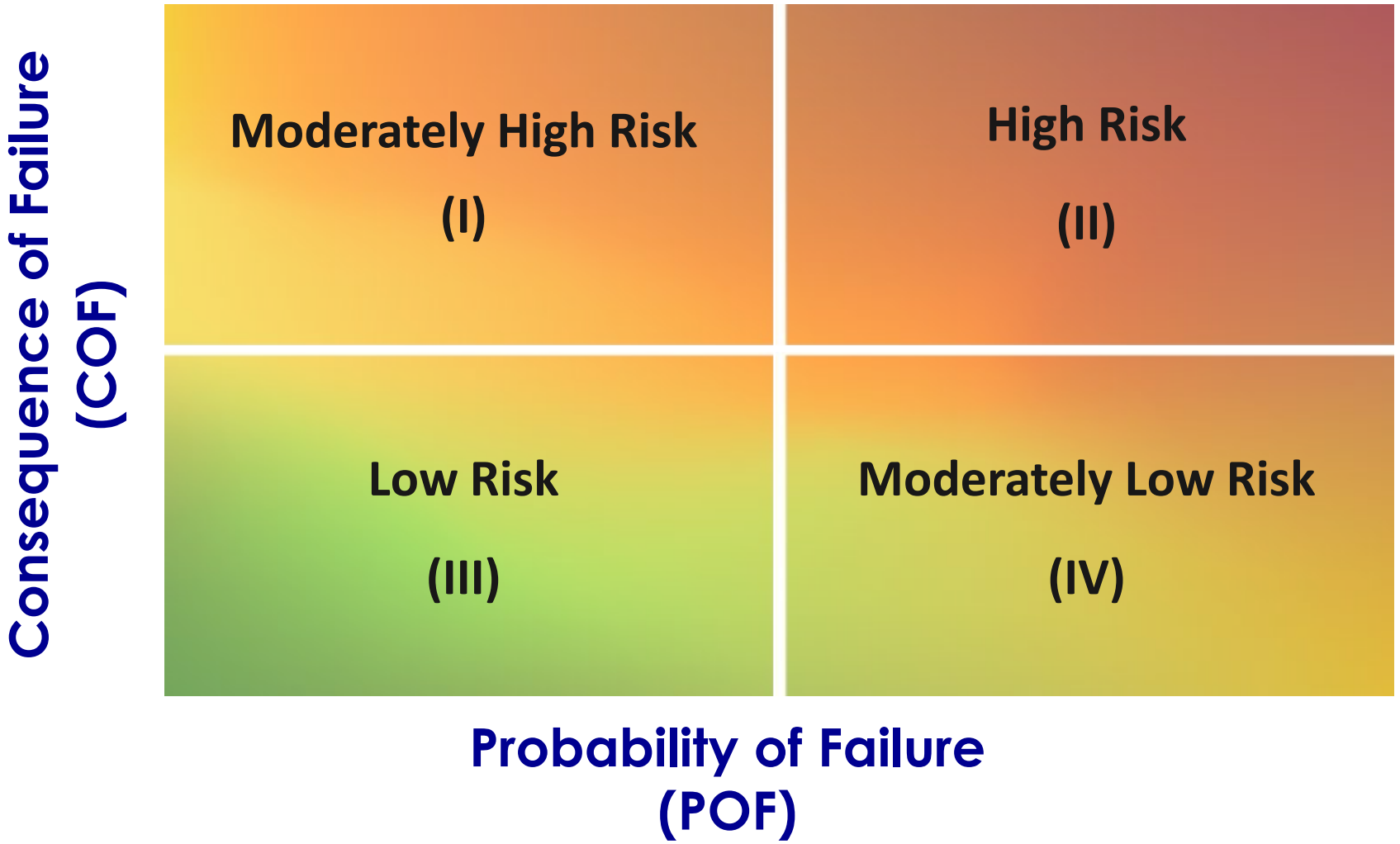
https://swefc.unm.edu/home/amkan/Chapter5Videos/CR-9.m4v

Risk of Failure

- Probability of Failure (POF)
  - Remaining life
  - Structural condition
- Consequence of Failure (COF)
  - General rating (negligible, moderate, high)
  - Depth & size of asset (influences cost of replacement)
  - Proximity to important community features:
  - (floodplains, environmental hazards, buildings, roadways)
- Redundancy (R)
  - Duplicate asset serving as back-up

Risk = POF x COF x R

Identify Critical Assets based on Risk



Criticality and Energy Use

- Factors
  - Meets Energy Efficiency Goals
  - Energy Use
  - Renewable Source of Energy
  - Potential Alternatives
  - Costs
  - Availability of Funding/Financing/Rebate
  - Operability
  - Regulatory Requirements

1	Very Low Energy Use
2	Low Energy Use
3	Moderate Energy Use
4	High Energy Use
5	Very High Energy Use

1	Very Low Feasibility
2	Low Feasibility
3	Moderate Feasibility
4	High Feasibility
5	Very High Feasibility

Questions?

Five Core Components…Five Steps

1. Build an Asset Inventory
2. Select a Level of Service
3. Identify Critical Assets
4. Estimate Life-Cycle Costs
5. Evaluate Long-Term Funding/Financing

Cost Types

- Initial cost of installation
- O&M
- Repairs
- Rehabilitation
- Disposal
- Legal, environmental, or social costs
- Debt

O&M Costs: Degrees of O&M

- **Reactive:**
  Meet maintenance and repair needs as they arise
- **Preventive:**
  Proactively undertake system maintenance and renewal activities prior to failures
- **Mixed:**
  Assign some assets reactive maintenance & others preventive

O&M Costs: O vs M

- **Operations**
  - Standard procedures
    performed on a routine basis
  - Alternate procedures
    performed in response to planned maintenance/repair
  - Emergency procedures
    performed in response to failure or natural disaster
- **Documented in an O&M Manual**

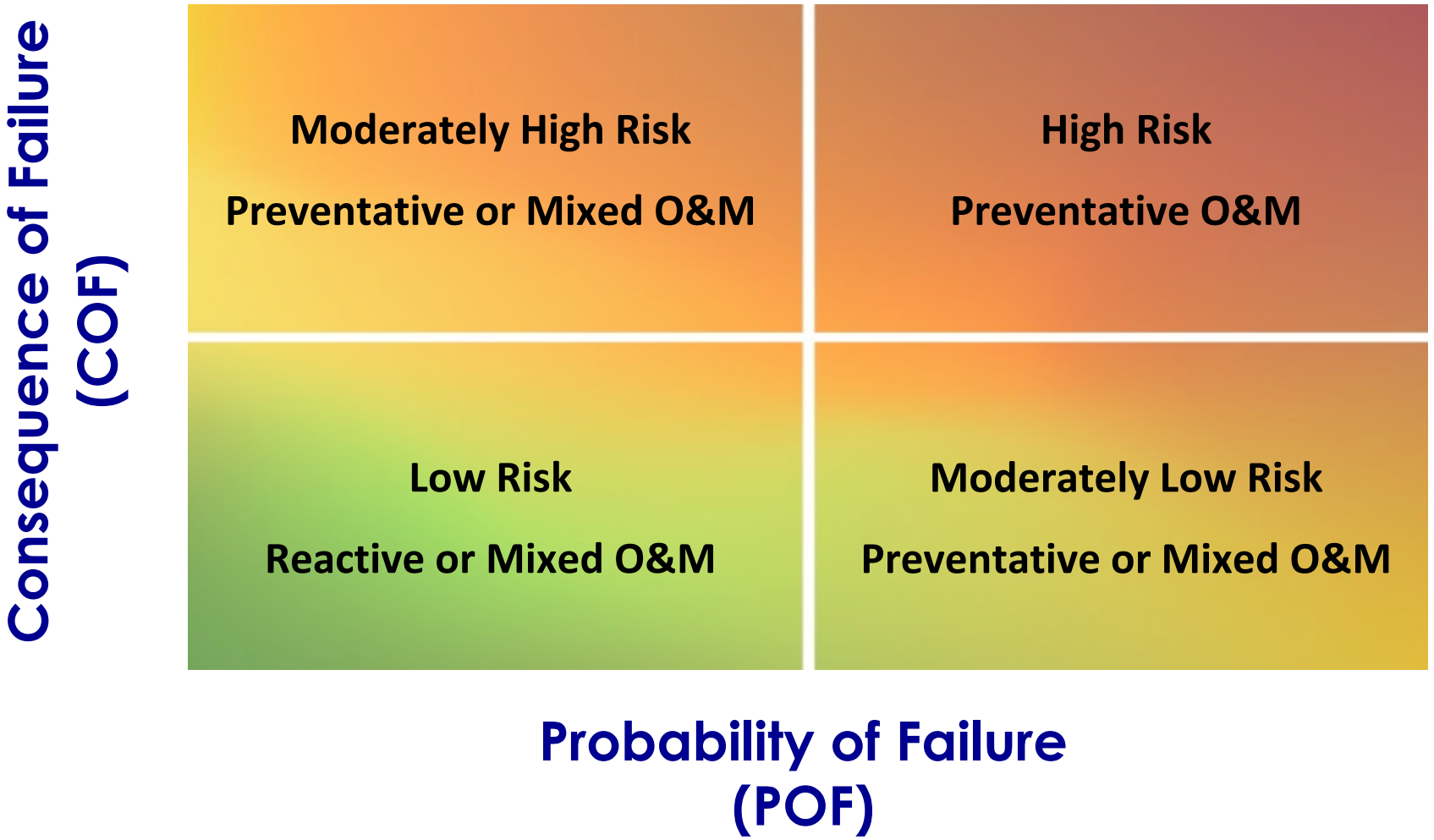
O&M Costs: O vs M

- **Maintenance**
  - Routine: *performed on a regular basis*
  - Planned: *planned, in lieu of responding to failure/crisis*
  - Preventative: *performed to prevent failure*
  - Warranty-Related: *required by manufacturer*
  - Corrective: *performed in response to failure*
  - Monitoring
  - Documented in some way: *written, software, CMMS*

O&M Costs: Questions

- What am I currently doing that I need to continue?
- What am I currently doing that I need to discontinue?
- What am I not doing that I need to start doing?
- What am I not doing that should stay that way?

O&M Costs: Based on Risk



Asset Repair, Rehab, or Replacement

- Consider:
  - Condition
  - Capital costs
  - O&M costs
  - Remaining useful life
  - Decay pattern
  - Criticality
  - Energy Use
  - Impact on LOS

Asset Repair, Rehab, or Replacement

https://swefc.unm.edu/home/amkan/Chapter6Videos/LC-12.m4v

Capital Improvement Planning

- Reasons for new assets
  - Replacement/Rehab
  - Future regulations
  - Growth
  - Consolidation/ regionalization
  - Improve technology

Capital Improvement Planning

- Contents
  - Project descriptions
  - Project needs & benefits
  - Project cost
  - O&M costs
  - Funding sources
  - Impact on LOS

Questions?

Five Core Components…Five Steps

1. Build an Asset Inventory
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4. Estimate Life-Cycle Costs
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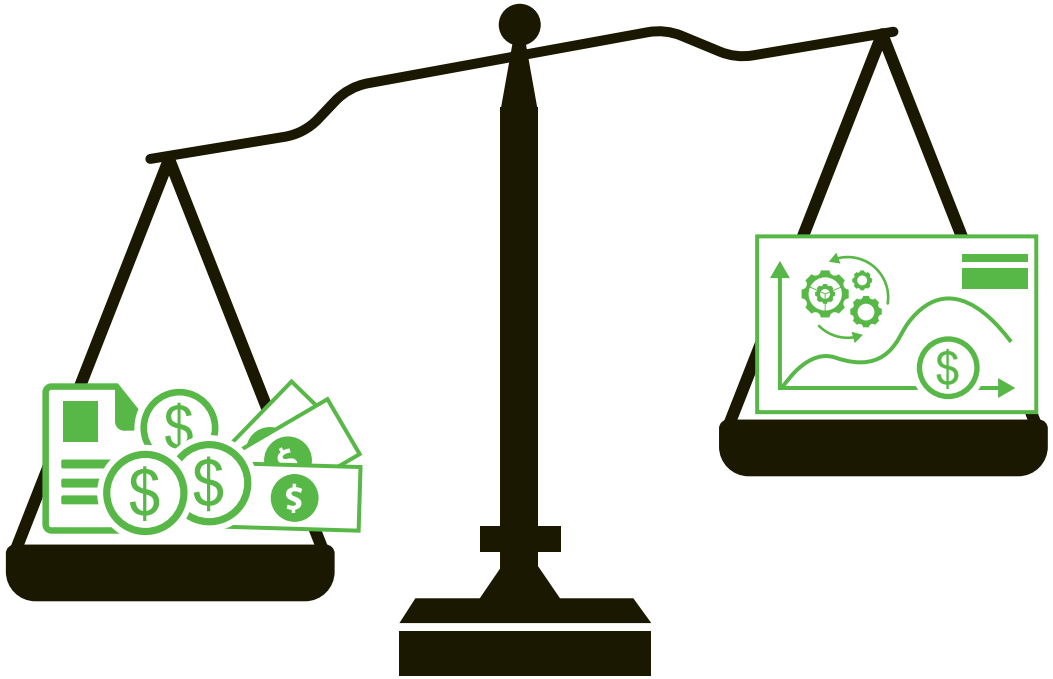
Compare Revenue to Life Cycle Costs



USEPA, undated

Funding Sources

Capital Projects:

Internal/External Funding:

- Grants
- Loans
- Special Funds
- Bonds

O&M:

Internal Funding:

- Taxes
- Customer Fees
- Impact Fees
- Customer Rates

External Funding: Capital Improvements

Asset Management helps in grant/loan applications

https://swefc.unm.edu/home/amkan/Chapter7Videos/FS-2.m4v

Internal Funding: Rate/Fee Structures

- Account for:
  - O&M costs
  - Debt service
  - Emergency operations
  - (Some) capital improvements
- Build reserves
- Be affordable to customers
- Include incremental increases
- Build (rate) capacity

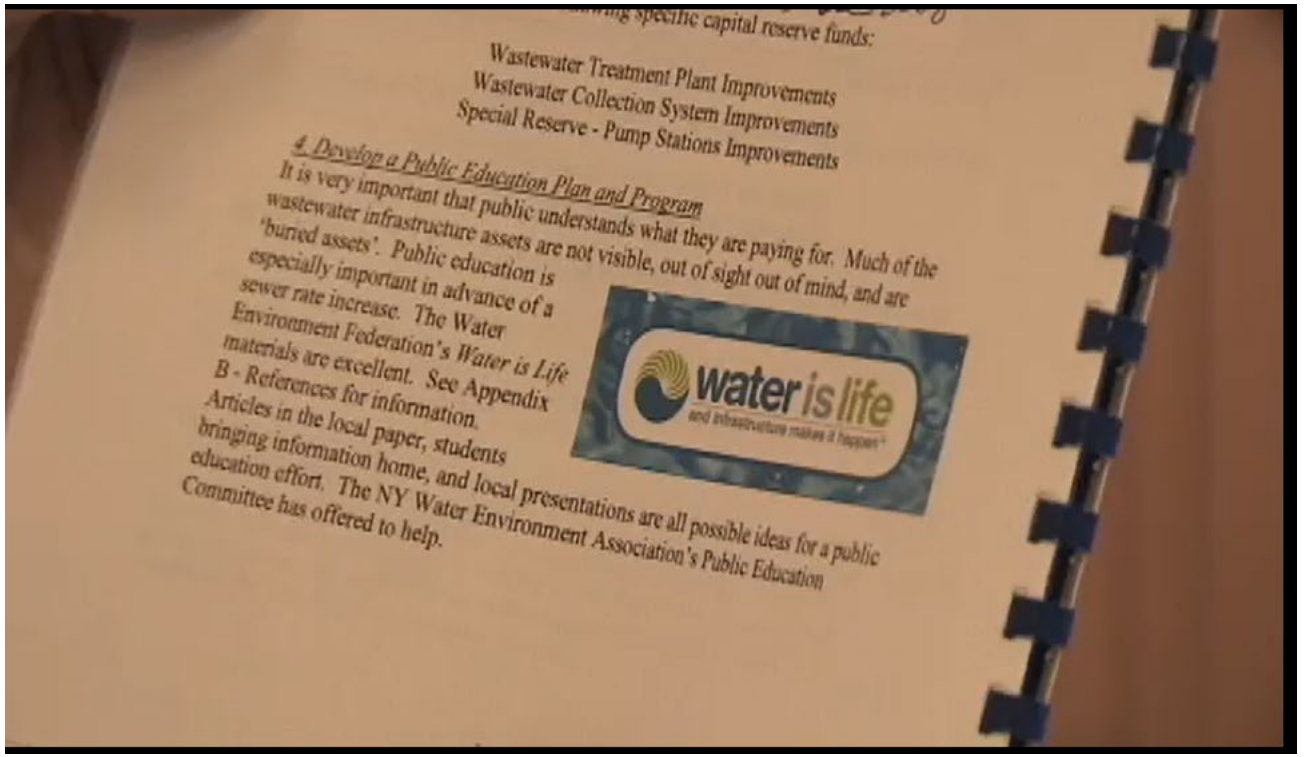
Rates Should…

- Cover costs for O&M, capital projects, and debt

https://swefc.unm.edu/home/amkan/Chapter7Videos/FS-5.m4v

Rates Should…

- Build reserves



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Building Rate Capacity

https://swefc.unm.edu/home/amkan/Chapter7Videos/FS-9.m4v

Comprehensive Funding Strategies

- Demonstrate O&M revenue source & adequacy
- Specify CIP funding sources
- Include debt repayment
- Define revenue source for increased O&M
- Account for inflation
- Anticipate rising energy costs & identify funding
- Balance L&M costs with CIP costs
- Support community sustainability

Questions?

“Taking a break can lead to breakthroughs.”

-Russell Eric Dobda

Asset Management: How Do I Get Started?

Start Simple: A Fiscal Sustainability Plan

- Very simple Asset Management Plan
- Contents
  - Inventory of critical assets
  - A plan for maintaining, repairing, and replacing the treatment works
  - A plan for funding the activities
  - An evaluation and implementation of water and energy conservation efforts

FSP Example: City of Biggs, CA

- Asset Inventory Approach
  - Evaluating expected lifetimes for each asset
  - Estimating replacement costs for each asset
  - Calculating annualized cost of replacement
- Critical Assets
  - Upon failure, significantly affect operation of the WWTP or land disposal system; or
  - Have an estimated remaining life of ≤ 15 years

City of Biggs FSP: Asset Inventory

Table 2. Assets for City of Biggs WWTP and Land Disposal System Improvements

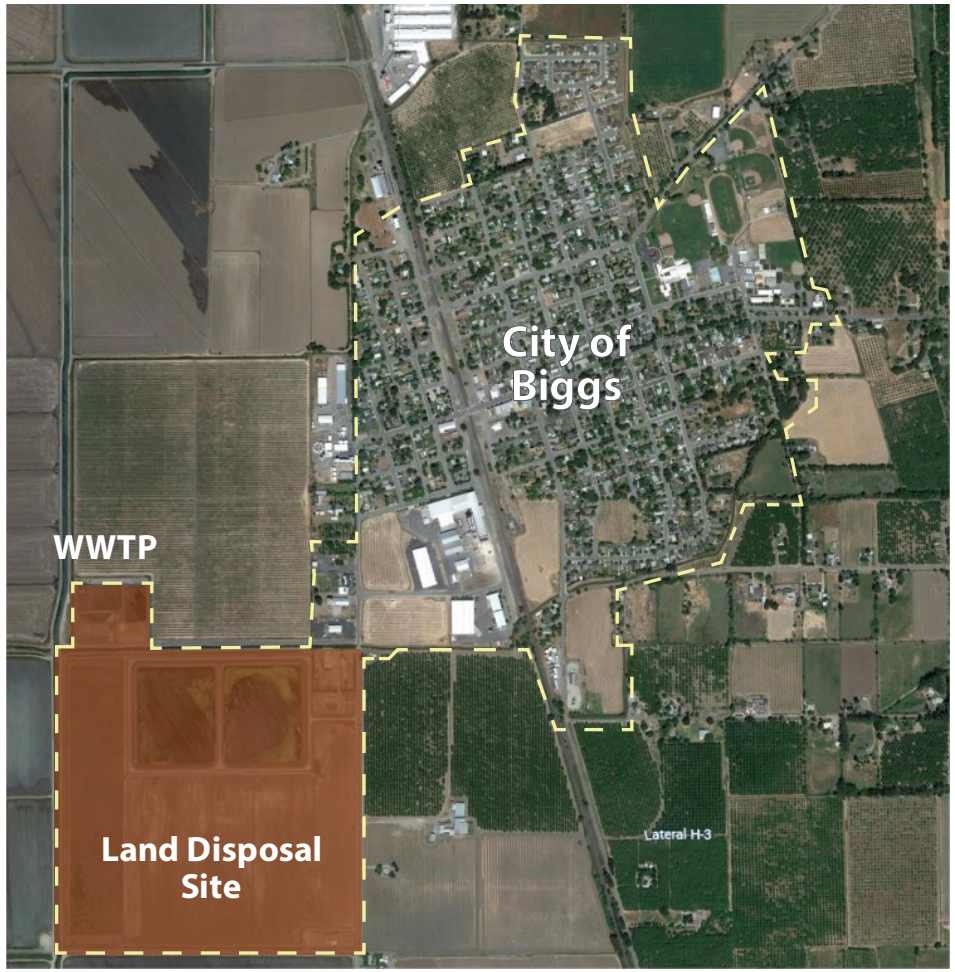
System	Asset	Material	Size	Quantity	Year of Install	Expected Life (yrs)	Remaining Life (yrs)
Effluent Pipeline "A"	16" Butterfly Valve	Cast Iron	16"	2	2019	35	35
Effluent Pipeline "A"	16" PVC Pipe*	DR-25 PVC	16" dia.; 220' length	1	2019	40	40
Effluent Pipeline "B"	12" Butterfly Valve	Cast Iron	12"	2	2019	35	35
Effluent Pipeline "B"	Air Release Valve	Cast Iron	1"	1	2019	35	35
Effluent Pipeline "B"	12" PVC Pipe*	C900 DR-25 PVC	12" dia.; 3170' length	1	2019	40	40
Effluent Pipeline "B"	10" HDPE Pipe*	DR-17 HDPE	10" dia.; 220' length	1	2019	40	40
Effluent Pump Station	Pressure Gauge Assembly	-	-	3	2019	15	15
Effluent Pump Station	Submersible Pump*	Cast Iron	10 hp	3	2019	15	15
Effluent Pump Station	Magnetic Flow Meter	-	8"	1	2019	20	20

City of Biggs FSP: Asset Categories (System)

- System Types
  - Effluent Pipeline “A”
  - Effluent Pipeline “B”
  - Effluent Pump Station
  - Headworks
  - Irrigation System
  - Tailwater Collection System
  - Treatment System

City of Biggs FSP: Costs

- O&M
- Debt Service
- Asset Replacement



City of Biggs FSP: O&M Costs

Table 3. Estimated Annual O&M Cost for City of Biggs Wastewater Program

Cost Category	Estimate
Personnel (salary, benefits, payroll tax, insurance, training, etc.)	$73,000
Insurance	$3,000
Energy Costs (fuel and electrical)	$15,000
Process Chemical	$36,000
Monitoring and Testing	$45,000
Professional Services	$20,000
Residuals/Waste Disposal	$5,000
Other	$15,000
Total	**$212,000**

** Source: Bennett 2019*

City of Biggs FSP: Debt Service Costs

Table 4. Biggs Current Debt Service

Funding Source	Principal Balance as of July 1, 2018	Principal Balance as of June 30, 2019	Principal Forgiveness	Annual Principal Due1	Interest Paid in 2019[1]	Annual Interest Rate[2,3]	Remaining Term (years)[4]
USDA Loan	$352,600	$342,700	$0	$9,900	$15,954.75	4.5%	34
USDA Loan	$118,100	$114,800	$0	$3,300	$5,334.75	4.5%	34
USDA Loan	$91,100	$88,100	$0	$3,000	$2,980.25	3.3%	29
State Water Board CWSRF Loan	$2,775,720	$2,713,346	$1,448,672	$62,375	$28,297.11	2.1%	20

City of Biggs FSP: Asset Replacement Costs

Table 6. Estimated Asset Replacement Costs

System	Asset	Quantity	Remaining Life (yrs)	Unit Replacement Cost	Total Replacement Cost
Effluent Pipeline "A"	16" Butterfly Valve	2	35	$50,700	$101,400
Effluent Pipeline "A"	16" PVC Pipe	1	40	$137,100	$137,100
Effluent Pipeline "B"	12" Butterfly Valve	2	35	$33,800	$67,600
Effluent Pipeline "B"	Air Release Valve	1	35	$4,300	$4,300
Effluent Pipeline "B"	12" PVC Pipe	1	40	$1,560,000	$1,560,000
Effluent Pipeline "B"	10" HDPE Pipe	1	40	$285,800	$285,800
Effluent Pump Station	Pressure Gauge Assembly	3	15	$7,100	$21,300
Effluent Pump Station	Submersible Pump	3	15	$233,700	$701,100
Effluent Pump Station	Magnetic Flow Meter	1	20	$27,100	$27,100
Effluent Pump Station	Chemical Dosing System	1	20	$80,400	$80,400

City of Biggs FSP: Asset Replacement Schedule

Table 5. Asset Replacement Schedule

Year of Replacement	Assets to be Replaced	Total Replacement Cost
2030	• 150kW Generator ($124,700) • Influent Pump ($378,600) • MCC-100 ($381,800) • Pressure Gauge Assembly ($21,300)	$906,400
2034	• Irrigation Pump ($155,800) • Pressure Gauge Assembly ($21,300) • Recycle Pumps ($218,200) • Submersible Pump ($701,100) • Tailwater Pump ($116,900)	$1,213,300
2035	• 6' Chain Link Fence ($207,300) • Magnetic Flow Meter ($27,100) • Pipe Supports ($11,100)	$245,500
2039	• Chemical Dosing System ($90,400) • Magnetic Flow Meter ($27,100) • Pipe Supports ($116,000)	$233,500
2040	• Davit Crane ($7,800)	$7,800

City of Biggs FSP: Current Revenue

Table 7. City of Biggs Sewer Fees and Revenue

Customer Sector	# of Customers (2019)	Total Monthly Sewer Fee/ Customer	Total Annual Revenue/Sector
Residential/Apartment	673	$74.40	$600,854
Tavern or Bar	1	$94.76	$1,137
Beauty Salon at Home	2	$82.61	$1,983
Churches and Halls	3	$76.63	$2,759
Commercial	12	$90.61	$13,048
Wild Rice Mill	1	$74.40	$893
Specialty Rice Mill	1	$115.23	$1,383
Sunwest Main Rice Mill	1	$318.89	$3,827

City of Biggs FSP: Funding Plan

Table 8. Funding Plan Estimate

Year	Starting Balance	Revenue	O&M Expenses[1]	Replacement Expenses	Total Debt Obligations	Remaining Balance[2]
2020	$-	$643,674	$217,845	$-	$159,130	$266,699
2021	$266,699	$643,674	$224,380	$-	$157,125	$528,867
2022	$528,867	$643,674	$231,112	$-	$155,120	$786,309
2023	$786,309	$643,674	$238,045	$-	$153,115	$1,038,823
2024	$1,038,823	$643,674	$245,186	$-	$151,110	$1,286,201
2025	$1,286,201	$643,674	$252,542	$-	$149,105	$1,528,228
2026	$1,528,228	$643,674	$260,118	$-	$147,100	$1,764,683
2027	$1,764,683	$643,674	$267,922	$-	$145,095	$1,995,341
2028	$1,995,341	$643,674	$275,960	$-	$143,089	$2,219,965
2029	$2,219,965	$643,674	$284,238	$-	$141,084	$2,438,316
2030	$2,438,316	$643,674	$292,765	$906,400	$139,079	$1,743,745
2031	$1,743,745	$643,674	$301,548	$-	$137,074	$1,948,796

City of Biggs FSP: Funding Plan

2043	$2,203,173	$643,674	$429,936	$-	$23,786	$2,393,125
2044	$2,393,125	$643,674	$442,834	$8,400	$23,090	$2,562,474
2045	$2,562,474	$643,674	$456,119	$920,000	$22,395	$1,807,633
2046	$1,807,633	$643,674	$469,803	$-	$21,700	$1,959,804
2047	$1,959,804	$643,674	$483,897	$-	$21,005	$2,098,576
2048	$2,098,576	$643,674	$498,414	$-	$20,310	$2,223,526
2049	$2,223,526	$643,674	$513,366	$3,400	$17,715	$2,332,719
2050	$2,332,719	$643,674	$528,767	$1,120,900	$15,982	$1,310,744
2051	$1,310,744	$643,674	$544,630	$-	$15,385	$1,394,403
2052	$1,394,403	$643,674	$560,969	$-	$14,788	$1,462,321
2053[3]	$1,462,321	$643,674	$577,798	$1,213,300	$14,190	$300,706
2054	$300,706	$643,674	$595,132	$1,463,500	$9,093	$(1,123,346)
2055	$(1,123,346)	$643,674	$612,986	$1,917,100	$-	$(3,009,758)

City of Biggs FSP: Water & Energy Conservation

- Energy Conservation
  - Pumps are appropriately sized
  - Variable frequency drives for pumps
  - Supervisory Control and Data Acquisition (SCADA) software

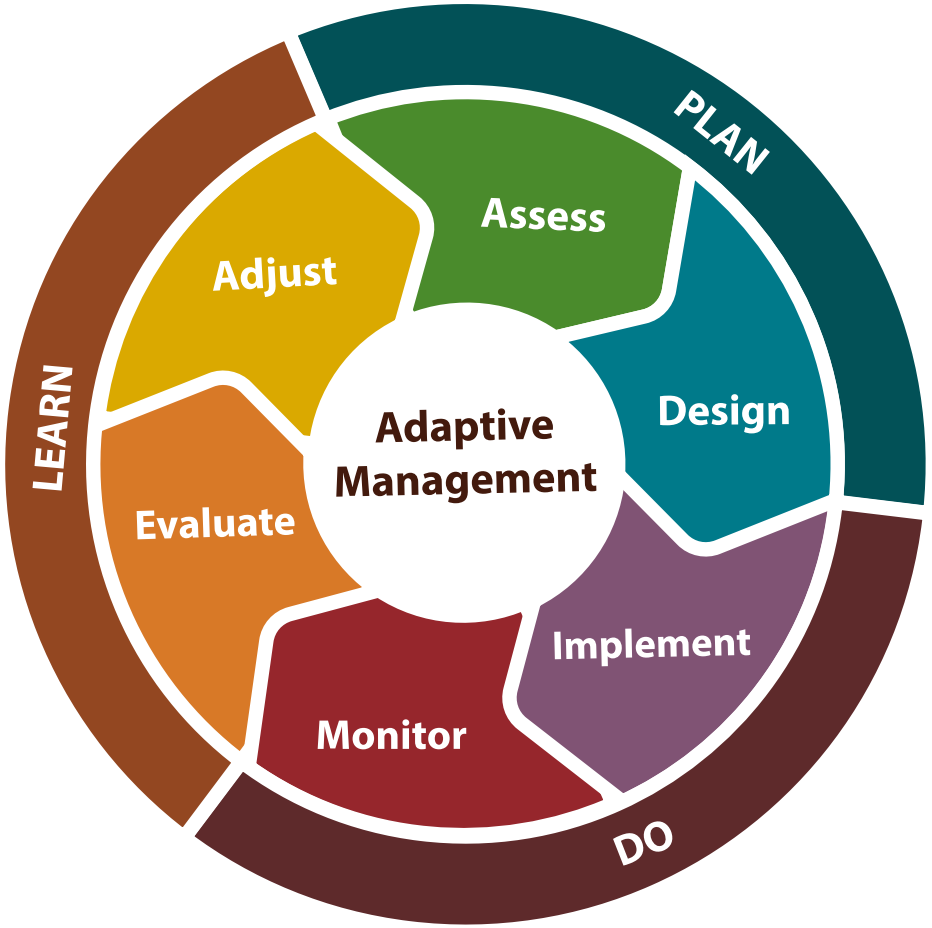
- Water Conservation
  - Use treated WW to irrigate cropland (rather than potable)
  - SCADA

Questions?

Asset Management: What's Next?

Tracking Progress & Adaptive Management

- Review and Update
  - Assets
  - Asset Characteristics
  - LOS goals
  - Life Cycle Costs
  - Funding/Financing Plan



Getting Advanced

- Energy Management
- Water Efficiency
- Climate Change
- Regional Planning/Collaboration
- Multi-Sector Coordination

Getting Advanced: Future Training

- Techniques & tools for developing/updating asset inventories & maps
- Setting & measuring level of service goals
- Using data to assess POF & COF
- Prioritizing projects based on risk analysis
- Using risk analysis to make AM decisions
- Funding & creating a CIP

Resources

- Technical Assistance
  - www.efcnetwork.org/get-help/
  - www.efc.csus.edu
  - Maureen.Kerner@owp.csus.edu
- EPA Guidance
  - https://www.epa.gov/dwcapacity/about-asset-management

EFCN environmental finance center network

ENVIRONMENTAL FINANCE CENTER AT SACRAMENTO STATE

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