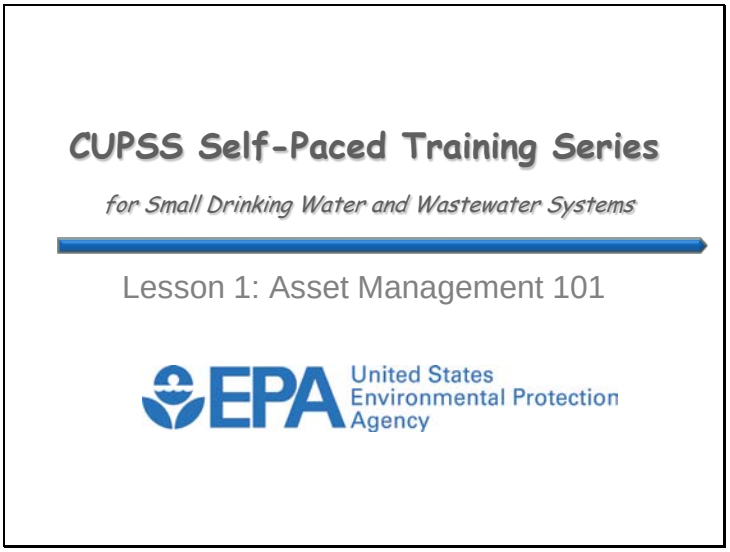
Slide 1



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Welcome to Lesson 1 of the Check Up Program for Small Systems (CUPSS) Self-Paced Training Series! This lesson will explain the fundamentals of asset management and how your community can get started.

Before you begin using this self-paced training, you might have a few questions about CUPSS. Maybe your state regulator or a technical assistance provider handed you this training and said, "Go for it!" In this lesson, we'll give you a little bit of information about the CUPSS software and how you might find it beneficial. We'll even tell you what asset management really means for your utility.

The first thing you may ask is, "What is CUPSS?" CUPSS stands for Check Up Program for Small Systems and is asset management software; its purpose is to help you organize and develop a plan for the physical and financial health of your drinking water or wastewater utility. CUPSS is 'desktop software,' meaning it is a program that runs on your computer. All your CUPSS data will be stored on your computer and is not accessible by EPA. You do not need an Internet connection to use CUPSS, just a computer to load the software. If you are connected, the program can use the Internet so that you can register your copy and update your version when necessary.

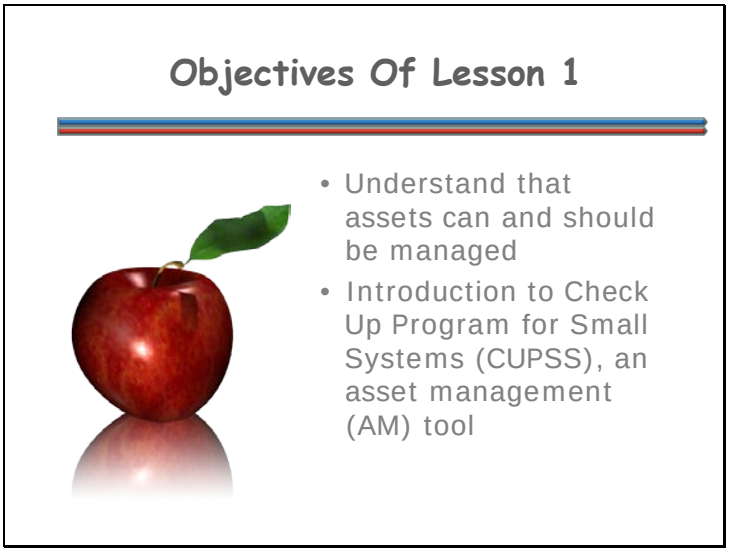
Like other types of computer software, there are two key components—input (what goes in), and output (what comes out). CUPSS relies on a combination of specific information entered by the user and general information provided by EPA. The information entered by EPA has been inserted to provide additional assistance—such as the life expectancy of 6" mains—to provide simple, enlightening reports. You need to enter in only a couple important assets and last year's financial statement to generate a targeted action plan.

You are likely most intrigued by what CUPSS can actually do for you. We think CUPSS will help you:

- Communicate with the decision makers in your community
- Make more informed, proactive choices
- Improve the efficiency and focus of your operations
- Maximize limited financial resources

Like anything worth doing, integrating CUPSS and asset management into your utility's culture will take time and effort. These are certainly high goals, but we think taking the simple approach used in CUPSS will result in great strides forward for your community.

Slide 2



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Lesson 1 will discuss why assets should be managed and a brief introduction of how to manage them by using the CUPSS software.

The first objective is to understand that assets can and should be managed to do the following

- Prevent possible disasters
- Keep your local decision makers informed
- Keep your community happy by keeping their rates as low as possible and delivering reliable services

The next objective of this lesson is to introduce CUPSS as an asset management tool that can, with your help

- Implement long-range managerial planning and financial projections
- Generate a personalized asset management plan

Slide 3

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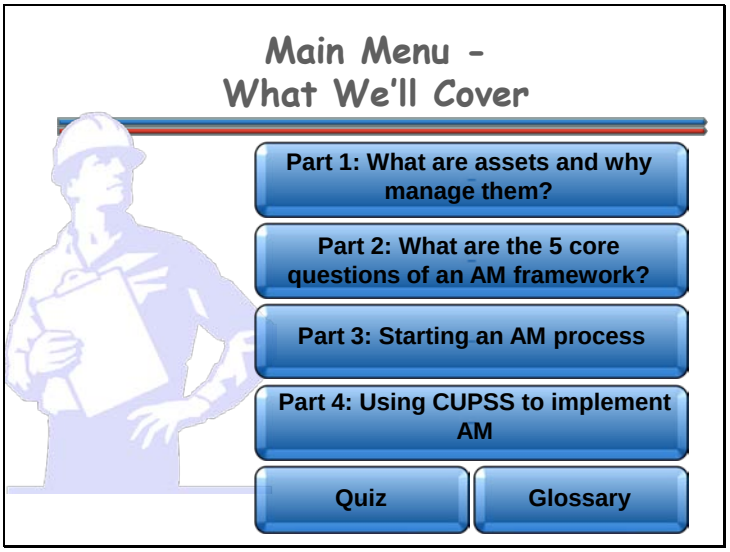
Slide 4



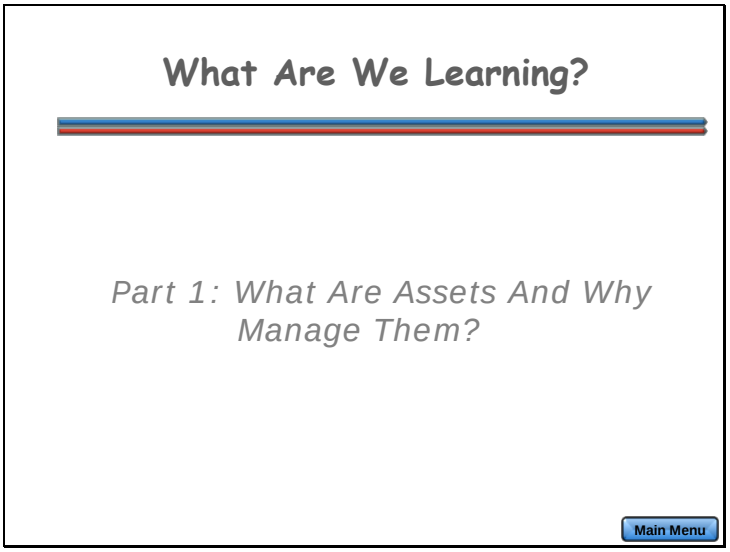
Navigation: *Click a button on the slide to begin a part of the lesson. You can start at the beginning or skip ahead the choice is yours. You may also choose "Quiz" to find test questions or "Glossary" to find term definitions. If you do not want to hear the audio, set the sound scale on the bottom left to zero or mute the computer's sound.*

This lesson is designed to be a first look at asset management or a brief refresher for those that have taken previous training. We hope to increase your knowledge of asset management through the resources provided during this lesson.

Here's what we'll cover in this lesson

- Part 1: What are assets and why manage them?
- Part 2: What are the 5 core questions of an asset management (AM) framework?
- Part 3: Starting an AM process
- Part 4: Using CUPSS to implement AM

Slide 5



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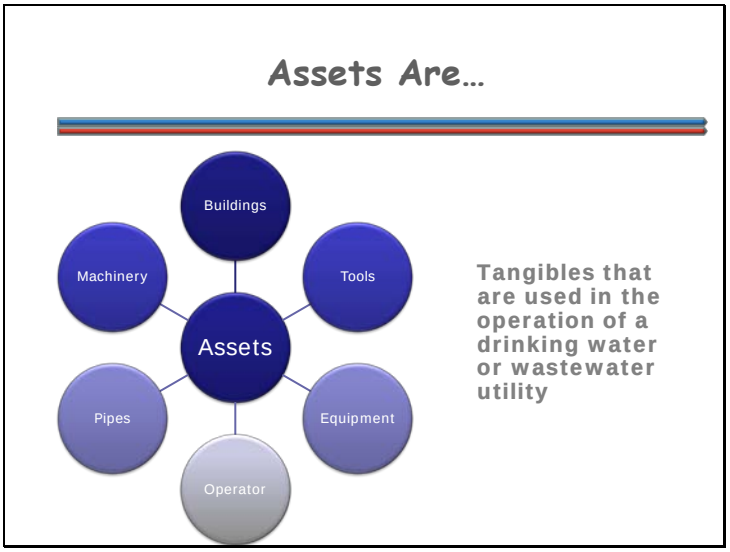
For Part 1 of this lesson, we want to start with the basics. The theme for Part 1 is, "What are assets and why manage them?"

Slide 6



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Assets are any building, tool, piece of equipment, pipe, or machinery used in the operation of a utility. Assets also include people, such as the utility operator. Managing assets ensures that a system gets the most value from each of its assets and has the financial resources to rehabilitate and replace them when necessary. Managing assets also includes developing a plan to reduce costs while increasing the efficiency, support and growth capacity, and the reliability of a system's assets. Successful asset management depends on knowledge of a system's assets and regular communication with decision makers and customers about the system's future needs.

Slide 7

Navigation: *Use the arrows in the upper-right to navigate backward to previous screens or forward through the interactive tool screens. When you are finished, select "Next Slide" in the upper right to continue past the interactive tool and on to the next lesson screen. If you do not want to hear the audio, set the sound scale on the bottom left to zero or mute the computer's sound.*

Thinking about categorizing your assets is a great first step. This helps a utility identify which areas of the system might need the most attention. It is really all about focusing your efforts to get the biggest bang for your buck.

Don't forget the operator is your most valuable asset!

Common Assets At A Water Utility

Source

Common Assets At A Water Utility

Pumping Facility

Common Assets At A Water Utility

Treatment

Common Assets At A Water Utility

Storage

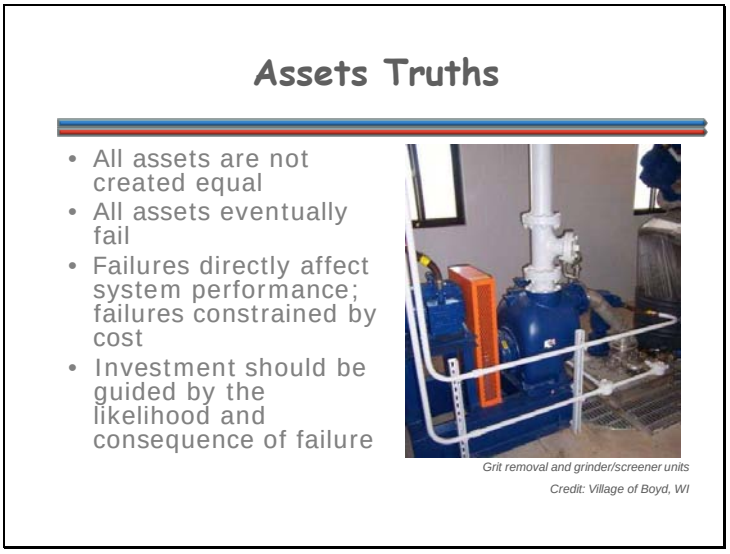
Common Assets At A Water Utility

Distribution

Common Assets At A Water Utility

Housing

Slide 8



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There are many realities utilities must face when it comes to their assets.

All assets are not created equal
Different assets have different probabilities of failure, as determined by age, materials and assembly processes, operating environment, demand/usage, and maintenance.

All assets eventually fail
Assets are not built to last forever; they will eventually fail regardless of operation and maintenance (O&M).

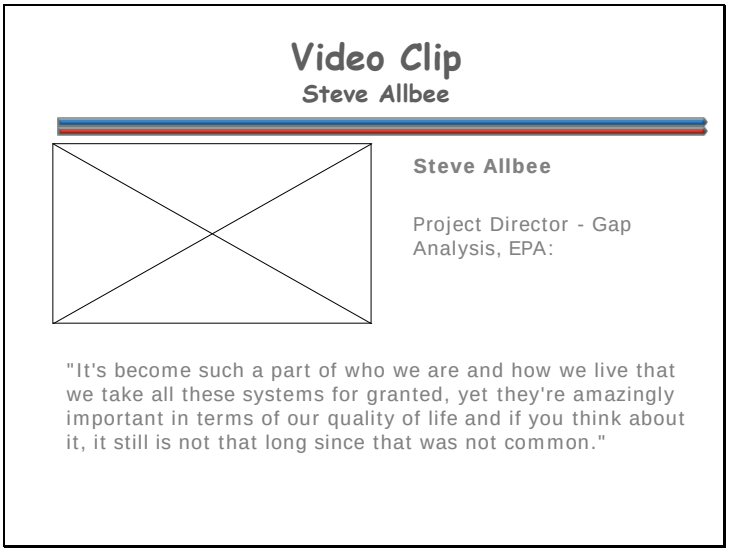
Failures directly affect system performance; failures are constrained by cost
Utilities want to manage the failure rates of assets. When an asset fails, it affects the whole utility process. The management of failures is highly constrained by cost; that is, customers are not typically willing to pay for zero likelihood of failure. There must be a balance.

Investment should be guided by the likelihood and consequence of failure

Investment in assets (their acquisition, operation, maintenance, renewal and disposal) should be guided by the likelihood of failure and its consequence to the customer and regulator. Condition and criticality analyses should be performed to determine when the asset will fail and what impact that failure will have on the utility's operation.

The more a utility understands its assets—the demand for the assets, their condition and remaining useful life, their risk and consequence of failure, their feasible renewal options (repair, refurbish, replace), and the cost of those options—the higher the confidence everyone can have that the utility's investment decisions are indeed the lowest life cycle cost strategies for sustained performance at a level of risk the community is willing to accept. This process is called asset management.

Slide 9



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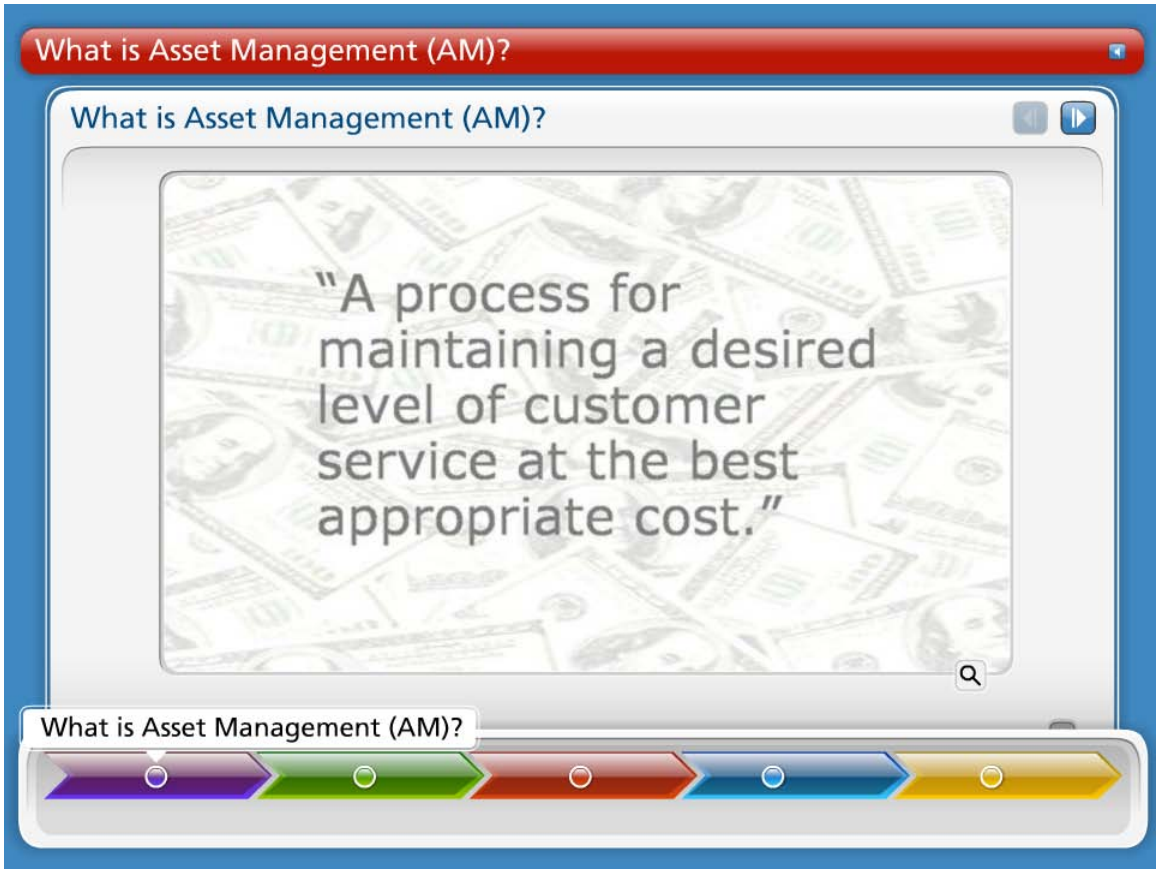
Slide 10



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What is asset management?
What does asset management really mean anyway? One definition of asset management is
"A process for maintaining a desired level of customer service at the best appropriate cost."

This is a good definition of asset management that small systems can relate to. There are longer, more complex definitions that are good definitions too. And really, there is no

right way or standard to-do list for practicing asset management. Our emphasis for small systems is to simply get started… to jump right in wherever they are. A small system's own definition of what asset management means to the utility and the community will come in time.

Why Manage Assets?
So why manage assets? Because it's always good to have a backup plan!

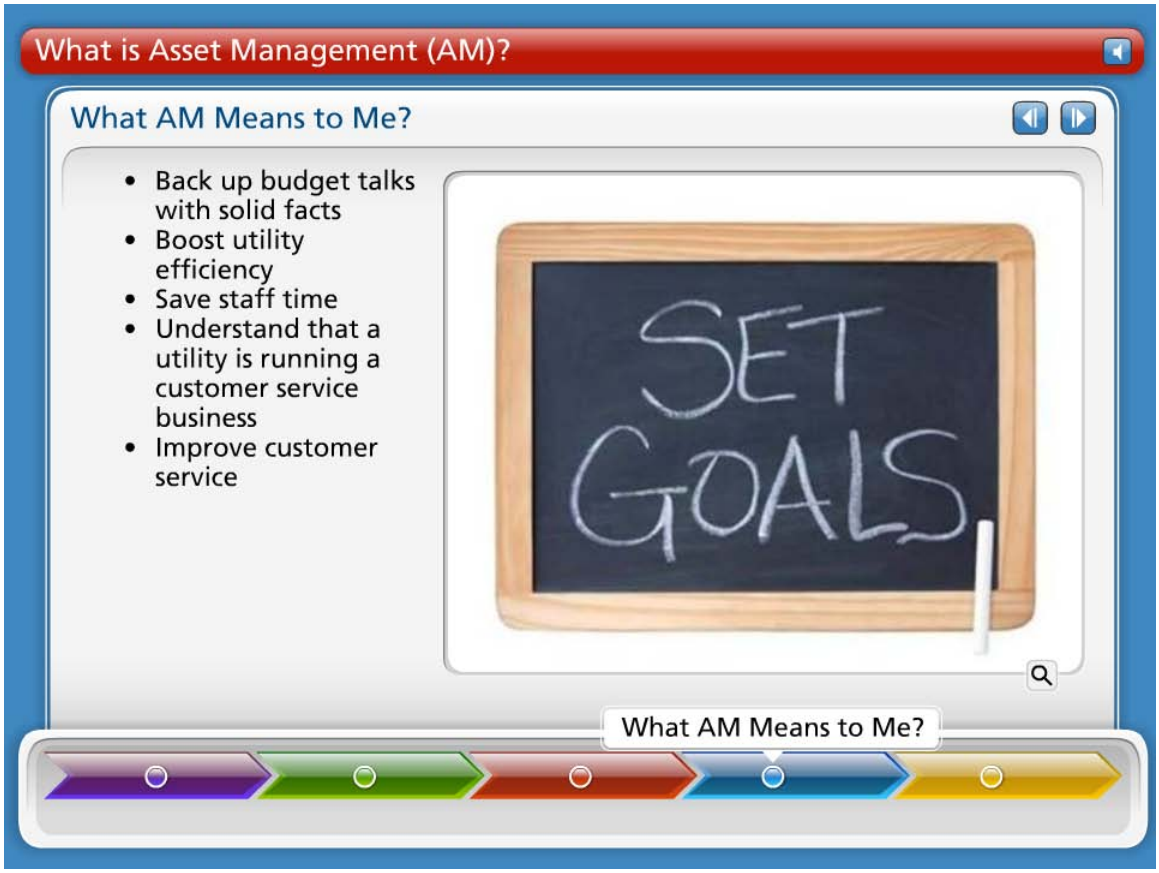
Why Care About Managing Assets?
There are many reasons to care about managing drinking water and wastewater infrastructure assets.

Assets are large pieces of complicated equipment that can be very expensive. Assets usually last a fairly long time, so utilities want to keep them in good shape. It's a fact that our country's water infrastructure is aging and failing at an alarming rate. And we don't even know where it all is! It's important to remember not only the large pieces of equipment that we see above ground, but also all the equipment that is underground.

Performing routine O&M on these assets is essential to protect public health. Malfunctioning equipment can cause people to get sick, especially the very young and the very old, or those with weakened immune systems.

Economic development depends on reliable and safe water delivery and wastewater management. But are utilities charging enough to meet today's and tomorrow's demand?

There is a way to address all these issues—and that is **asset management**.



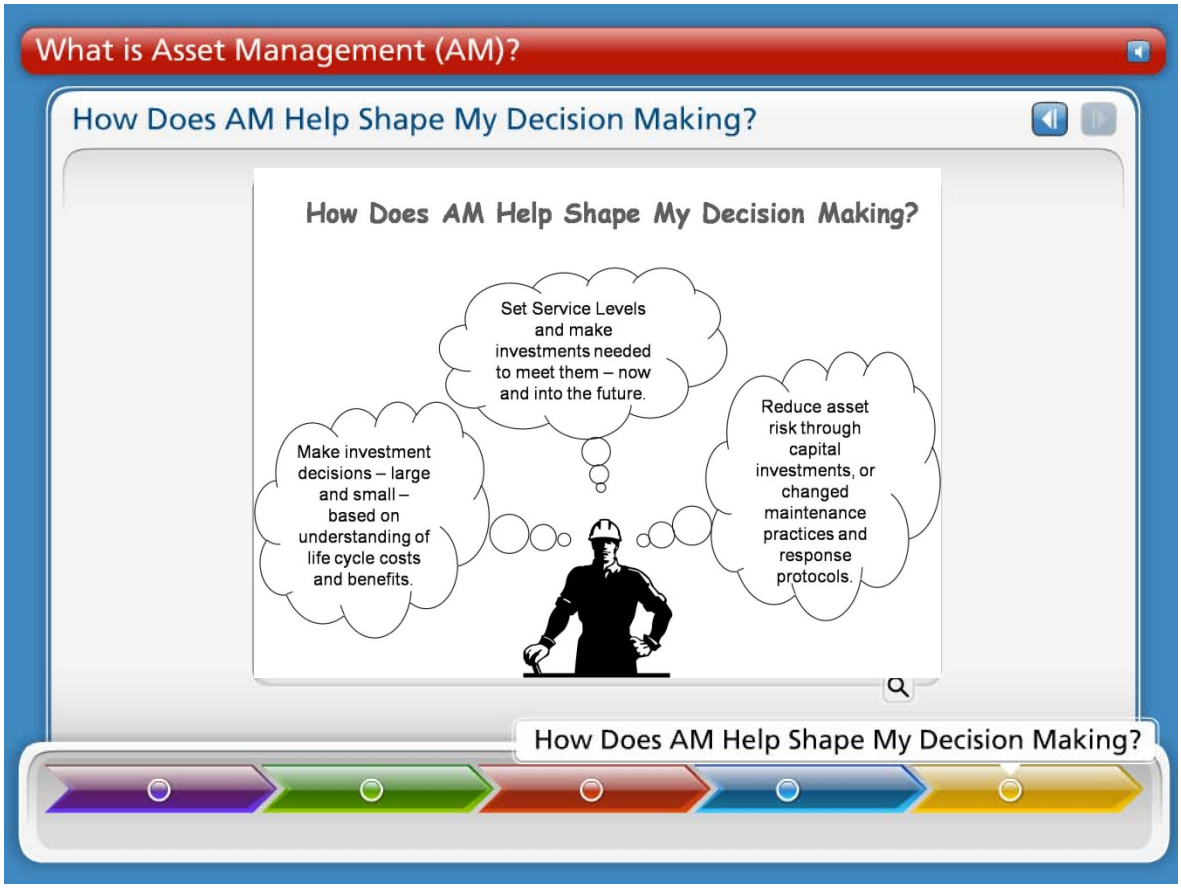
What AM Means to Me

Large systems here in the United States, like Seattle Public Utilities and Orange County Sanitation District, have been practicing asset management and have well-developed programs. Their lessons learned are detailed and complex, but the concepts can be boiled down and made relevant for anyone contemplating the process.

Asset management will help utilities

- Back up budget talks with solid facts
- Boost utility efficiency
- Save staff time
- Understand that a utility is running a customer service business
- Improve customer service

The bottom line is that utilities can make better decisions because they're more informed. It's really an organizational and communication process that you can baby-step your way into. We all know that major change doesn't happen overnight.



How Does AM Help Shape My Decision Making?

Asset management is not just a process of managing a utility's assets, but it's also a way of thinking for a system's everyday activities. The decisions that are made today will shape the outcomes that will occur in the future. Asset management helps utilities understand the big picture and how each small part affects the system as a whole.

Slide 11

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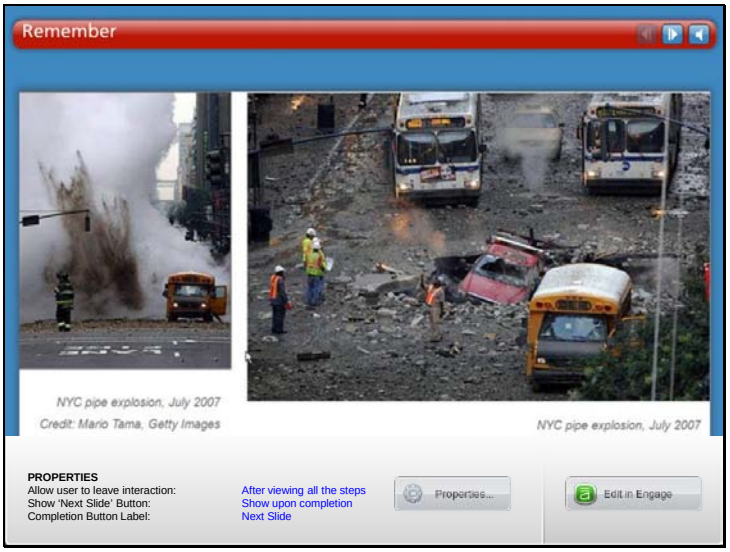
Slide 12



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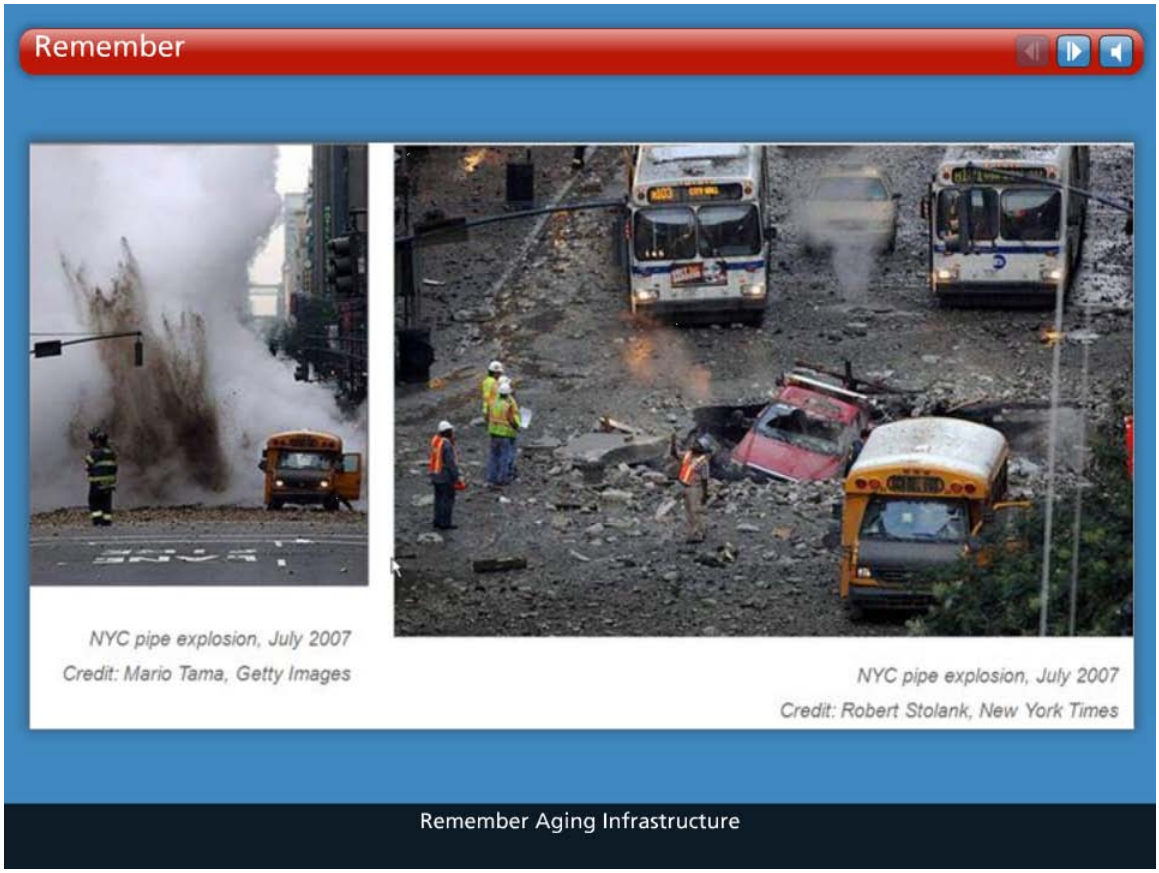


Remember Aging Infrastructure
These photos are of a steam pipe explosion near Grand Central Terminal in Manhattan. It sent hot steam, mud, and debris 40 stories high during rush-hour for 2 hours. Eighteen people were taken to hospital, and one person died. It left a 35-foot wide, 15-foot deep crater. Possible causes include water hammer (cold water coming into contact with steam pipes), a broken water main, heavy rain that day, or a crack in the pipe. The steam pipe was installed in 1924. The explosion occurred on July 18, 2007.

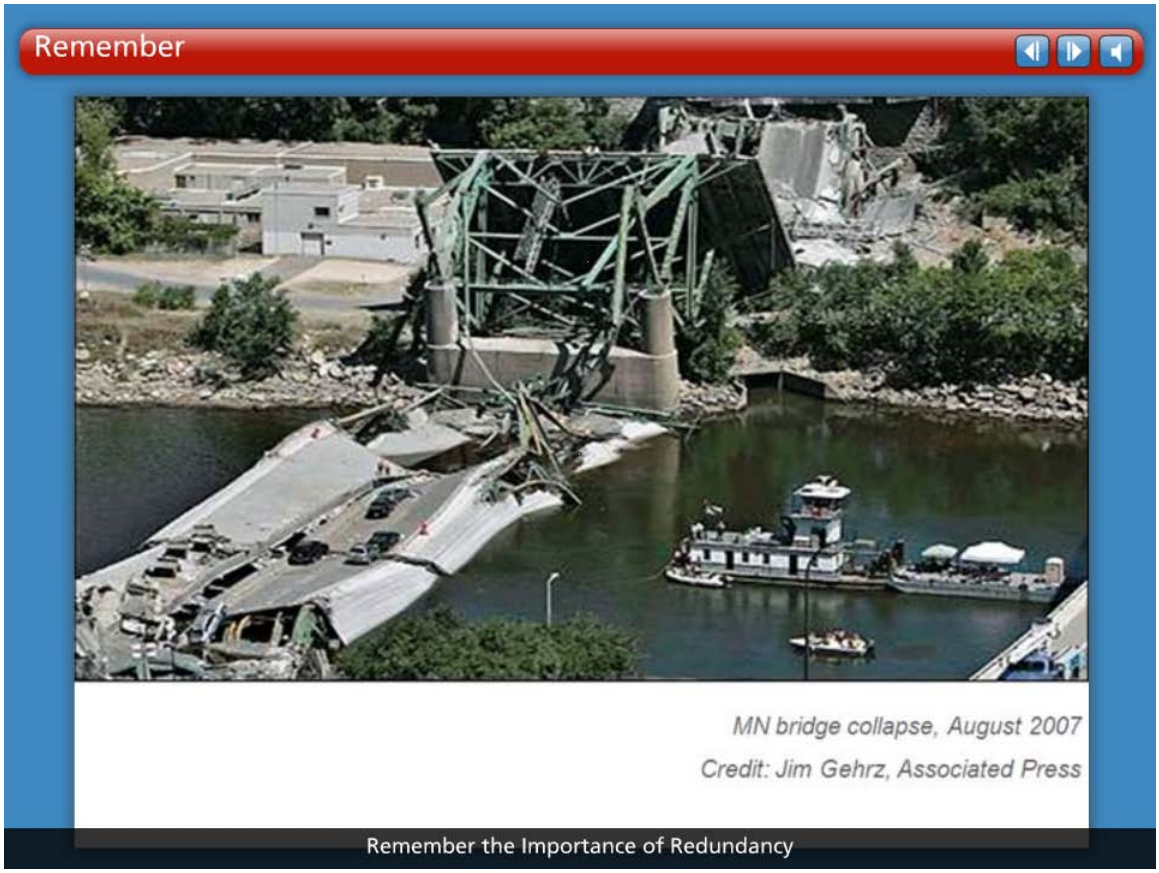
Aging infrastructure throughout the country is causing problems for many communities—large and small. Implementing asset management will help you understand asset life cycles and plan for repair, rehabilitation, or replacement.

It’s all about improving customer service, in downtown New York City and on Main Street USA.

Video Clip Benjamin Grumbles
"Infrastructure spending is an investment in the future. And adequate maintenance managing those assets, it pays enormous dividends, and we see that in our role leading the country's efforts on clean water and drinking water. It's critically important and as systems age and as population pressures increase on systems we all need to work together and we need to advance technology, and innovation and work in a collaborative way."

Remember The Condition of Assets

Would your community be satisfied with receiving its drinking water from a pipe (left image) or reservoir (right image) like this? Knowing the condition of your assets can prevent a possible failure or public health hazard. The condition of your assets can also determine the capacity that they can handle. If your community sees increased growth and your assets are in poor condition, you'll have a more difficult time supplying safe drinking water and adequate wastewater collection and treatment.



Remember Importance of Redundancy
This is the I-35W bridge collapse in Minneapolis, Minnesota. Main spans of the bridge collapsed causing 100 vehicles to fall into the Mississippi River and onto its banks. Thirteen people died and approximately 100 more were injured. One cause was lack of redundancy in the main truss system. The bridge was built in 1967. The bridge collapsed on August 1, 2007.

Lack of redundancy in any system is not good. If one part of a system fails and there is not another part online to immediately take its place, a devastating situation can occur like the Minnesota bridge collapse. Asset management keeps track of redundancy within a utility and gives specific risk factors for each component.

Remember The Community
In November 2007, Washington, DC's Water and Sewer Authority stated that 62 fire hydrants were not working properly. The fire department's number was much higher—235 fire hydrants were in need of repair or replacement. Because there isn't a comprehensive list maintained of broken fire hydrants in DC, faulty hydrants are not discovered until a fire occurs.

In addition to knowing which hydrants are broken, it is important to have a list of aging hydrants that should be repaired, rehabilitated, or replaced. Utilities need to know the remaining useful life of their assets to take the proper measures to prevent breaks. Asset management can help keep the staff up to date with the age of a community's assets.

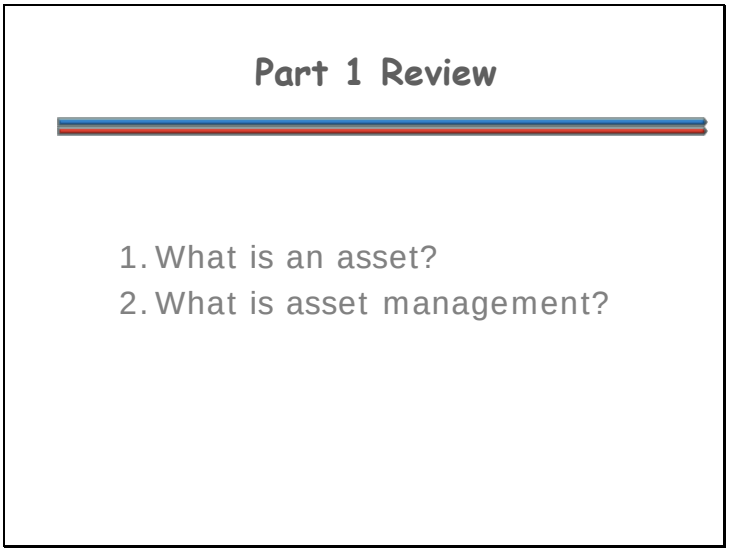
Remember Surrounding Watersheds
Knowing where wellheads are and what's around them can prevent source water from becoming contaminated. Asset management allows utilities to be able to create maps with the specific location of each asset. Helping to maintain a sustainable watershed will help your utility in the long run by ensuring an adequate, available source.

Remember The Forces of Nature
Hurricane Katrina occurred on August 23, 2005. Estimates of about 100 million gallons of wastewater were in the treatment system in New Orleans when Katrina shut the city down.

While a hurricane cannot be avoided, knowing what to do when mother nature strikes will help lessen the harmful effects on the community. Having asset inventories and maps will help utilities find and restore critical assets after a natural disaster, such as a hurricane. Being able to contain wastewater and shut the system down will keep hazardous wastes out of the flood waters. Asset management will help a system keep track of inventories and tasks and will establish procedures for utilities to follow.

Photos: (left) A fallen water tower in Biloxi, Mississippi. (right) Flooded I-10/I-610/West End Boulevard interchange and surrounding area of northwest New Orleans and Metairie, Louisiana.

Slide 13



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1. What is an asset?

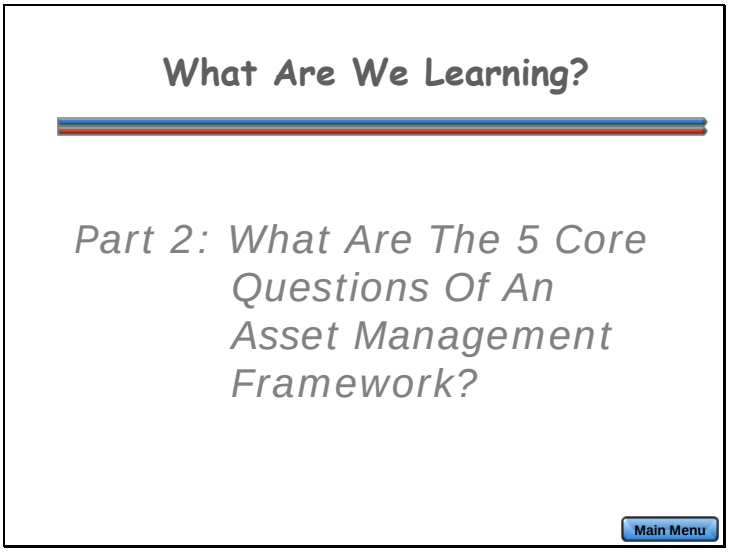
Assets are tangibles that are used in the operation of a drinking water or wastewater utility. Assets can be people, buildings, tools, pieces of equipment, pipes, or machinery used in the operation of a utility.

2. What is asset management?

"A process for maintaining a desired level of customer service at the best appropriate cost."

It is not just a process of managing a utility's assets but also a way of thinking for a system's everyday activities.

Slide 14



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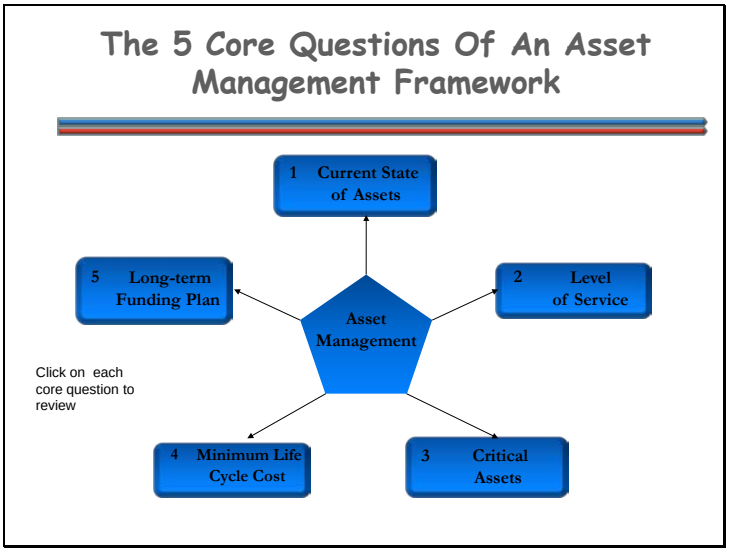
For Part 2 of this lesson, you will go over the 5 Core Questions of An Asset Management Framework.

Slide 15



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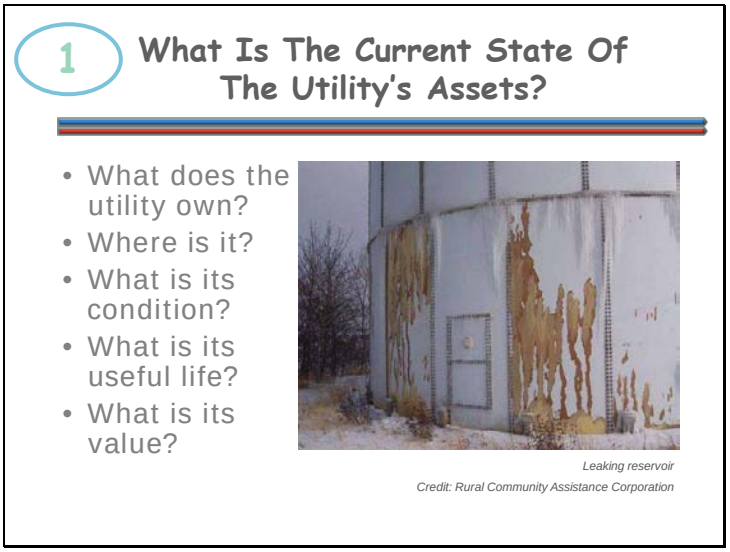
Asset management best practices aim to improve utility operations. Utilities will become more familiar with these approaches as an asset management program is implemented. A good starting point for any size system is the 5 Core Questions framework. This framework walks you through all the major activities associated with asset management and can be implemented at the level of sophistication reasonable for a given system.

The five core questions of an asset management framework are

1. What Is the Current State of the Utility's Assets?
2. What Is the Utility's Required Sustained Level of Service?
3. Which Assets Are Critical to Sustained Performance?
4. What Are the Utility's Best "Minimum Life-Cycle Cost" CIP and O&M Strategies?
5. What Is the Utility's Best Long-term Financing Strategy?

These questions all relate to each other

Slide 16



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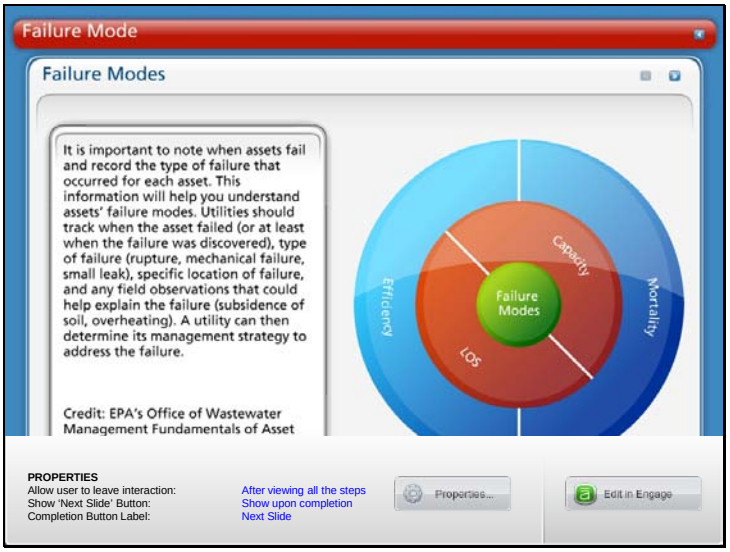
The first step in managing a utility's assets is knowing their current state. Because some of this information may be difficult to find, estimates can be used when necessary. Over time, as assets are replaced or rehabilitated, the utility's inventory will become more accurate.

Questions to ask:

- What does the utility own?
- Where is it?
- What is its condition?
- What is its useful life?
- What is its value?

Slide 17



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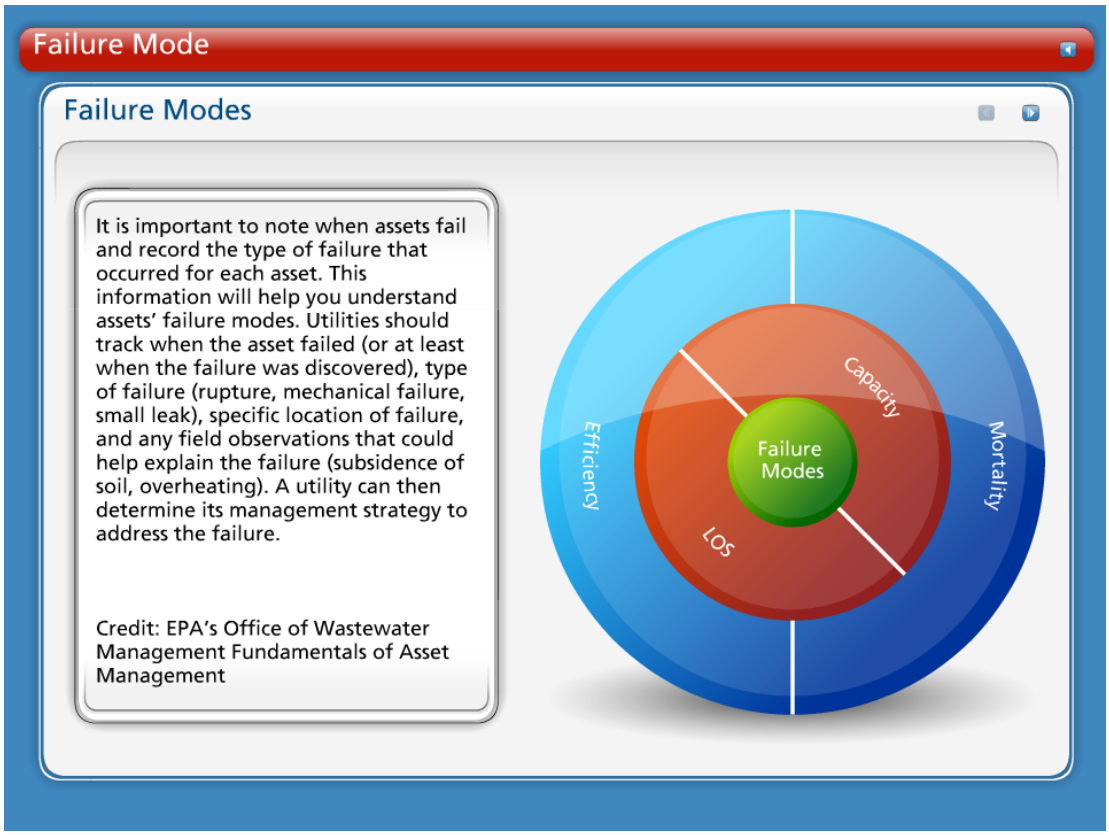
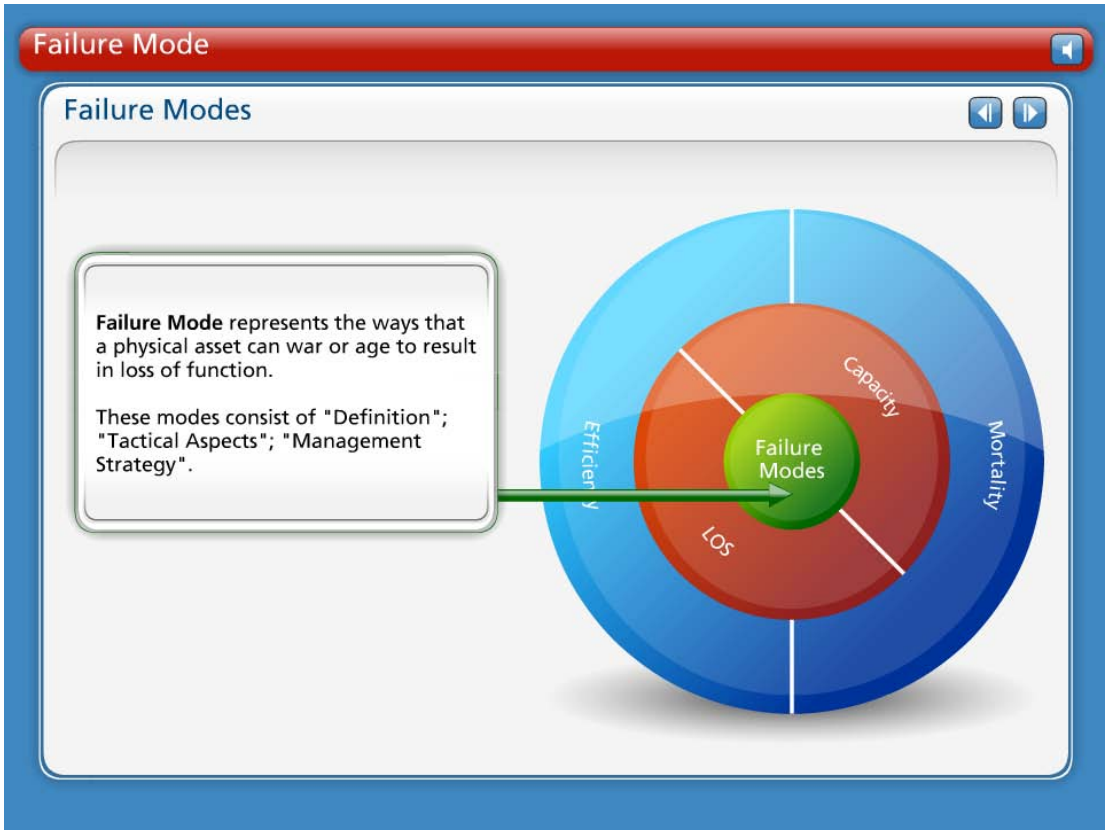
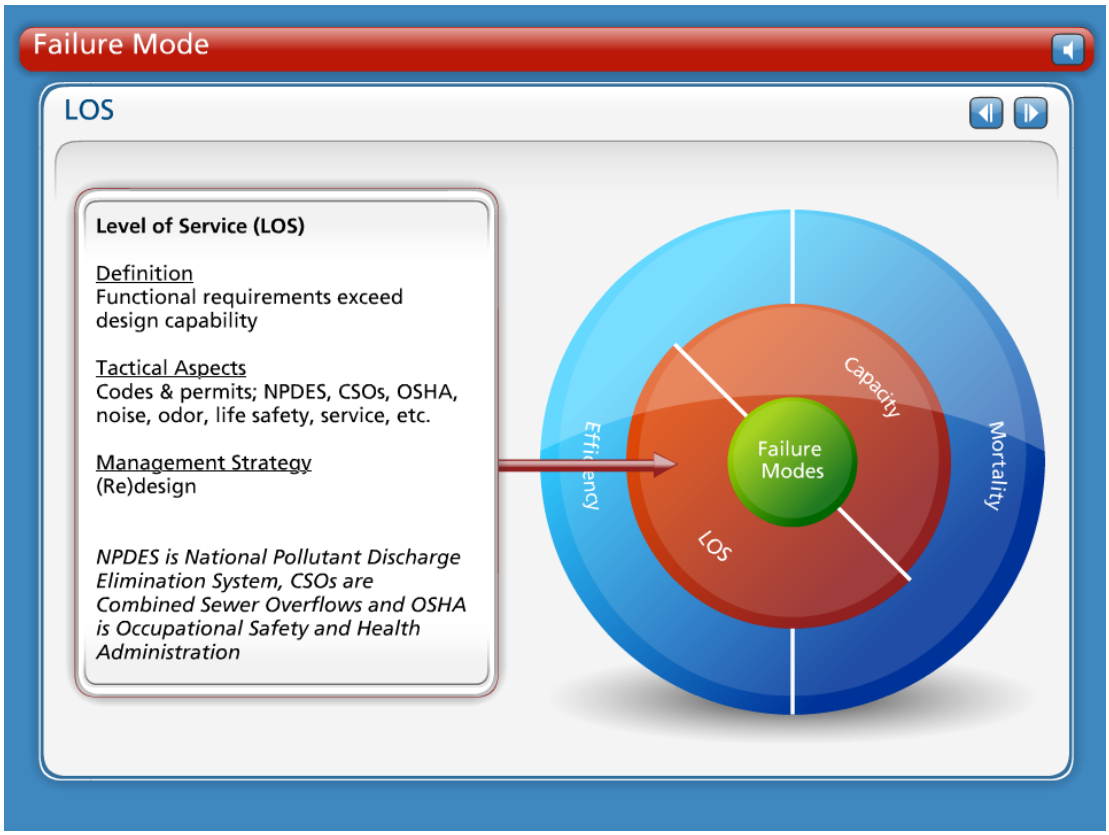
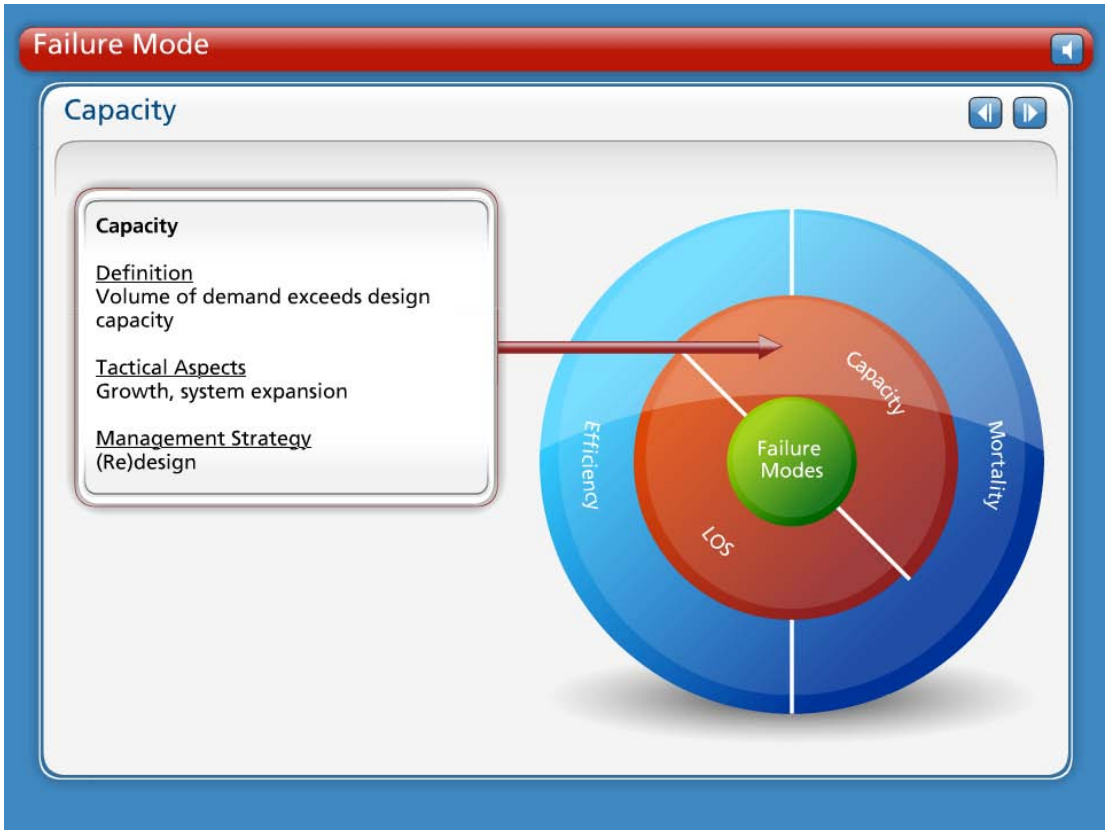
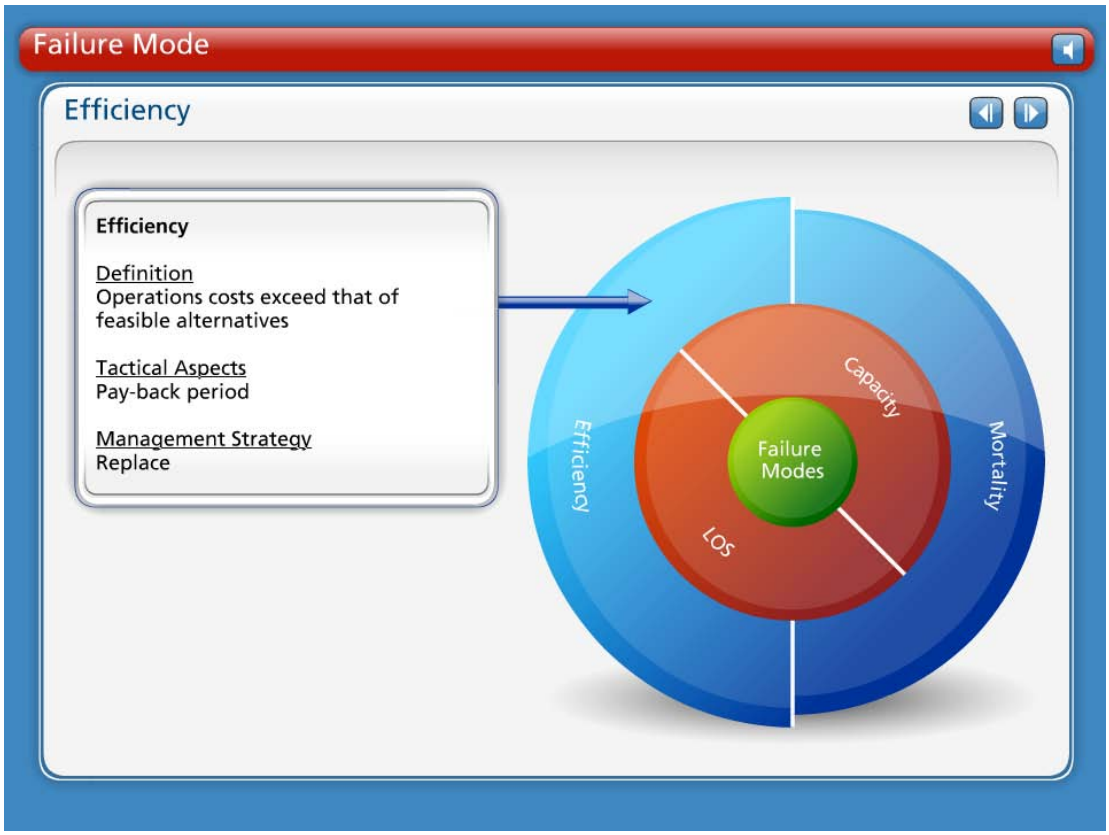
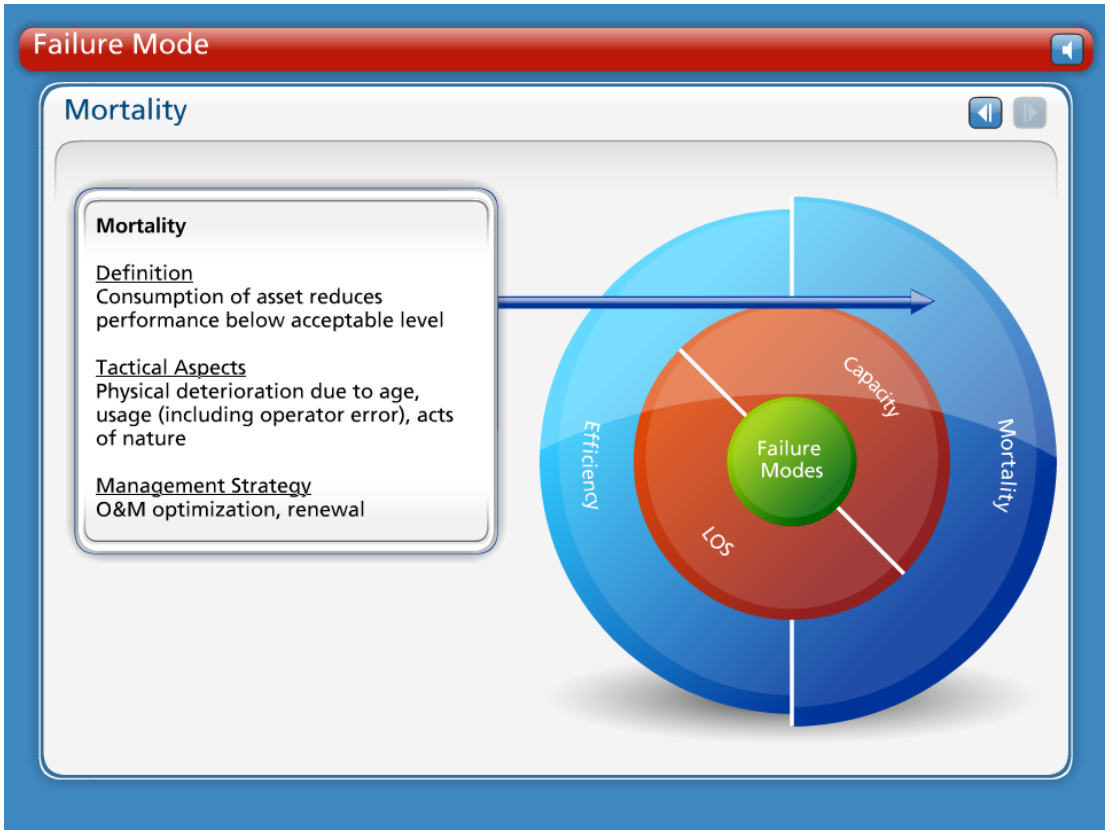

Failure Mode
Failure Modes
It is important to note when assets fail and record the type of failure that occurred for each asset. This information will help you understand assets' failure modes. Utilities should track when the asset failed (or at least when the failure was discovered), type of failure (rupture, mechanical failure, small leak), specific location of failure, and any field observations that could help explain the failure (subsidence of soil, overheating). A utility can then determine its management strategy to address the failure.
Credit: EPA's Office of Wastewater Management Fundamentals of Asset Management
Capacity
Mortality
Efficiency
LOS
Failure Modes


Failure Mode
Failure Modes
Failure Mode represents the ways that a physical asset can war or age to result in loss of function.
These modes consist of "Definition"; "Tactical Aspects"; "Management Strategy".
Capacity
Mortality
Efficiency
LOS
Failure Modes


Failure Mode
LOS
Level of Service (LOS)
Definition
Functional requirements exceed design capability
Tactical Aspects
Codes & permits; NPDES, CSOs, OSHA, noise, odor, life safety, service, etc.
Management Strategy
(Re)design
NPDES is National Pollutant Discharge Elimination System, CSOs are Combined Sewer Overflows and OSHA is Occupational Safety and Health Administration
Capacity
Mortality
Failure Modes
LOS


Failure Mode
Capacity
Capacity
Definition
Volume of demand exceeds design capacity
Tactical Aspects
Growth, system expansion
Management Strategy
(Re)design
Capacity
Mortality
Efficiency
Failure Modes
LOS


Failure Mode
Efficiency
Efficiency
Definition
Operations costs exceed that of feasible alternatives
Tactical Aspects
Pay-back period
Management Strategy
Replace
Capacity
Mortality
Efficiency
LOS
Failure Modes


Failure Mode
Mortality
Mortality
Definition
Consumption of asset reduces performance below acceptable level
Tactical Aspects
Physical deterioration due to age, usage (including operator error), acts of nature
Management Strategy
O&M optimization, renewal
Capacity
Mortality
Efficiency
LOS
Failure Modes

Slide 18

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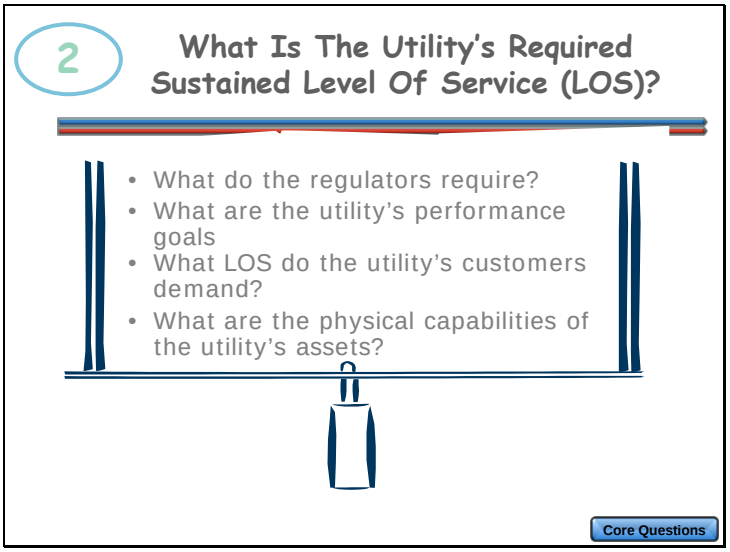
The best practices in figuring out the current state of a utility's assets are:

- Prepare an asset inventory
- Develop a system map or schematic
- Develop condition assessment and rating system
- Assess remaining useful life
- Determine asset values and replacement costs

Slide 19

Navigation: *Use the arrows in the bottom-middle of the screen to navigate backward to previous screens or forward through the lesson screens. If you do not want to hear the audio, set the sound scale on the bottom left to zero or mute the computer's sound. If you would like to listen to the video again, you must leave the screen by going backward or forward and then returning to the screen with the video.*

Slide 20



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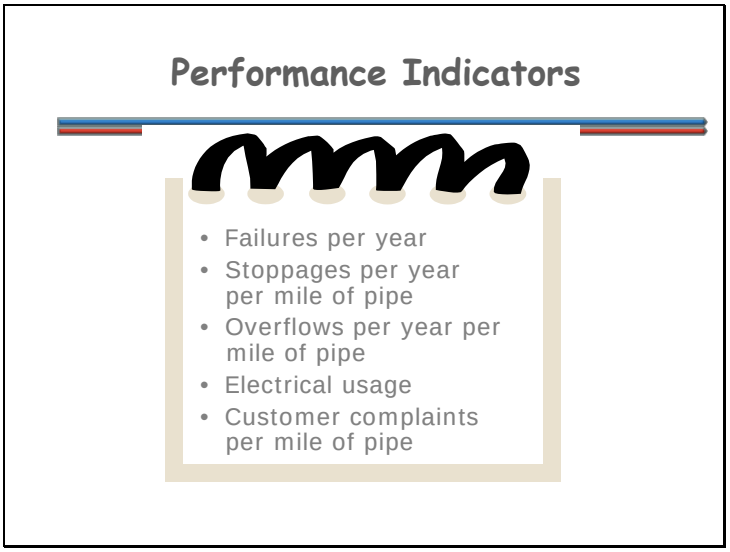
Knowing the utility's required "sustainable" level of service will help the utility implement an asset management plan and communicate to stakeholders what is being done. The required sustainable level of service is the set of features that describe the utility's short- and long-term performance standards as well as the customer's expectations. Quality, quantity, reliability, and environmental standards are elements that can define level of service and associated system performance goals. The utility's level of service "statement" can be updated to account for changes due to growth, regulatory requirements, and technology improvements (Level of service standards or goals are usually contained in a "service agreement" or "service statement"). Information about customer demand, data from utility commissions or boards, and information from other stakeholders can be used to develop the statement.

Questions to ask in determining Level of Service:

- What do the regulators require? Find out what you have to provide and how.
- What are the utility's performance goals? Or what services is the utility providing? Find out if the services can be improved.

• What level of service do the utility's stakeholders and customers demand or expect? Another way to ask this is, what is the best way to meet the needs of the customers? Find out from customers what services are most important to them.
• What are the physical capabilities of the utility's assets? Or what else can the utility do in its current capacity? Find out if the utility is doing all it can do.

Slide 21



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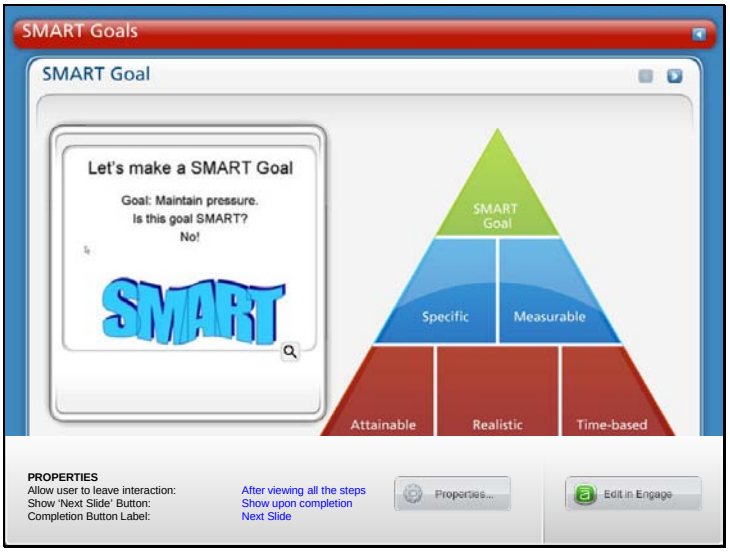
Mapping customer complaints can help a utility pinpoint problems within its service area and can lead to an efficient way of problem solving. Once those complaints have been addressed, it can help the utility demonstrate commitment in meeting customer expectations.

- Performance Indicators can include
- Failures per year
- Stoppages per year per mile of pipe
- Overflows per year per mile of pipe
- Electrical usage
- Customer complaints per mile of pipe

Slide 22



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Use these concepts to implement SMART goals

Specific
- Well defined
- Clear to anyone who has a basic knowledge of the utility

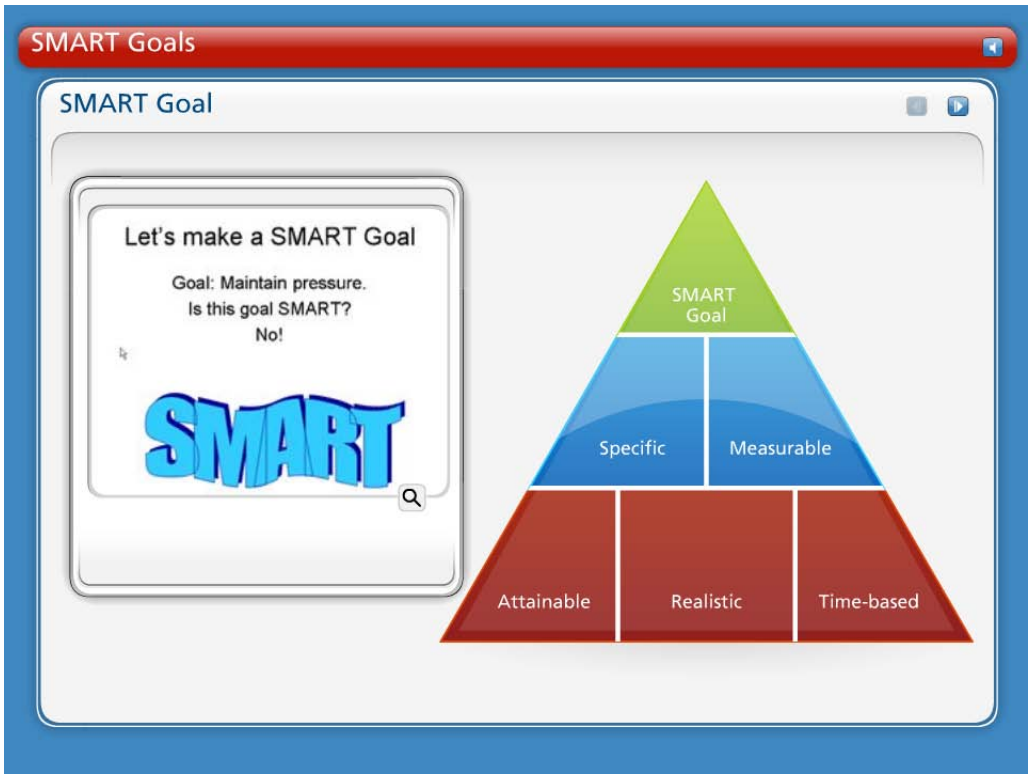
Measurable
- Know if the goal is obtainable and how far away completion is
- Know when it has been achieved

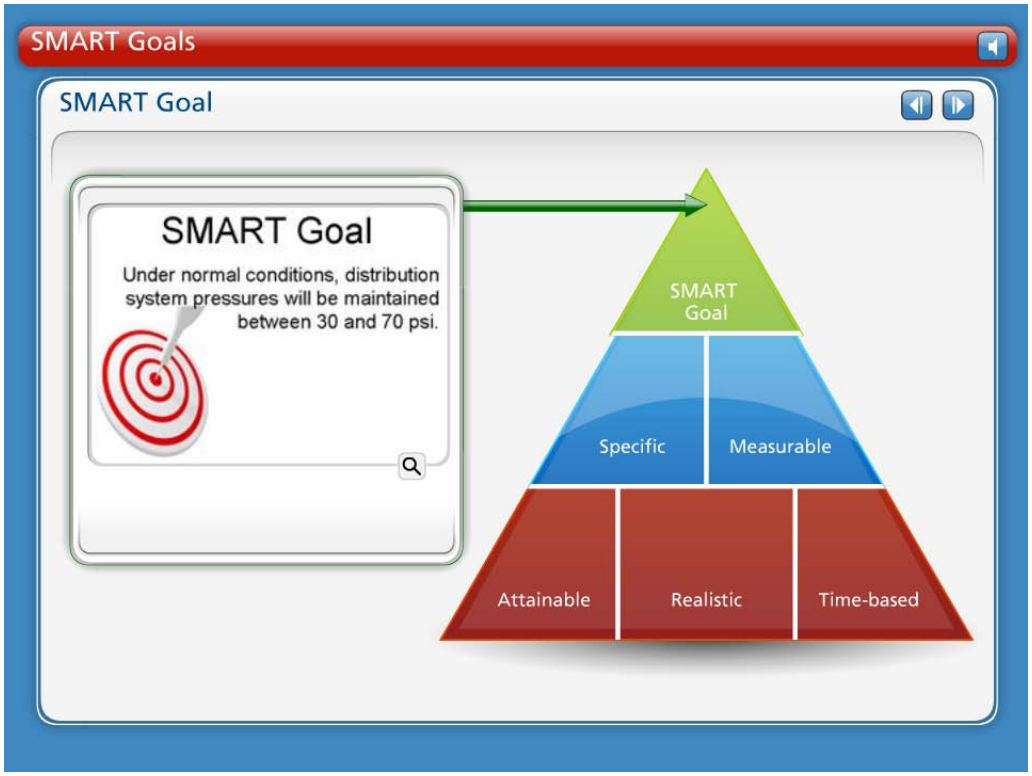
Attainable
- Capable of being reached

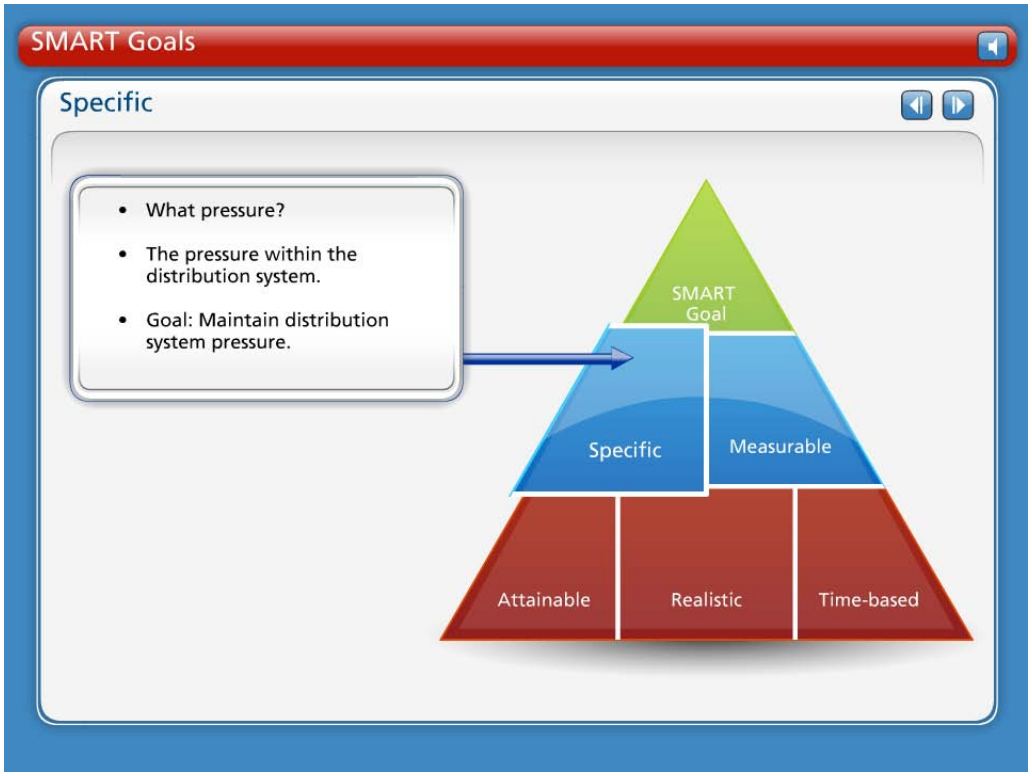
Realistic
- Within the availability of resources, knowledge, and time

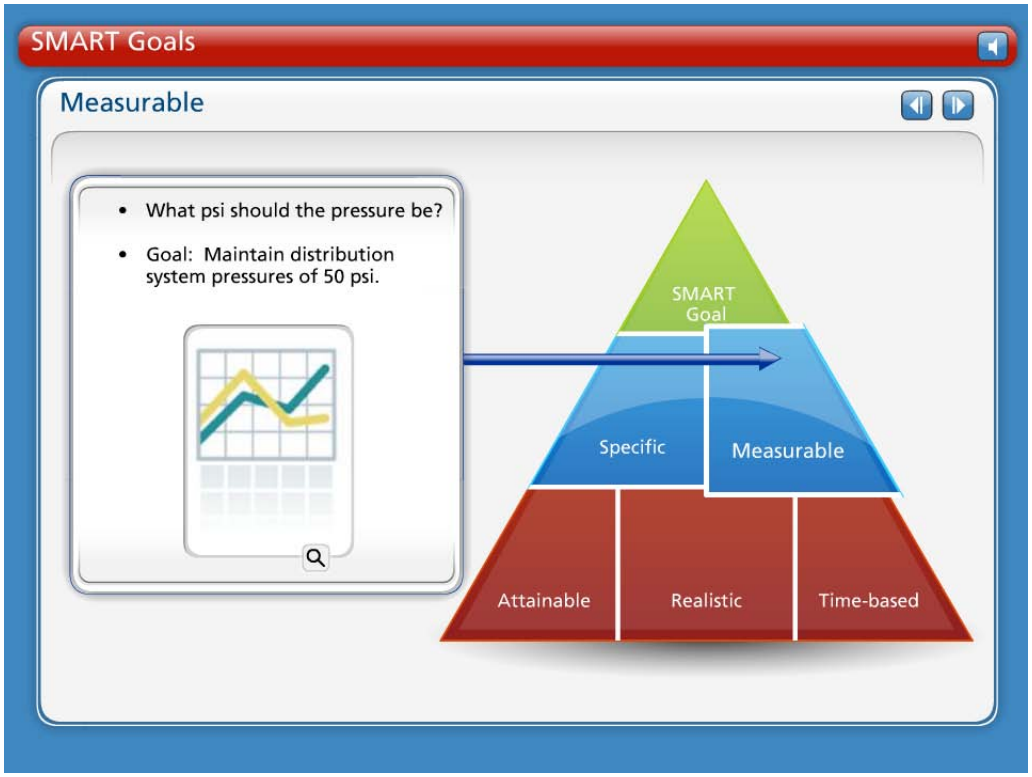
Time-based

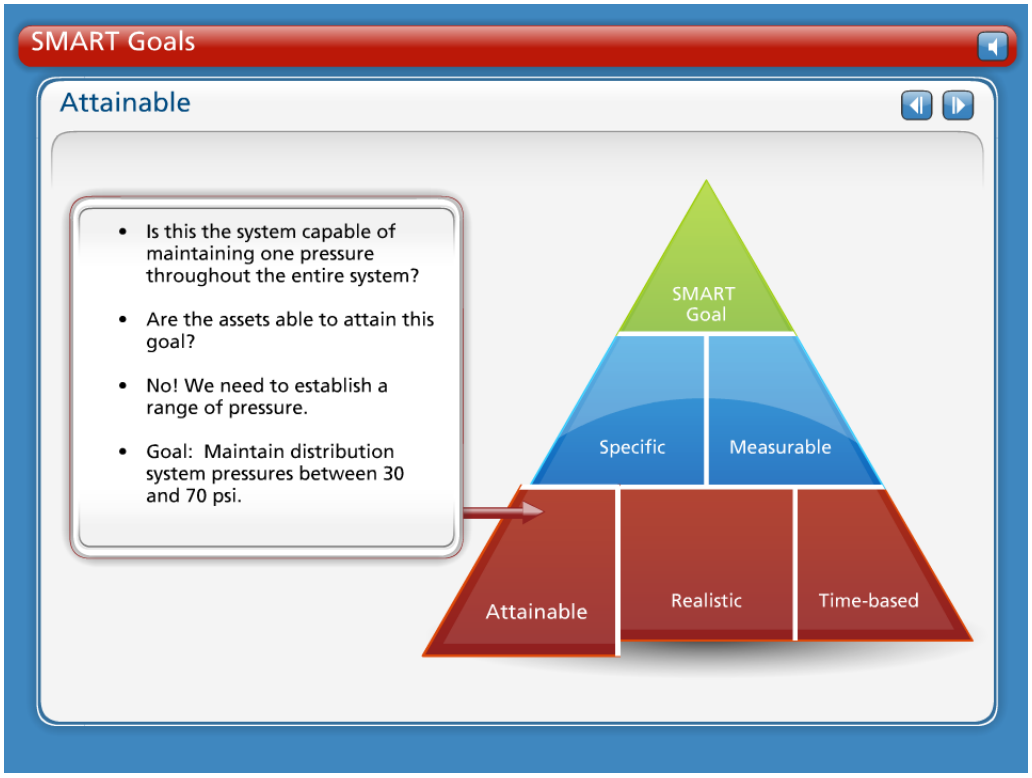
• Enough time to achieve the goal
• Not too much time, which can affect utility performance

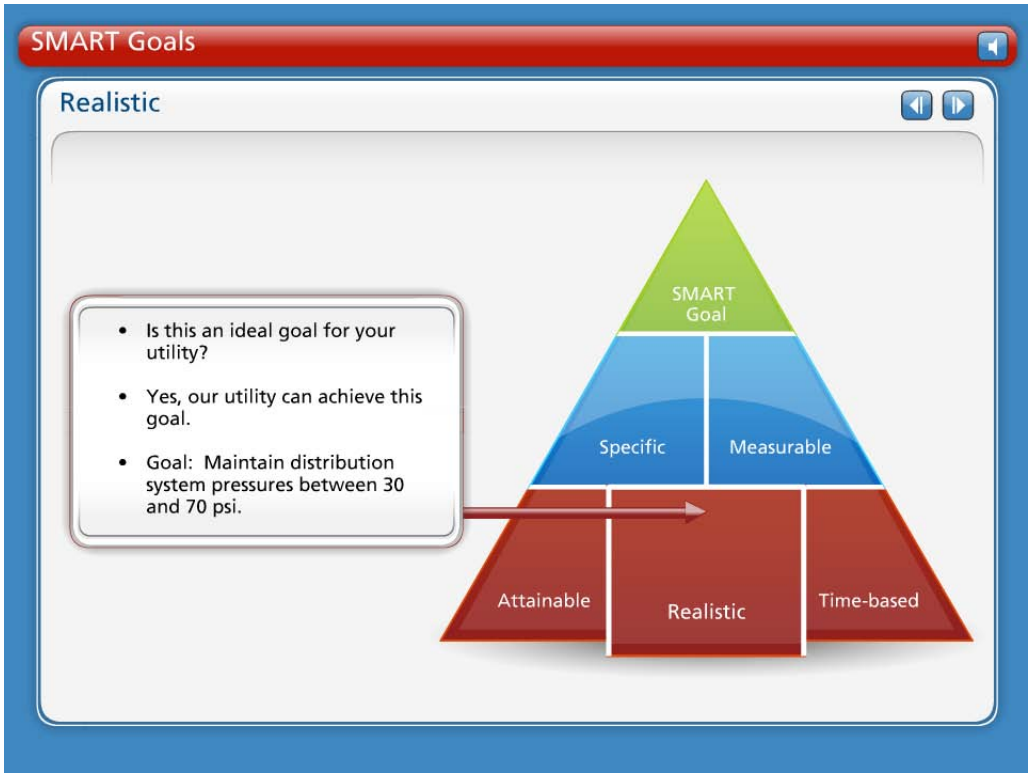


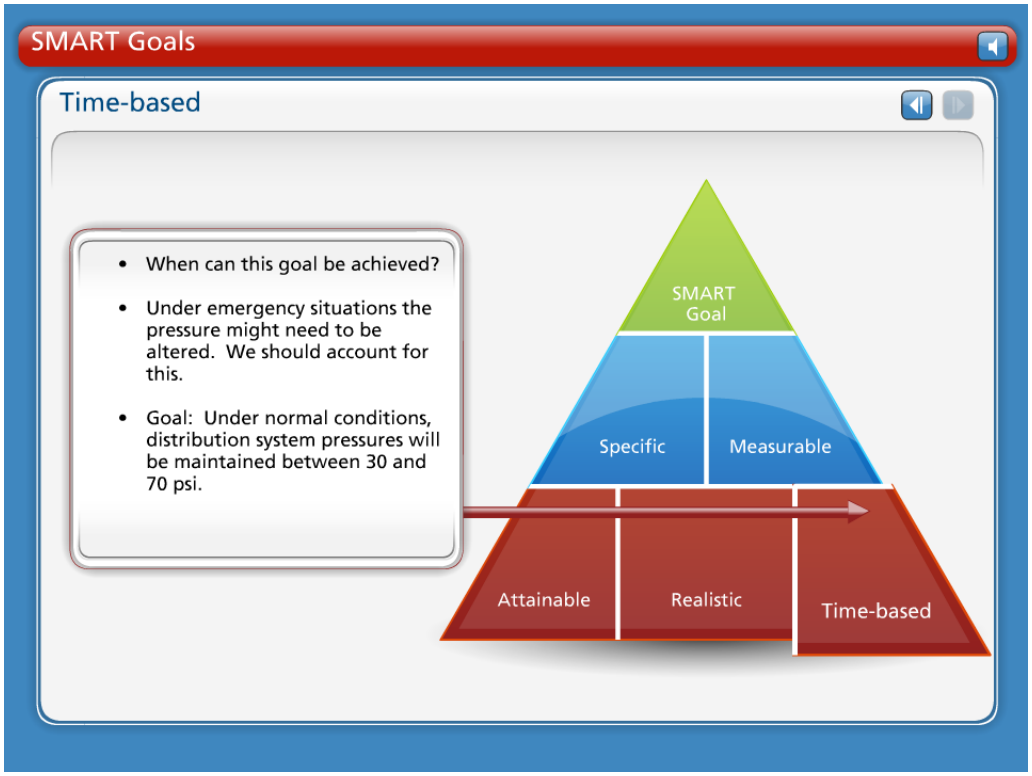



SMART Goals
Specific
What pressure?
The pressure within the distribution system.
Goal: Maintain distribution system pressure.
SMART Goal
Specific
Measurable
Attainable
Realistic
Time-based

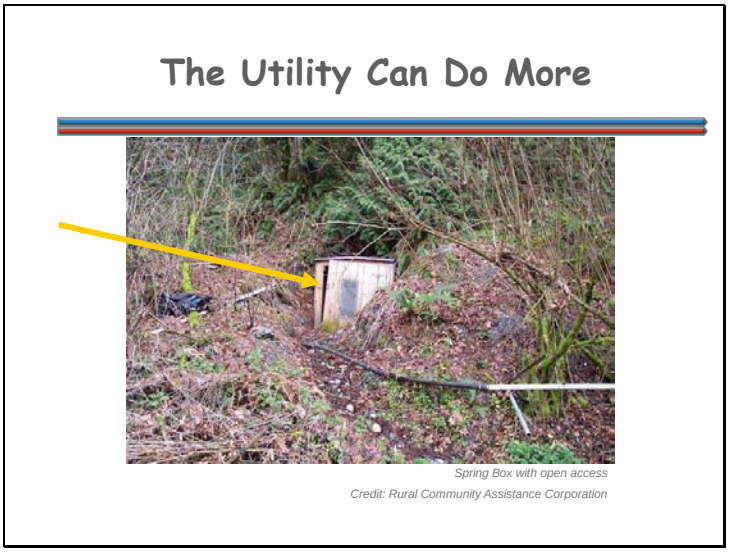

SMART Goals
Measurable
What psi should the pressure be?
Goal: Maintain distribution system pressures of 50 psi.
SMART Goal
Specific
Measurable
Attainable
Realistic
Time-based


SMART Goals
Attainable
Is this the system capable of maintaining one pressure throughout the entire system?
Are the assets able to attain this goal?
No! We need to establish a range of pressure.
Goal: Maintain distribution system pressures between 30 and 70 psi.
SMART Goal
Specific
Measurable
Attainable
Realistic
Time-based


SMART Goals
Realistic
Is this an ideal goal for your utility?
Yes, our utility can achieve this goal.
Goal: Maintain distribution system pressures between 30 and 70 psi.
SMART Goal
Specific
Measurable
Attainable
Realistic
Time-based


SMART Goals
Time-based
When can this goal be achieved?
Under emergency situations the pressure might need to be altered. We should account for this.
Goal: Under normal conditions, distribution system pressures will be maintained between 30 and 70 psi.
SMART Goal
Specific
Measurable
Attainable
Realistic
Time-based

Slide 23



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Note the open door to the spring box! One level of service goal could be keeping the utility's asset safe and secure.

Slide 24

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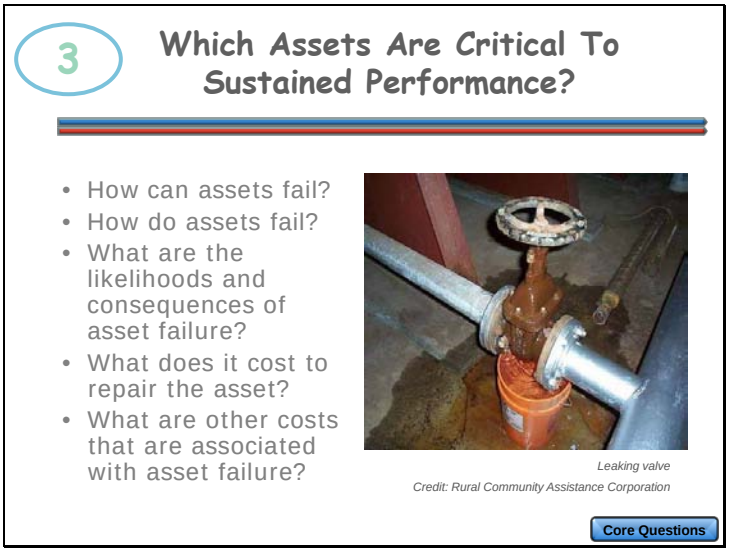
Best practices for maintaining a utility's required sustained level of service are

- Analyzing current and anticipated customer demand and satisfaction with the system
- Understanding current and anticipated regulatory requirements
- Writing and communicating to the public a level of service "agreement" that describes the system's performance targets
- Using level of service standards to track system performance over time

Slide 25



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Because assets fail, how the utility manages the consequences of failure is vital. Not every asset presents the same failure risk or is equally critical to the drinking water or wastewater system's operations. Therefore, it is important to know which assets are required to sustain the utility's performance. Critical assets are those the utility decides have a high risk of failing (such as if the asset is old or in poor condition) and major consequences if they do fail (major expense, system failure, safety concerns). The utility can decide how critical each asset is and rank them accordingly. Simply look at the importance of an asset and think about how bad it would be if it failed tomorrow.

Questions to ask:

- How can assets fail? Different things contribute to an asset failing including Demand exceeds design capacity (which comes from population growth) or physical deterioration from age, usage, or nature.
- How do assets fail? The type of failure depends on the type of asset: water pipes can leak, or disinfection equipment can stop working.
- What are the likelihoods (probabilities) and consequences of asset failure? Likelihoods of failure depend on age and condition. Consequences of failure

depend on how critical the asset is: Is it the chlorinator in a small system that has no other backup?
- What does it cost to repair or replace the asset? Cost depends on if the utility has to repair, rehabilitate, or replace the asset.
- What are the other costs (such as social costs or environmental costs) that are associated with asset failure?

These are important values to know, understand, and consider in any decision-making process. Running a utility is fundamentally a business operation, and we have to treat it that way.

Slide 26

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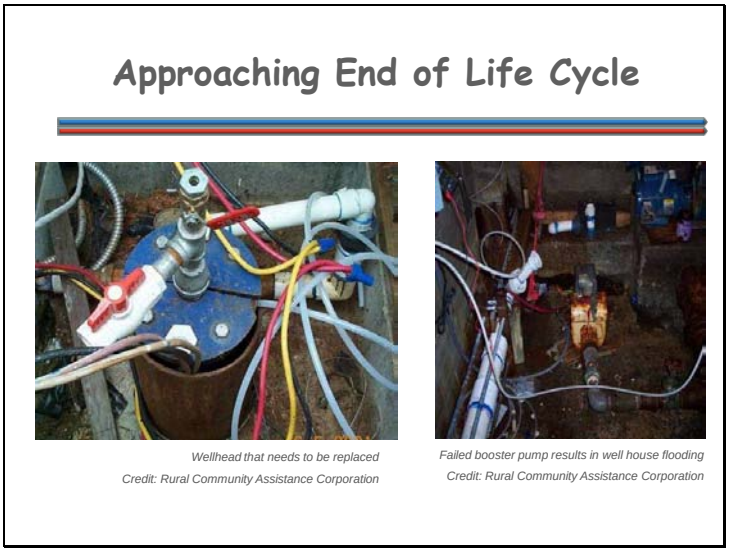
Slide 27



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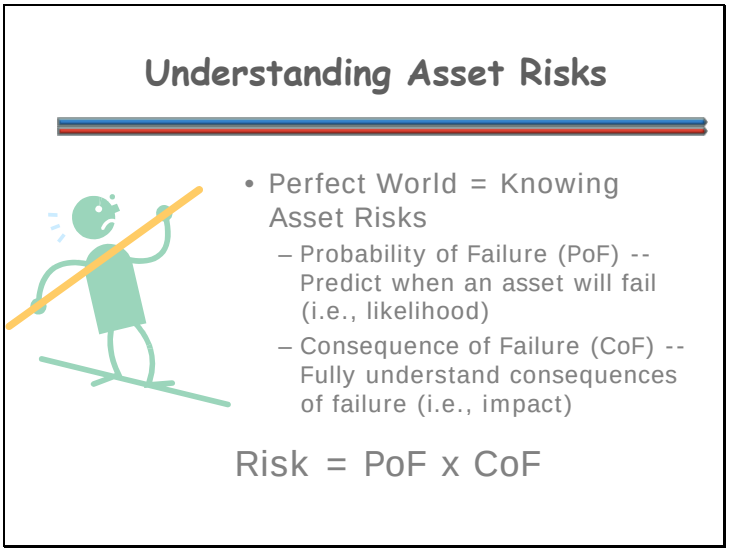
All assets will eventually reach the end of their useful life. Some assets will reach this point sooner than other assets. Understanding the answers to the first three core questions will prepare a utility for determining the best approach to managing each asset and the system as a whole.

Slide 28



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A fuller, more complete understanding is at the heart of core question 3.

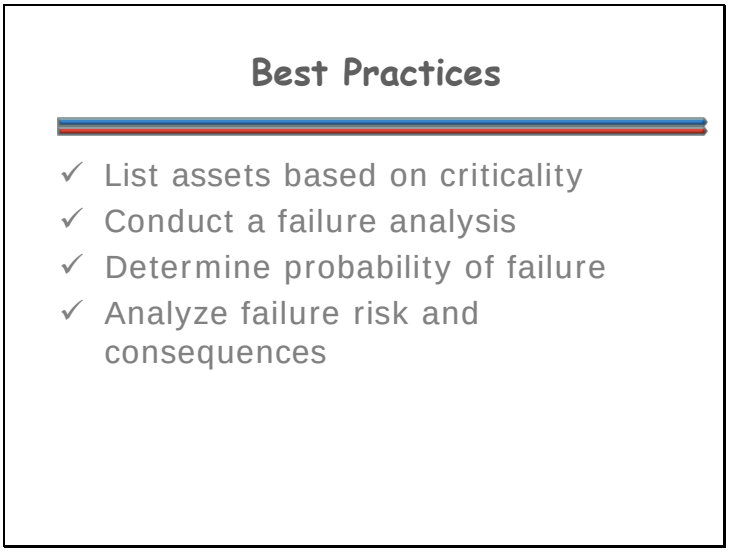
What is the likelihood of failure of the utility's assets?

- Probability of Failure means the chance an asset will fail given the percent of effective life consumed and redundancy

What is the consequence of failure of the utility's assets?

- Consequence of Failure means the real or hypothetical results associated with the failure of an asset

Slide 29



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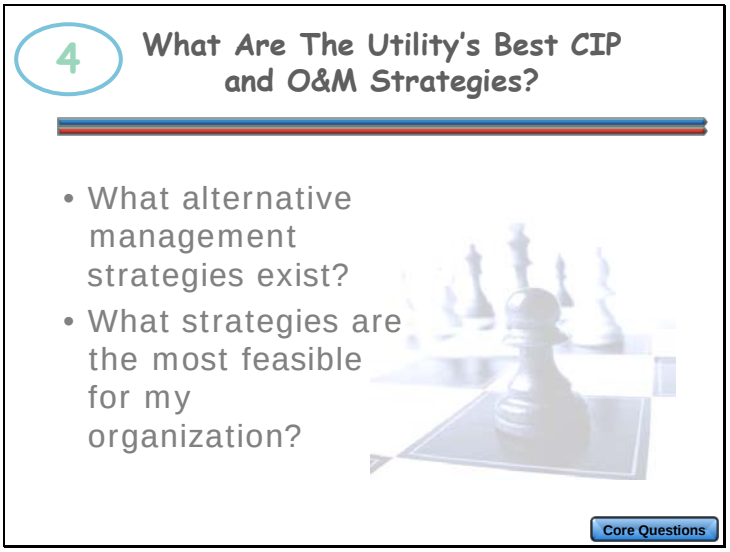
It is helpful to have a step-by-step approach. Here are some best practices for determining which assets are critical to the utility's sustained performance:

- Listing assets according to how critical they are to system operations
- Conducting a failure analysis to understand how and why a failure happens
- Determining the probability of failure and listing assets by failure type
- Analyzing failure risk and consequences

The first bullet is the nugget here for small systems. Having a prioritized list with associated costs is a huge milestone in a small system's asset management program.

Slide 30



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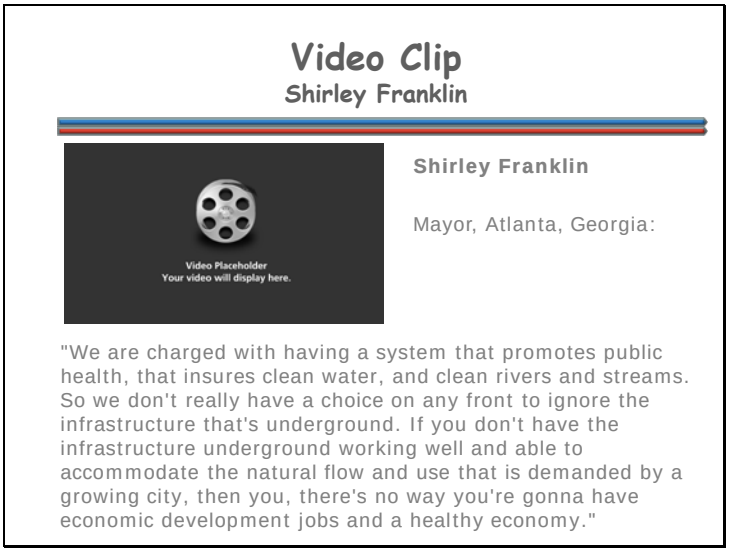
It is important to recognize that O&M, personnel, and the capital budget account for an estimated 85 percent of a typical system's expenses. Asset management enables a system to determine the lowest cost options for providing the highest level of service over time. Utilities want to optimize the work O&M crews are doing, where they are doing it, and why. An asset management program helps utility make risk-based decisions by choosing the right project, at the right time, for the right reason.

Questions to ask

- What alternative management strategies exist? Run to failure can be a very real option for some utilities. Is it necessarily the best option?
- What strategies are the most feasible for my organization?

Slide 31



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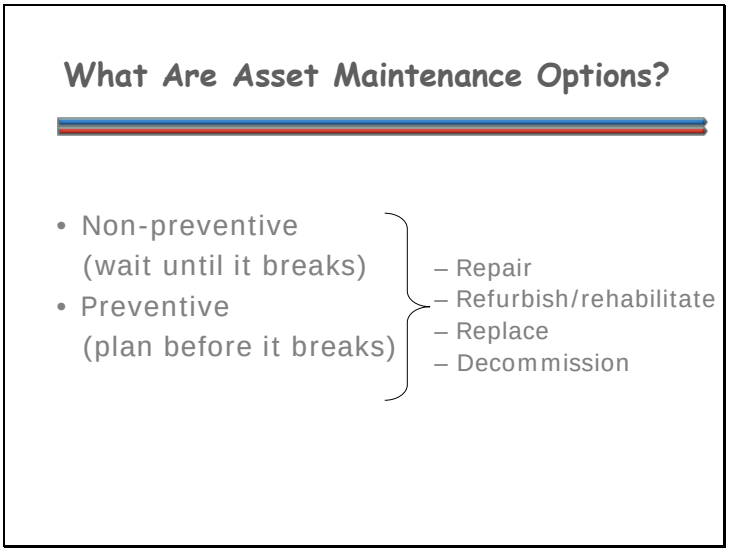
Slide 32



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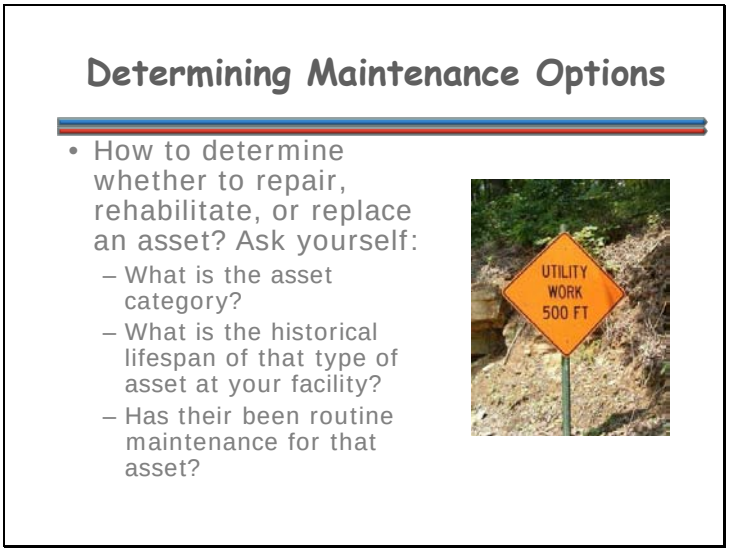
Developing an asset management plan can reduce unplanned and emergency repairs because it increases emphasis on preventive and predictive maintenance. Knowing these options help a utility determine which assets will be maintained and which will "run to failure."

Slide 33



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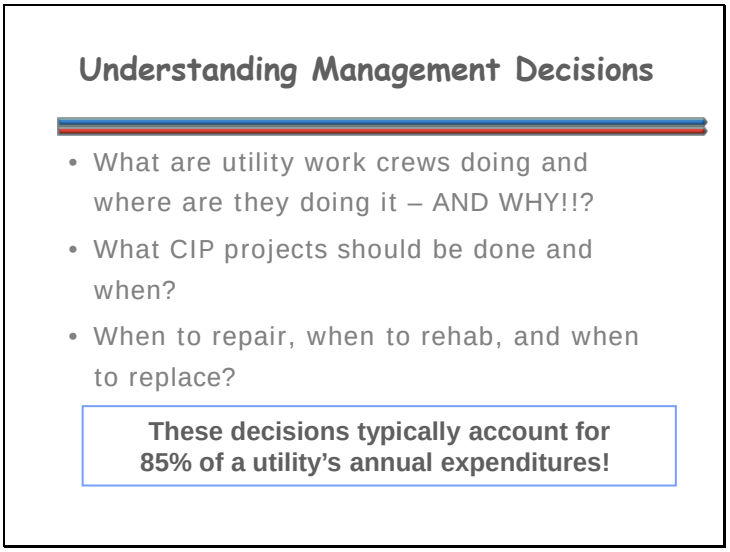
All assets are unique and will operate differently according to a number of factors including amount of use or length of service. For example, a pump will wear out sooner if it is used more and will last longer if it is used less. The age of the pump is not always as important as the amount of work the pump has done. On the other hand, pipe assets wear out more depending on the length of time in the ground. If a pipe is in the ground for a long period, the soil around it and the water in it and might start to corrode the pipe. Because each facility has different site-specific characteristics, utilities should track failure history on all the asset categories base asset life within the local context and the conditions of that utility.

Slide 34



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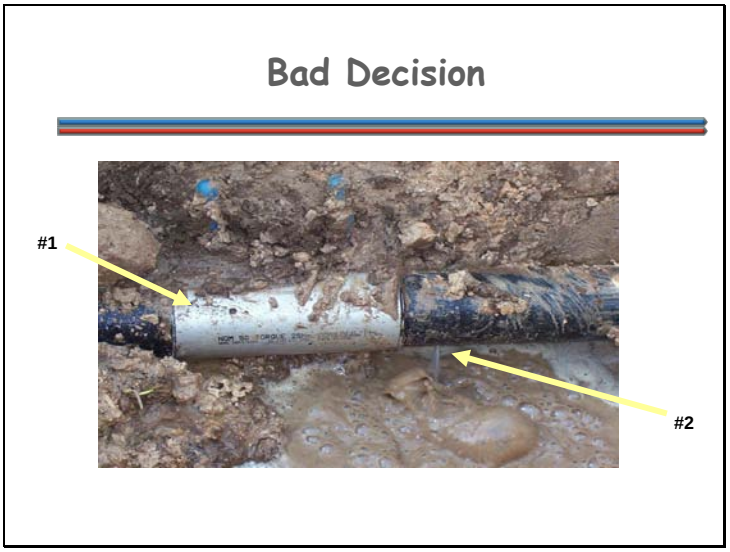
Understanding management decisions is critical to implementing asset management. These decisions typically account for
85 percent of a utility's annual expenditures!

Slide 35



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Let's take a look at this bad decision.

#1- A saddle clamp is usually used for small leaks in water mains. It is easy and fairly reasonable to install while the pipe is under pressure and limits service interruptions. It is not intended as a long-term solution—just a short-term fix until that section of pipe can be properly replaced.

#2- Another leak within a foot of the previous leak. This water system has had to block off this section of road, re-dig, and will probably place another clamp right next to the older one in an attempt to rush the job. This does several things:

- This section of pipe is apparently too weak and old to maintain its integrity.
- The town has had to dig the same hole twice, and possibly a 3rd time before the year is out.
- If the repairs on this aging pipe had been coordinated through asset management, the extra money used for these numerous repeat repairs could have been used elsewhere—say, to replace 50 or more service meters.

Slide 36

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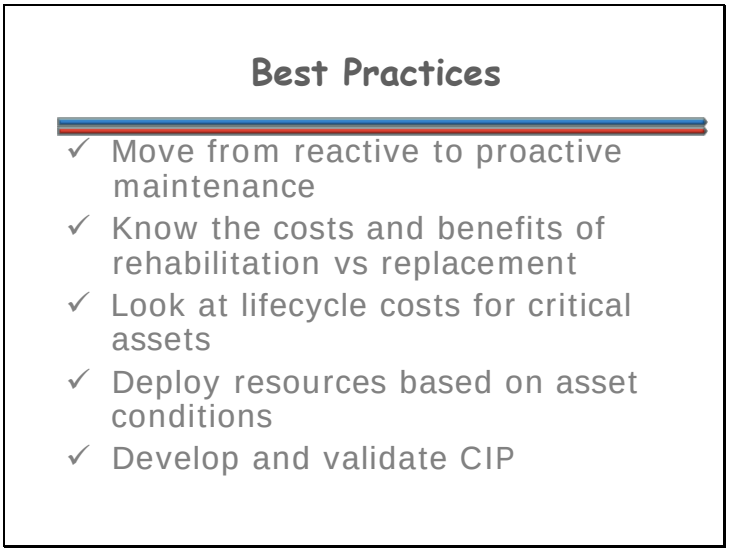
Slide 37



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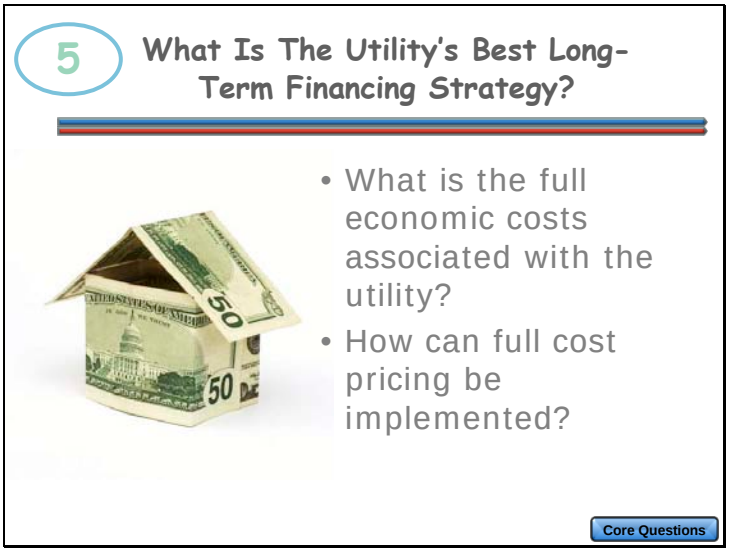
Best practices for determining the utility's best "minimum life-cycle cost" Capital Improvement Plan and Operation & Maintenance strategies are:

- Moving from reactive maintenance to proactive maintenance
- Understanding the benefits of repair, rehabilitation, and replacement decisions
- Looking at life cycle costs, especially for critical assets
- Deploying resources on the basis of assets' conditions
- Analyzing the causes of asset failure to develop specific response plans
- Developing and validating the utility's Capital Improvement Plan, including linking engineering project needs with anticipated financial costs

Slide 38



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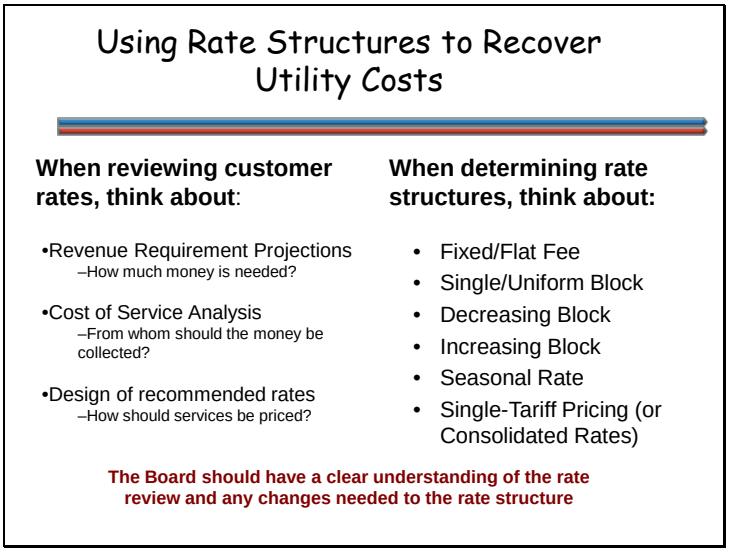
Knowing the full economic costs of services provided is critical for making sound financial decisions and developing an effective long-term funding strategy. Having this information in an asset management plan will help tell the utility's "story." An asset management plan that refers to the utility's sustainable level of service is good for communicating this information to decision makers and customers. The utility can decide how to fund its strategies by knowing the system's financial forecast.

Questions to ask

- What is the full economic cost associated with the utility?
- How can full-cost pricing be implemented?

Slide 39



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Using Rate Structures to Recover Utility Costs

A water rate structure is a fee or schedule of fees designed to recover the utility's costs.

When implementing a water rate structure review:

-The rate review should address both current and future system needs. Think about your 10 year financial forecast –

- How much money is needed for your capital improvement projects?
- Who should have to pay for the future rehabilitation and replacement of the water assets?
- How should different services be priced for equitable distribution of water treatment and delivery services?

-The board should have a clear understanding of the rate review and should plan for informing the public of any rate adjustments.

Different water rate structures include:

- Fixed/Flat Fee - All customers pay the same amount each month regardless of quantity of water used in unmetered systems.
    - Advantages:
        - Eliminates the cost of installing and reading meters.
    - Disadvantages:
        - Everyone pays too much or too little for what they use. Promotes high consumption
    - Example:
        - Each customer will be charged a flat rate of $X per month.

- Single/Uniform Block - Customers are charged a constant price per gallon regardless of the amount of water used. Often coupled with a Minimum Rate for having service available.
    - Advantages:
        - Cost to the customer is in direct proportion to amount used.
        - Easy to administer,may encourage water conservation.
    - Disadvantages:
        - Could discourage high water consuming industries from locating in the community.
    - Example:
        - $X Minimum service availability charge (optional) plus $X per 1,000 gallons used

- Decreasing Block - The price of water declines as the amount used increases. Each succeeding consumption block is cheaper. This structure is based on the assumption that costs decline as consumption goes up.
    - Advantages:
        - Attractive to agricultural and industrial users.
    - Disadvantages:
        - May reach a point of diminishing returns.
        - High water consumption increases the need for wastewater treatment facilities.
        - Industrial wastewater could be much higher in certain regulated pollutants than sanitary sewage.
    - Example:
        - $14 Minimum for the first 2,000 gallons
        - $2.59 per 1,000 from 2,001-6,000 gallons
        - $2.00 per 1,000 from 6,001-10,000 gallons
        - $1.00 per 1,000 for everything over 10,000 gallons

-Increasing Block - The price of water increases as the amount used increases. Each succeeding consumption block is more expensive. Structure based on the assumption that water rates should promote water conservation.
    - Advantages:
        - Promotes water conservation, especially important in areas with limited water supplies or high treatment costs.

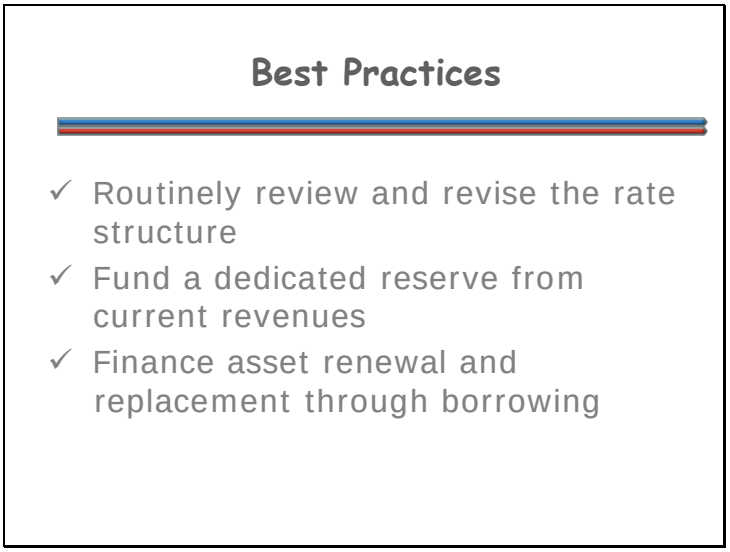
        - Less water use means less wastewater, and smaller, less expensive wastewater treatment. Provides a reasonable amount of water at reasonable price and charges a premium for higher usage.
    - Disadvantages:
        - Higher costs for high usage may discourage industry from locating within the system's service area.
    - Example:
        - $14 Minimum for the first 2,000 gal.
        - $2.00 per 1,000 from 2,001-6,000 gal.
        - $2.50 per 1,000 from 6,001-10,000 gal.
        - $3.00 per 1,000 for everything over 10,000 gal.

- Seasonal Rate - The rate varies by time of year, establishing a higher price for water consumed during a peak-demand season. Rates can be uniform, increasing, or decreasing block rates.
    - Advantages:
        - Promotes water conservation, especially important in areas with limited water supplies or high treatment costs.
        - Can potentially postponing or eliminate the need for expensive upgrades or new equipment
    - Disadvantages:
        - Does not work as well with quarterly billing cycles.
        - Penalizes customers with high peak-demand usage requirements
    - Example:
        - $2.50 per 1,000 from October 1st through April 30th
        - $4.00 per 1,000 from May 1st through September 30th

-Single-Tariff Pricing (or Consolidated Rates) - is the use of a unified rate structure for multiple water (or other) utility systems that are owned and operated by a single utility, but that may or may not be contiguous or physically interconnected.
    - Advantages:
        - Can be an incentive for larger water utilities to acquire small water systems that lack capacity because it makes it possible to spread costs over a larger service population and maintain more stable and affordable rates for customers of some smaller and more expensive systems.
        - Physical interconnection is not considered a prerequisite
        - Addresses small-system viability issues
    - Disadvantages:
        - Conflicts with cost-of-service principles
        - Provides subsidies to high-cost customers
        - Fails to account for variations in customer contributions
    - Example:
        - Under a system of single-tariff pricing, all customers of the utility pay the same rate for service, even though the individual systems providing service may vary in terms of the number of customers served, operating characteristics, and stand-alone costs. Single-tariff pricing essentially

allows for allocating the average costs of combined systems in the course of ratemaking.

Slide 40



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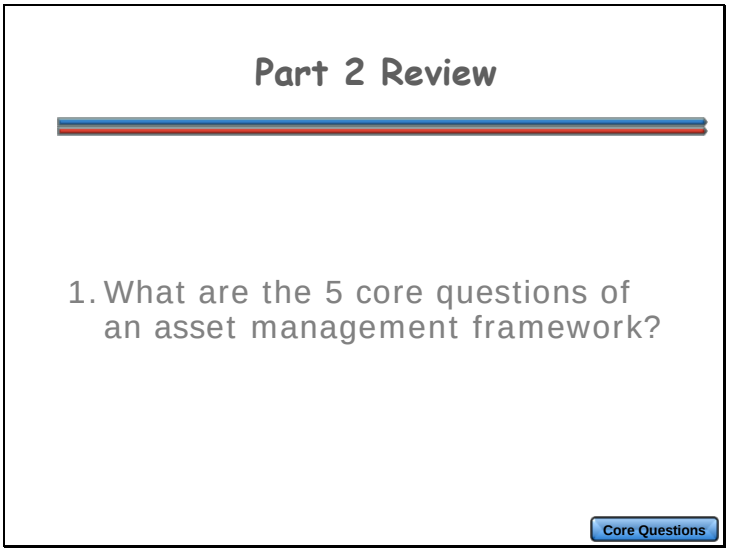
Best practices for determining the utility's best long-term financing strategy are

- Revising the rate structure. Knowing the answers to the previous core questions puts the utility in a good position to justify scheduled rate increases.
- Funding a dedicated reserve from current revenues (i.e., creating an asset annuity).
- Financing asset renewal and replacement through borrowing or other financial assistance.

Slide 41



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1. What are the 5 core questions of an asset management framework?

The 5 core questions of an asset management framework are:

1. What Is the Current State of the Utility's Assets?
2. What Is the Utility's Required Sustained Level of Service?
3. Which Assets Are Critical to Sustained Performance?
4. What Are the Utility's Best "Minimum Life-Cycle Cost" CIP and O&M Strategies?
5. What Is the Utility's Best Long-term Financing Strategy?

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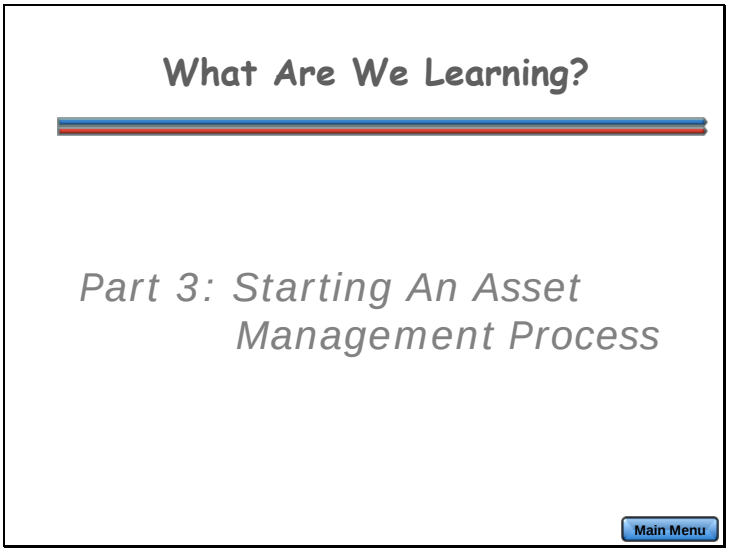

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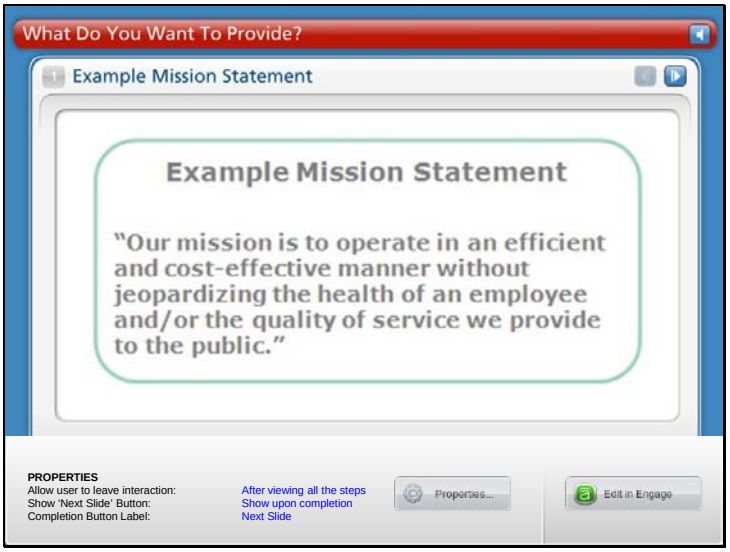
Now that you are familiar with the 5 core questions, you're ready to tackle them! Before you do, however, you must be able to answer two very important questions—what do you want to provide, and what do your customers want?

Slide 43



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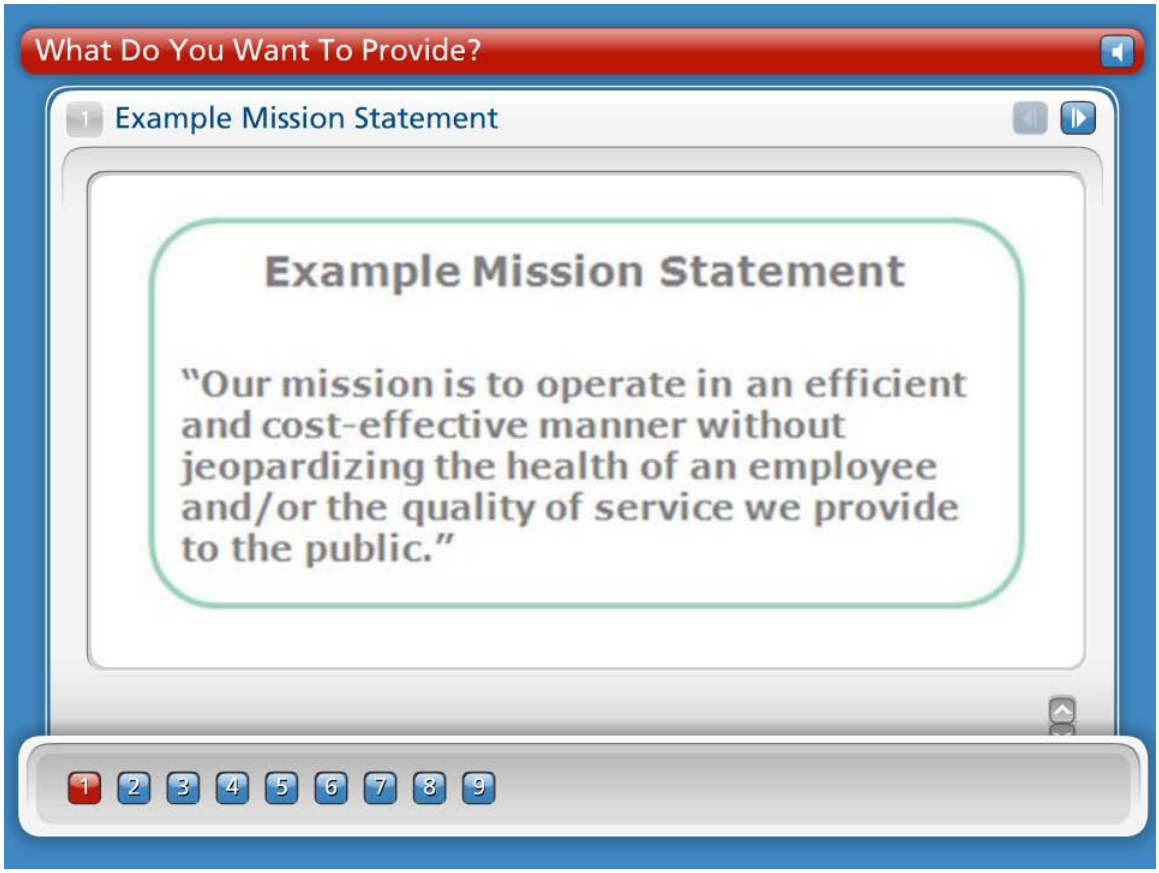
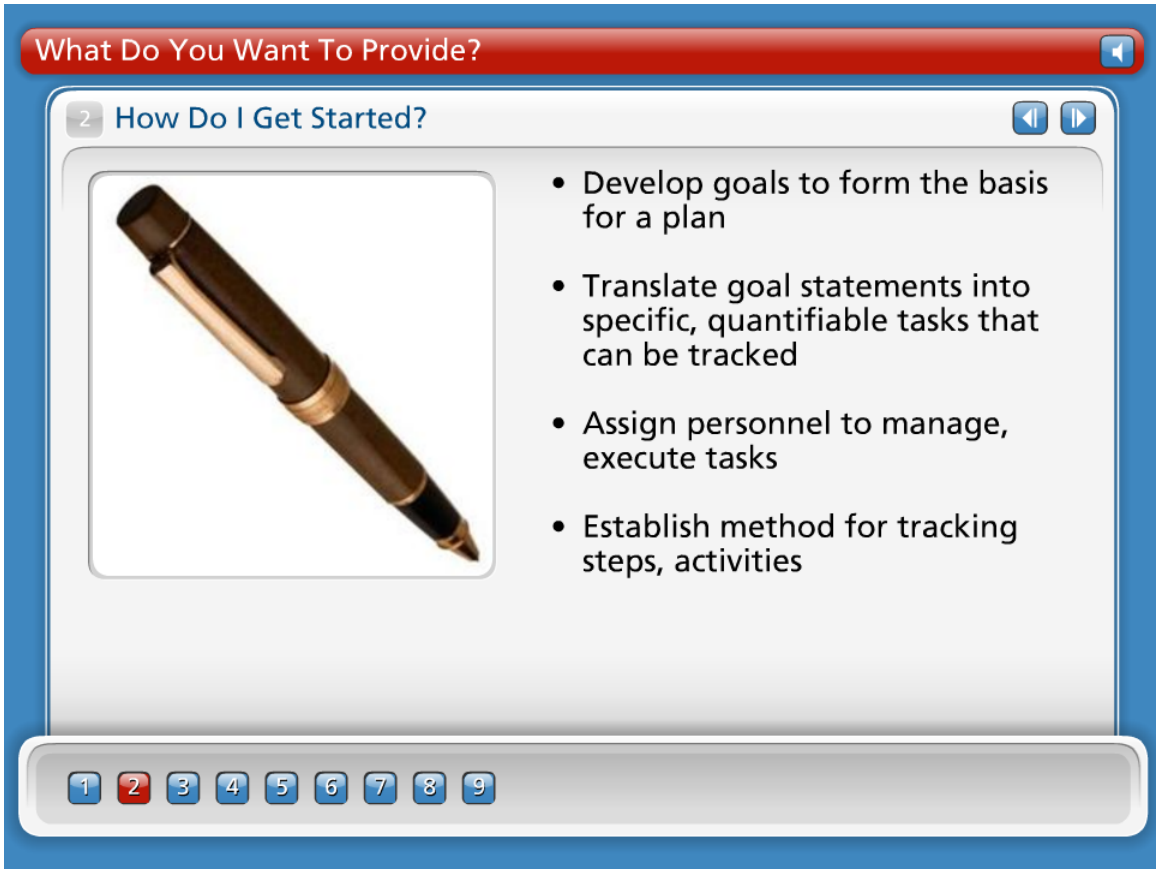


Example Mission Statement
The first step is to establish a mission statement for the utility. Think about why implementing asset management is a good idea and how you want your utility's processes to change.

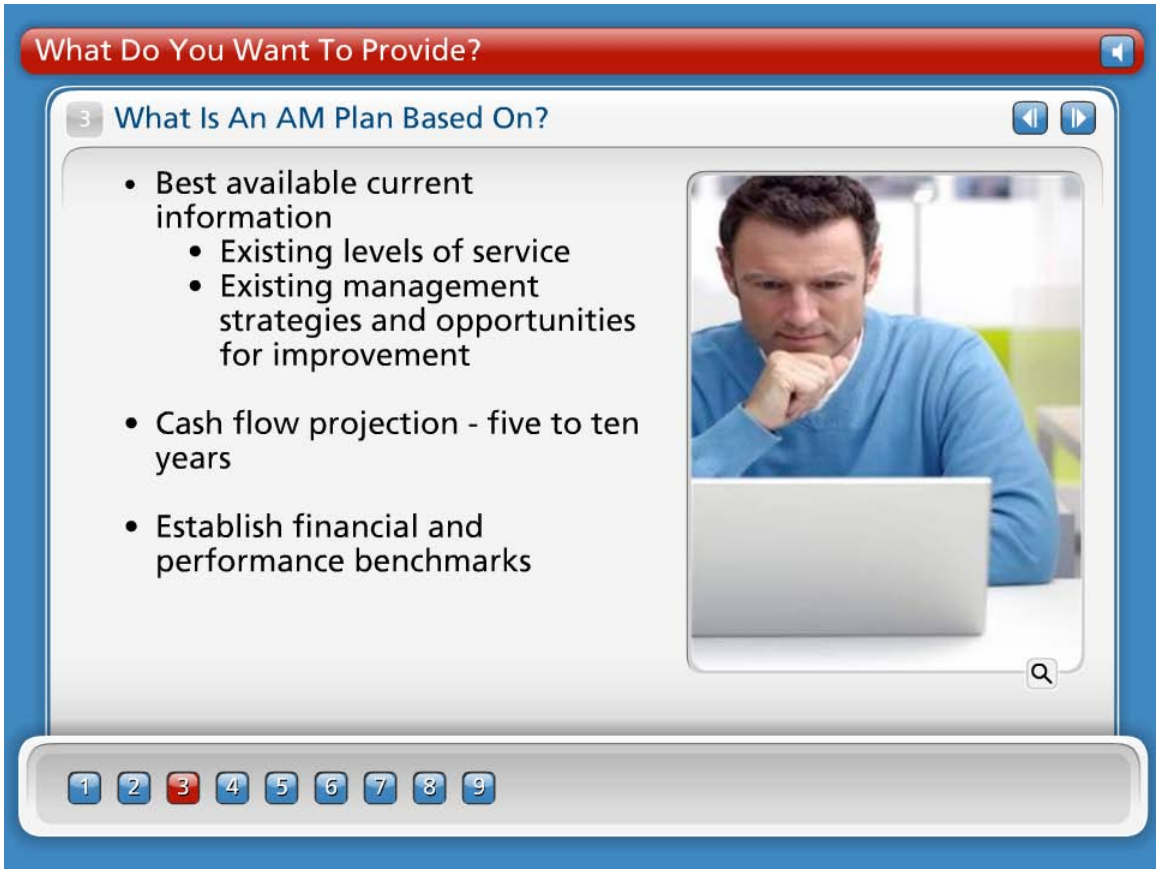


How Do I Get Started?
Getting started with asset management requires some planning and thinking before implementation. After creating a mission statement, the team will need to identify level of service goals and objectives. Understanding who you serve and what it is they require is essential to asset management. Make sure to gather input from external stakeholders. A stakeholder is anyone who holds an opinion about the way in which the plant is run and might include the following groups: residential, retail and industrial customers, elected officials, developers, consultants, auditors, regulatory agencies, and environmental groups.

You should translate the goal statements into specific, quantifiable tasks that can be tracked (e.g., if the objective is to determine the condition of all 500 miles of collection system piping in a 5-year period, the strategy might outline the number of miles of pipeline that have to be inspected per year)

You can assign specific people to manage and execute each task (e.g., Joe, the system superintendent, is responsible for ensuring that his maintenance department inspects an average of 2 miles of pipeline per week for 50 weeks, for a total of 100 miles per year, or 500 miles in 5 years)

It’s a good idea to establish a mechanism to track the progress of each step in the task and begin tracking the activity (e.g., on a weekly basis, Joe must enter data into a spreadsheet, which tracks the location, length, and condition of all pipeline inspected).

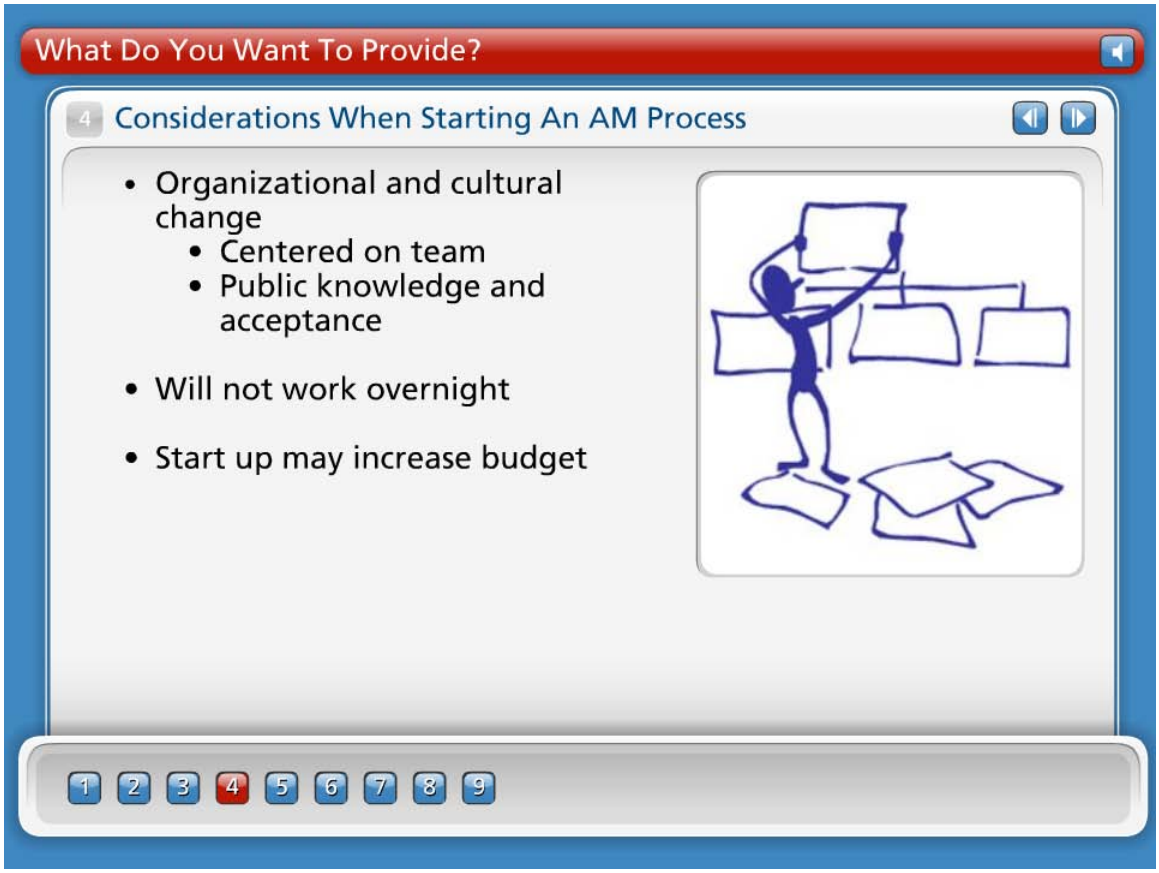


What Is An AM Plan Based On?
An asset management plan should be developed using the best current information that is readily available. The more information the utility has, the better the plan can be.

What is the utility’s cash flow projection for the next five to ten years? Knowing how much money will be coming in and going out will help with managing assets.

It’s very important for the plan to establish financial and performance benchmarks—lack of goals equals lack of growth (both financial and capacity).

An asset management plan should be reviewed at least once a year, noting any relevant changes. Throughout the year, utilities should keep a running list of items to consider or include in the annual asset management plan update.



Considerations When Starting An AM Process
Asset management is an organizational and a culture change—a new way of thinking and doing business.

Changing the culture requires a champion to promote and articulate the benefits of asset management to decision makers, stakeholders, and employees. The champion can be an operator, manager, town clerk, elected official, or stakeholder who coordinates the team as he or she develops and implements the asset management program. Maybe you are the champion?!?

The role of champion is a challenge, because there might be many hurdles to face. The organization must change from operations-centered culture to an asset-centric management model. There is no “I” in “Team” - Public knowledge and acceptance is crucial to the success of an asset management program.

Asset management will not work overnight; the team should expect several years to see results. Realize that start up could increase the budget with results unrealized for a period after.

What Do You Want To Provide?

5 Video Clip Dan Woltering & Casey Dinges

Dan Woltering
Director of Research, Water Environment Research Foundation:
Casey Dinges
Managing Director for External Affairs, American Society of Civil Engineers (ASCE):

"I saw an advertisement on television, it's been a couple of years ago, and I don't remember what the product or the service was that they were selling, but part of the set up to it was, now some things are free, like water. And I reacted to that, I thought, water isn't free and if that's where we are in terms of the public mind that water is free because you can turn on the tap and here it comes, then we have a

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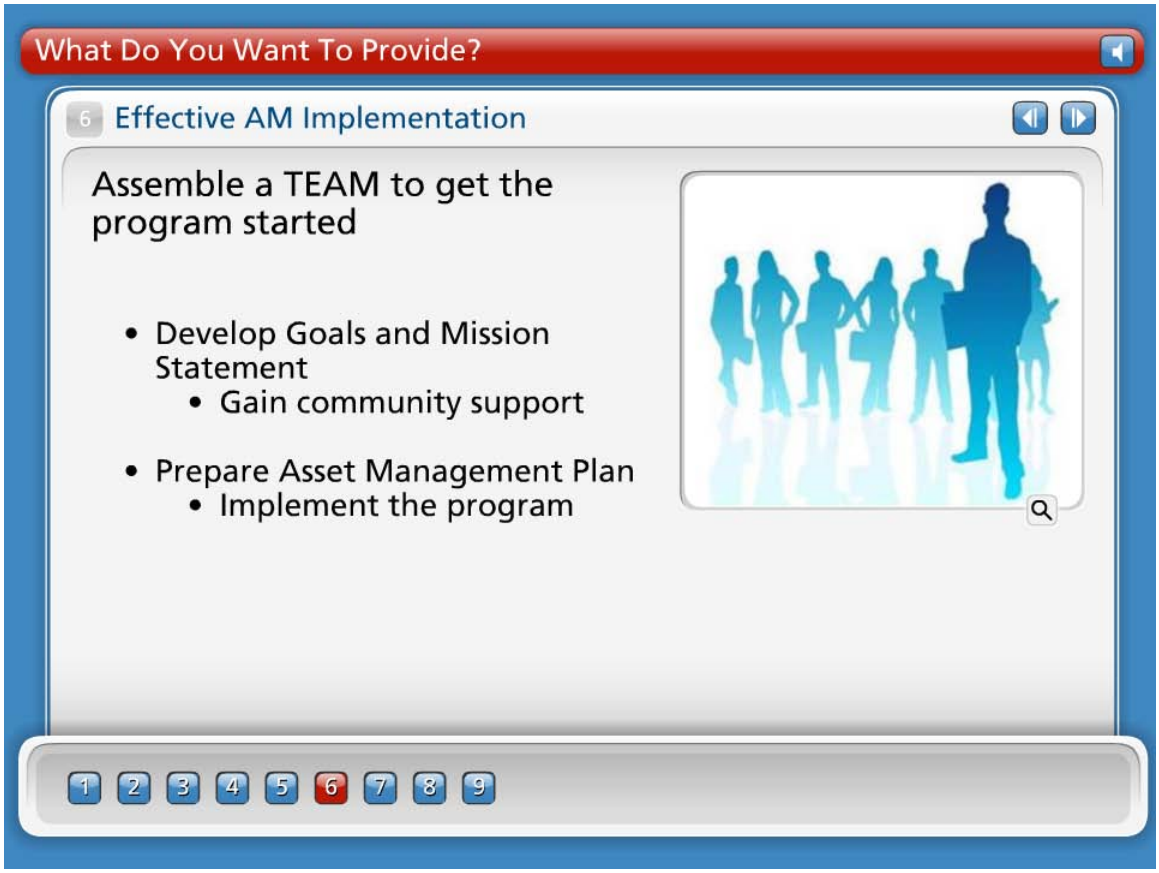
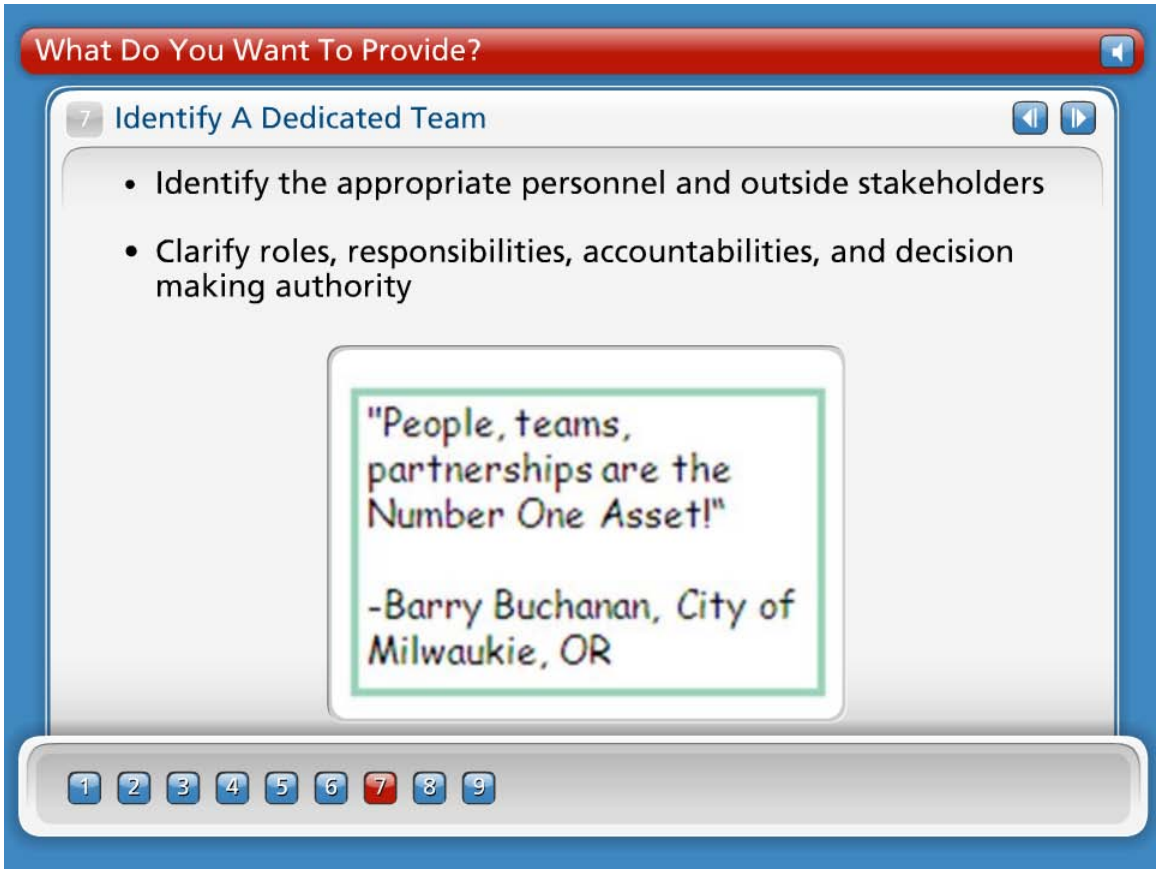


Effective AM Implementation
We keep hearing success stories and want to emphasize that teams work. Bringing in every decision maker into the process, as central to the team, will make all the difference. Getting started with asset management does take time—but it will take less time if there is a small group helping.

The team together will help throughout the process from start to finish; beginning with the development of goals and mission statements and ending with the continued implementation of the program.



Identify A Dedicated Team

Identifying a dedicated team is critical. Key team members can include

- Utility operators and engineers (including upper management) who have the:
  - Knowledge of the current state of water and/or wastewater infrastructure assets
  - Ability to describe the costs and benefits of changes to infrastructure assets
  - Experience with the current capital improvement plan and the O&M strategy

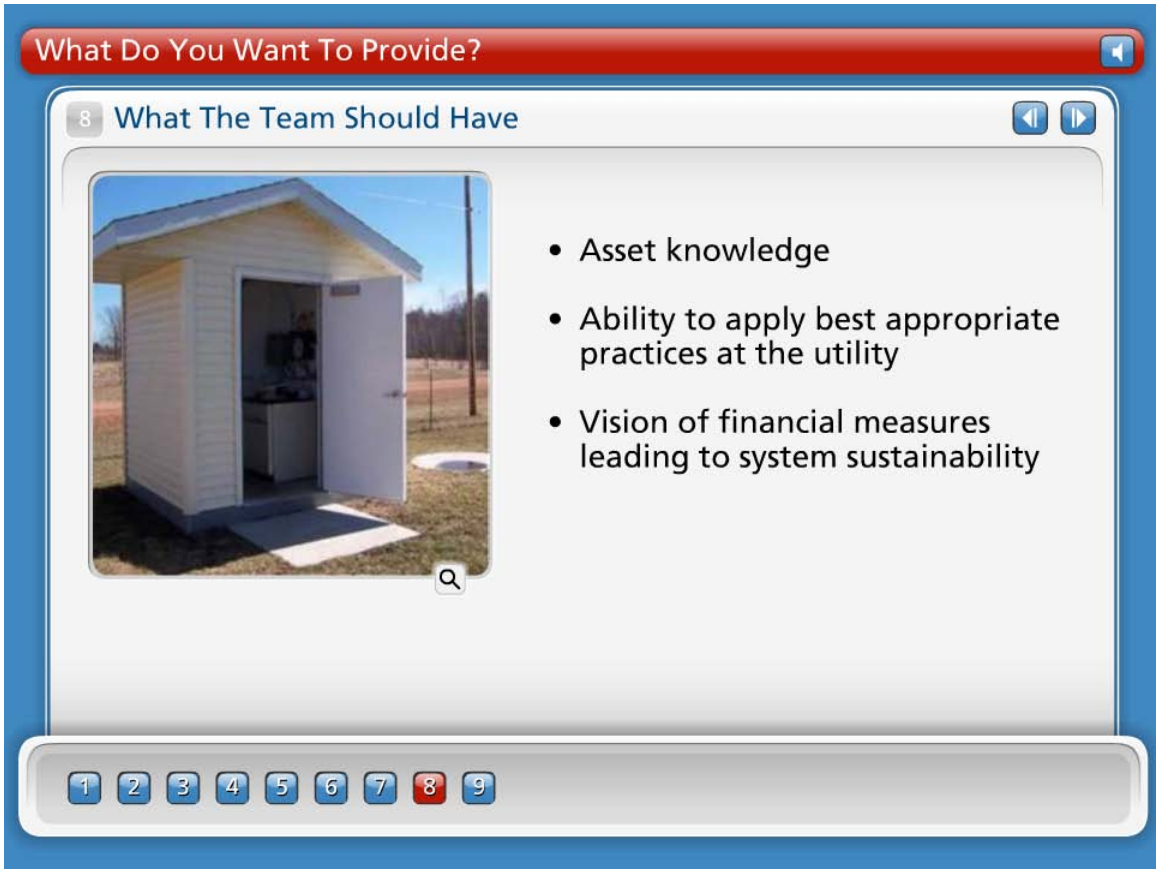
- Local and elected officials (e.g., mayor, council, town manager) who have the:
  - Authority to commit resources
  - Knowledge of the political landscape
  - Ability to create new financing mechanisms and restructure ineffective institutions

- Accounting personnel who have the:
  - Ability to help estimate the replacement cost of assets
  - Knowledge of the existing financing strategy, potential financial resources and challenges, and the need for rate changes

- Information Technology personnel who have the:
  - Ability to determine the most practical way to collect, store, and present the information needed to make strategic decisions

• Treasurer who has the:
    • Ability to implement new financing mechanisms (e.g., bonds, loans, and other debt instruments) and create dedicated reserve accounts

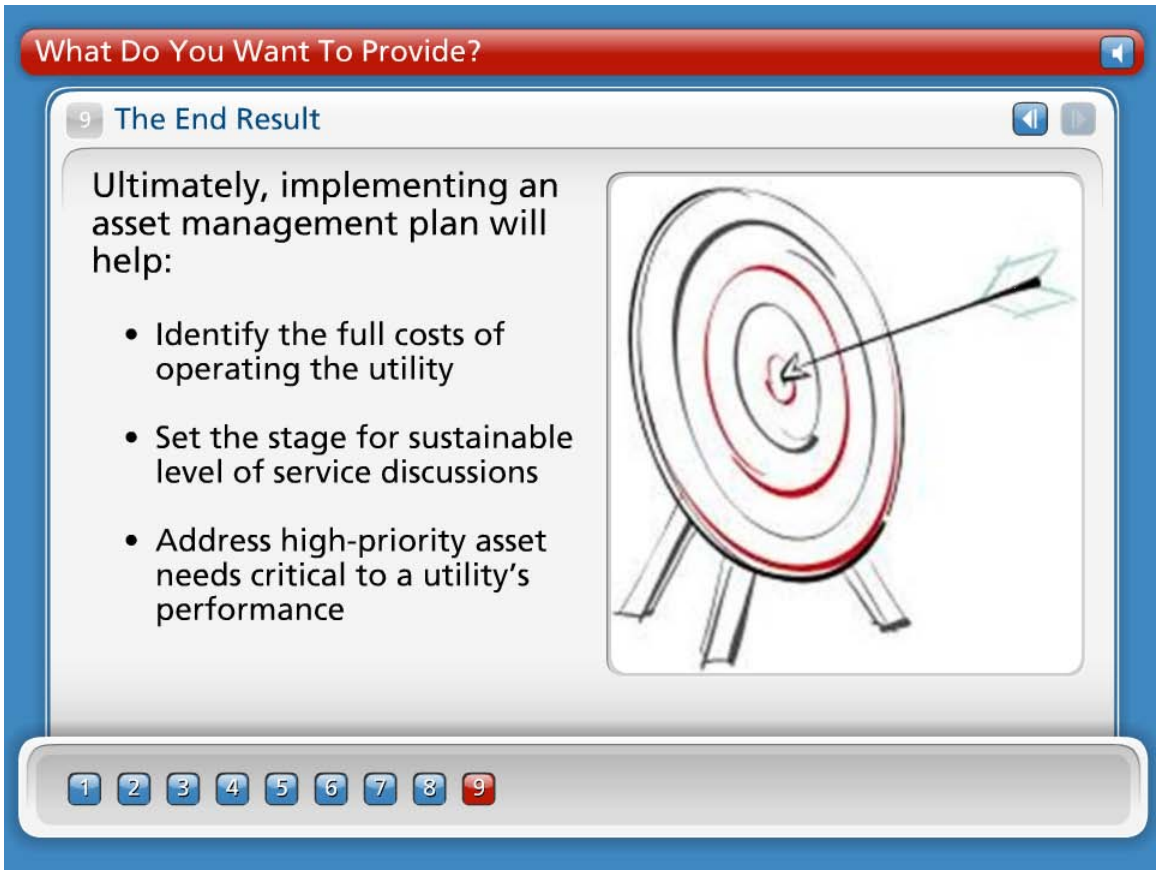
Don’t forget other stakeholders such as:
• Other infrastructure managers and utilities (e.g., roads, sewers, and electric)
• Conservation and environmental groups
• Neighboring water districts
• Community members



What The Team Should Have
The team members should possess certain qualities to make the asset management program work:
    • Asset knowledge—what they have, where it is, what condition it’s in, and the financial plan to manage priorities
    • Best appropriate practices—need to understand system risks and consequence of system failures. Identify failures within the norms and those that are catastrophic.
    • Vision—Asset management is the basis for understanding the total cost in pricing services.

An asset management team should also:

• Be flexible and encourage critical thinking
• Create opportunities for sharing ideas and information through open and transparent debate
• Work through problems and shares the success, not the blame
• Foster an atmosphere that builds trust and develops partnerships
• Use existing elements of asset management as a basis for the program
• Start implementation during planning to achieve early gains



The End Result
As asset management is implemented, it really becomes a broader way of thinking about utility management.

• Improve intergovernmental relations by improving relationships that lead to better decision making
• Have better pricing and asset valuation
• Improve technical, managerial, and financial capacity
• Allow you to sleep better knowing the chances are reduced that you will have to answer emergencies in the middle of the night

Implementing an asset management plan will help the utility optimize the TOTAL cost of ownership

• Operation (identifying the total costs of operating the utility)
• Maintenance (setting the stage for sustainable level of service discussions)

- Capital (addressing high-priority asset needs critical to a utility's performance)
- Disposal (addressing the costs to dispose of unneeded assets)

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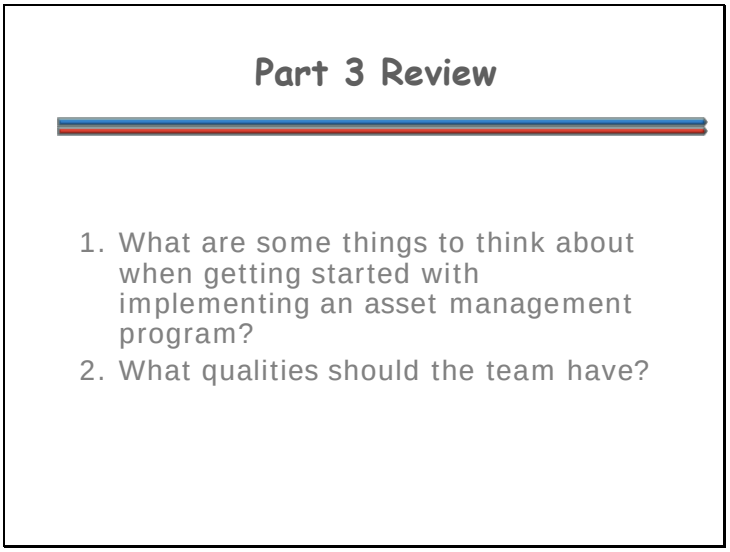

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1. What are some things to think about when getting started with implementing an asset management program?

What are your utility's goals? Assemble a dedicated team to help develop a mission statement and identify level of service goals and objectives.

2. What qualities should the team have?

- Asset knowledge—what they have, where it is, what condition it's in, and the financial plan to manage priorities
- Best appropriate practices—need to understand system risks and consequence of system failures. Identify failures within the norms and those that are catastrophic.
- Vision—Asset management is the basis for understanding total cost in pricing services.

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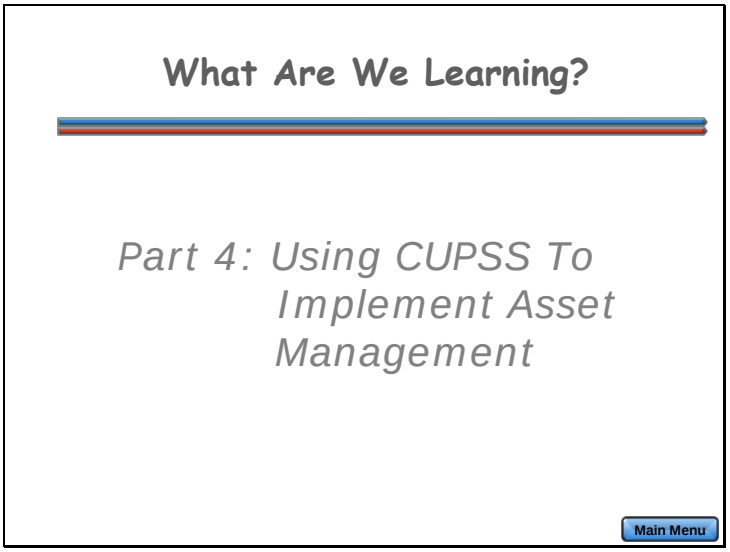

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Asset management isn't always a simple process but CUPSS can help you make it manageable.

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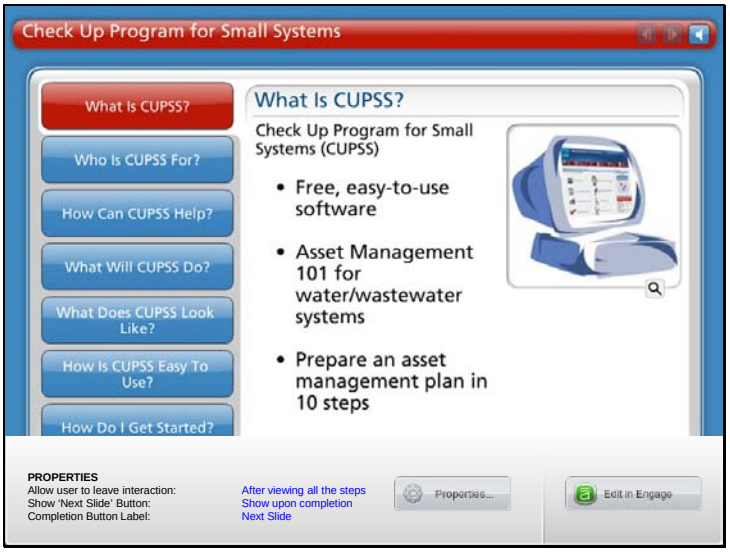

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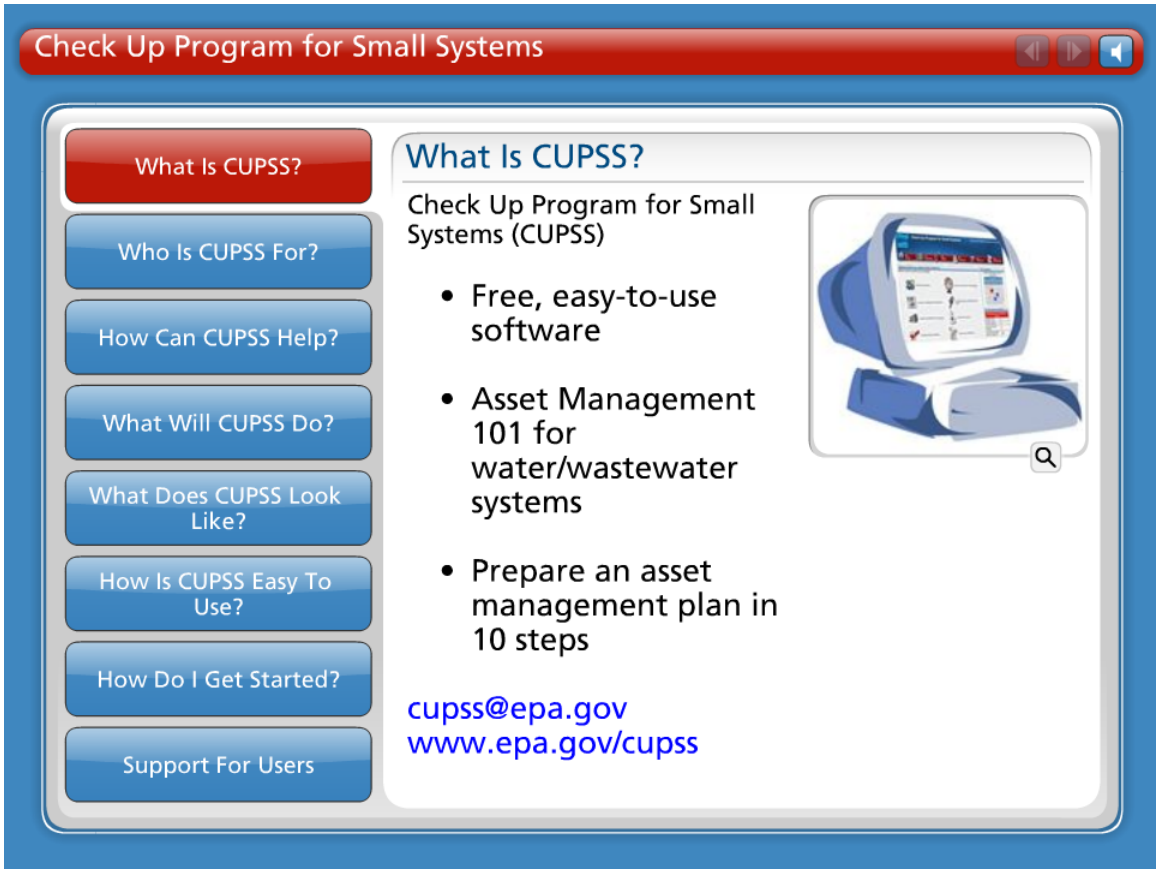
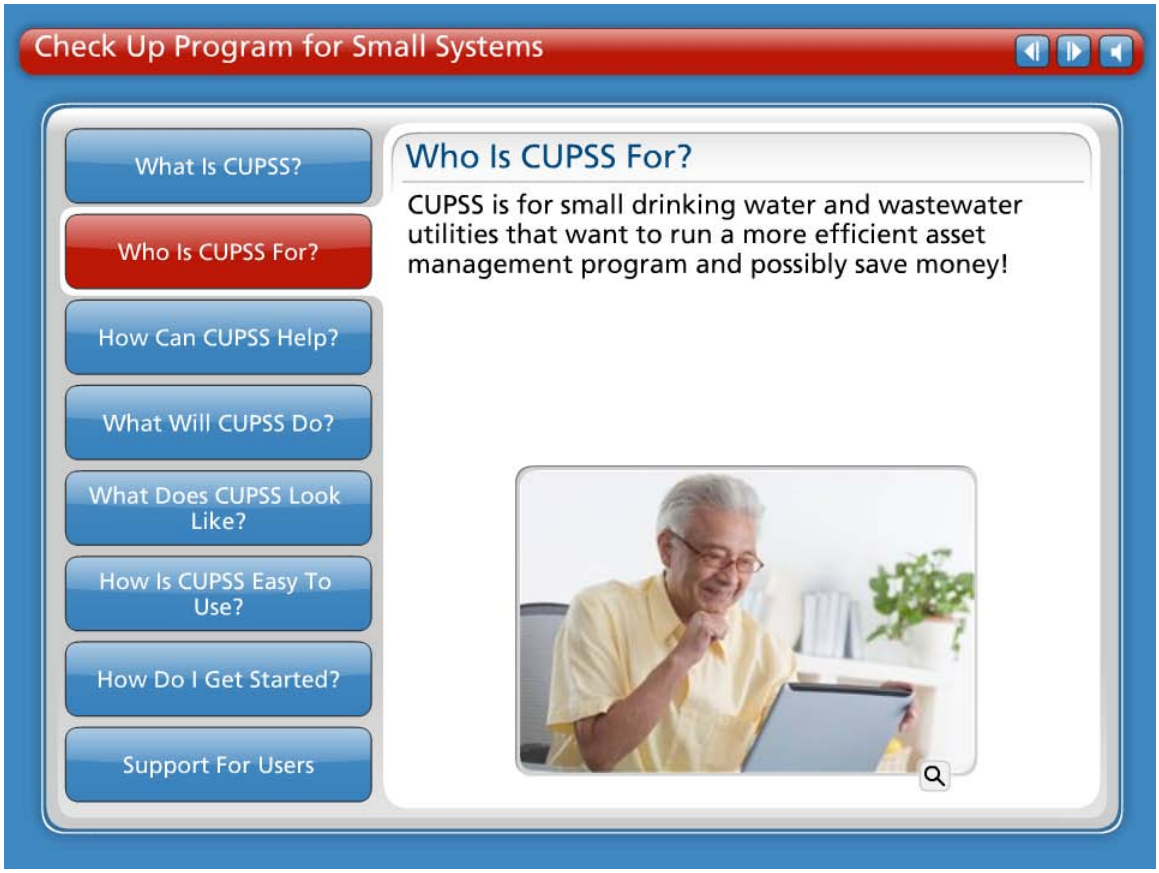


What Is CUPSS?
So what is CUPSS, and how will it help a small system implement asset management?

CUPSS is computer software that helps water and wastewater systems do asset management. The tool walks a utility through ten steps to help create a personalized asset management plan specific to that system's needs.

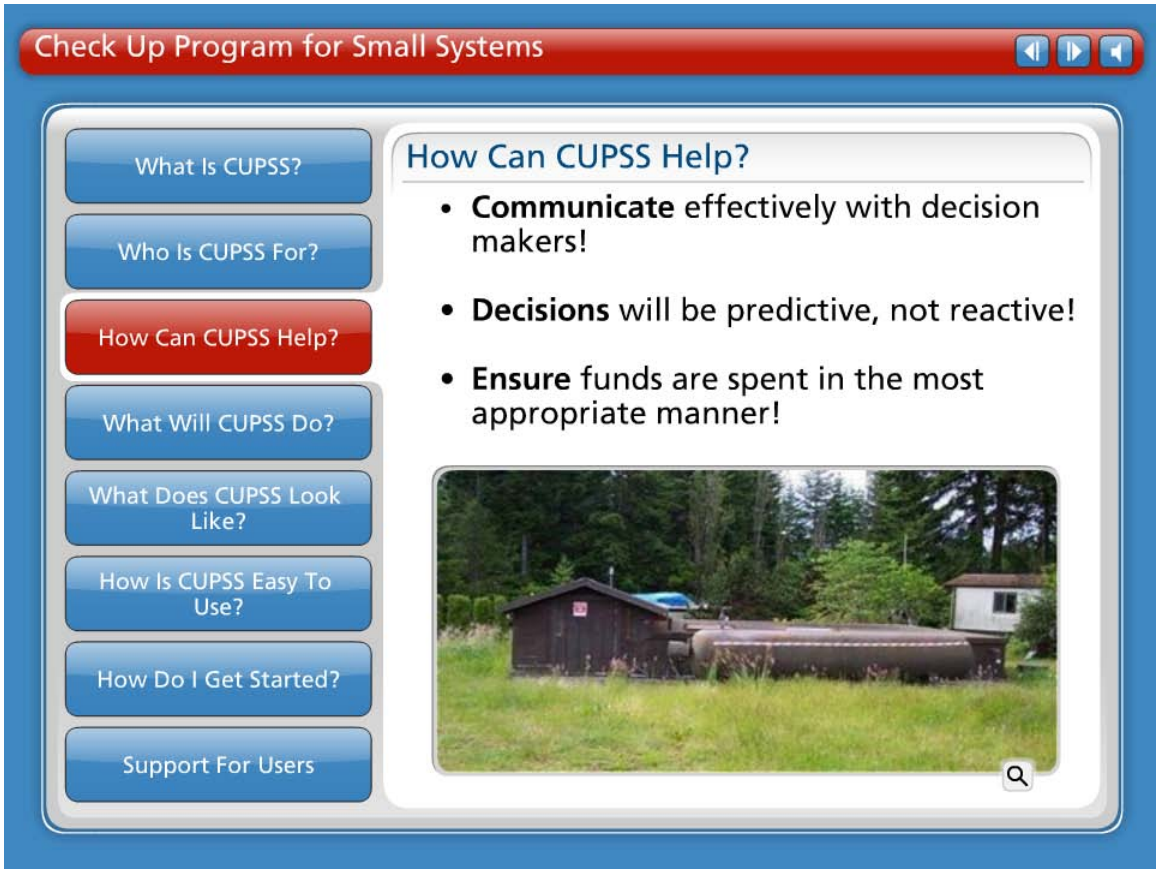
There have been various webcasts and training presentations about CUPSS and asset management, which are at http://www.epa.gov/cupss/training.html.



Who Is CUPSS For?

CUPSS was developed for small drinking water and wastewater systems to help manage their assets. Using CUPSS to implement asset management can:

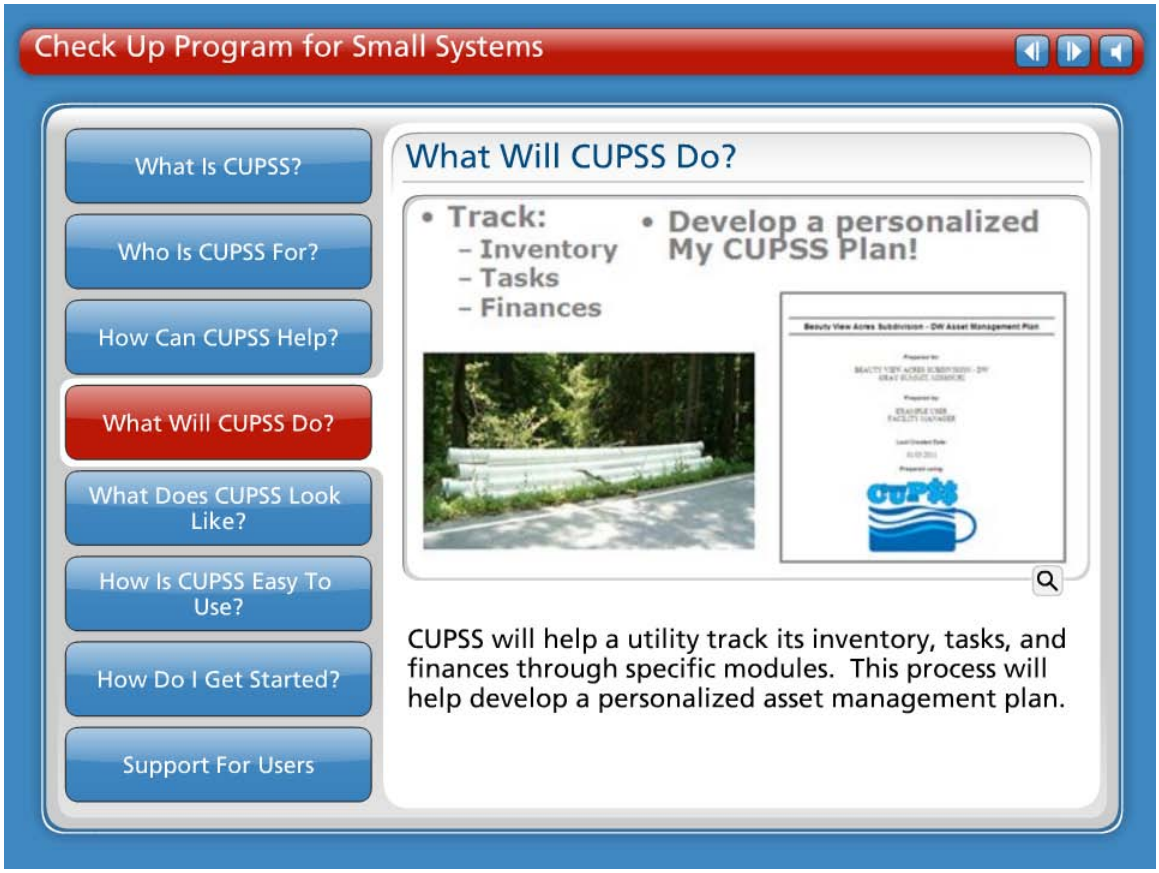
- Contribute to less crisis decision making (predictive, not reactive decision making)
- Prevent disasters
- Help develop level of resource goals to lower response time, more planning, and higher level of coordination
- Help the utility comply with Government Accounting Standards Board (GASB) Statement Number 34 financial reporting procedure.s Private companies can also follow the Financial Accounting Standards Board (FASB); helps establish a good credit rating
- Help the utility gain or remain in control of resource demands



How Can CUPSS Help?

CUPSS can help keep:

- Utilities knowledgeable about their utility—utilities will be able to confidently describe the risks of not maintaining system components
- All important information in one place—utilities will be able to effectively communicate the system's requirements
- Customers happy—utilities will be able to justify long-term financial plan to customers



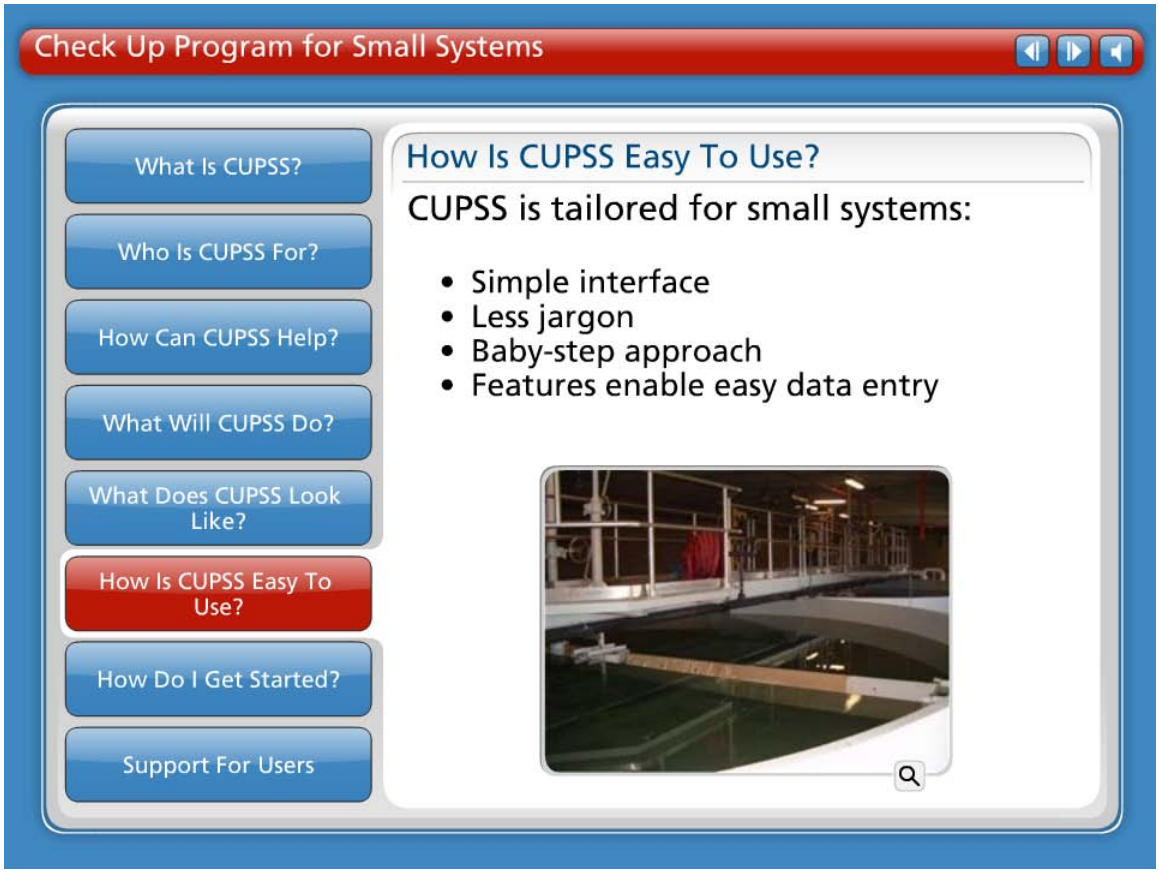
What Will CUPSS Do?

CUPSS will help a utility track its inventory, tasks, and finances through specific modules. This process will help develop a personalized asset management plan.

What Does CUPSS Look Like?

CUPSS is a desktop software application. When you open it, it displays an interactive screen. There are links within CUPSS that

- Provide examples and training
- Manage an asset inventory
- Schedule and track operation and maintenance activities
- Track and manage finances
- Generate financial and asset check up reports
- Generate an Asset Management Plan



How Is CUPSS Easy To Use?
CUPSS is a simple application that is easy to use by those who manage water and wastewater systems. The application guides a user through a straightforward process. There is a simple interface with less confusing jargon in a step-by-step approach. The features make data entry easy.

How Do I Get Started?

Getting started with using CUPSS to implement asset management consists of

- Organizing asset and financial records. Think about assets at the utility: When were they installed? When was the last maintenance performed?
- Forming a team. Who helps manage the utility? Who makes important decisions?
- Reaching out to others. What other utilities are implementing asset management? Are they using CUPSS? Is there a local CUPSS trainer that can help me?
- Identifying level of service goals. How many connections are there? What is the community's projected growth in the next 10 years?

Support For Users
CUPSS was developed with you in mind. Many resources are available to those who are just starting to think about asset management as well as others with a little more expertise.

Getting Started with CUPSS Workbook
This workbook gives a basic introduction of how to prepare to use CUPSS and implement asset management, including checklists of people to talk to and materials to gather. The purpose is to help users become comfortable with the basic concepts and the types of information they will be required to enter, before loading the program.
Getting Started with CUPSS Workbook (PDF) (22 pp, 623K)

CUPSS User's Guide
The user's guide is the companion document to the CUPSS application. It introduces asset management through a step-by-step approach, using CUPSS as the foundation; provides exercises to build understanding of concepts; and provides detailed information on how to use the CUPSS software.
CUPSS User's Guide (PDF) (142 pp, 5.1MB)

"CUPSS and Us" Promotional Presentation – for Decision Makers
The audience for this presentation is local decision makers. It highlights the benefits of

getting started in asset management using CUPSS, key features of the tool itself, and describes the support EPA and its partners will make available to users.
PPT Version (5.9MB) | PDF Version (27 pp, 2M)
Top of page

CUPSS Trainers

"Getting Ready for CUPSS" Presentation – for Trainers

This 90-minute presentation is based on the "Getting Ready for CUPSS" workbook and the "Trainer's Workbook." It provides trainers with the skills and information needed to support communities as they prepare and begin to use CUPSS.
PPT Version (3M) | PDF Version (55 pp, 3M)

Trainer's Guide

This guide is for potential CUPSS trainers. It is designed to:
Educate trainers on possible marketing strategies and techniques to use to gain buy-in from decision makers and stakeholders on the adoption of CUPSS.

- Provide examples, training and case studies of successful asset management implementation.
- Educate trainers on the key features and benefits of CUPSS to potential users.
- Walk trainers through the various activities to conduct during training.
- Trainer's Guide (PDF) (26 pp, 1.5MB)

CUPSS Postcard Series

This series includes two postcards: one designed to recruit CUPSS trainers and the second to promote CUPSS to potential users. Copies are available by calling 1-800-490-9198.

- Help Wanted (PDF) (2 pp, 230K)
- Asset Management Made Easy (PDF) (2 pp, 497K)

"CUPSS and Us" Promotional Presentation – for Decision Makers

The audience for this presentation is local decision makers. It highlights the benefits of getting started in asset management using CUPSS, key features of the tool itself, and describes the support EPA and its partners will make available to users.
PPT Version (5.9MB) | PDF Version (27 pp, 2M)

EPA Resources

Additional EPA Resources

- Small Drinking Water Systems
- Small Wastewater Communities

Asset Management: A Best Practices Guide

This guide will help you understand what asset management means, the benefits of asset management, best practices in asset management and how to implement an asset management plan. It is intended for owners, managers and operators of public water systems; local officials; technical assistance providers; and state personnel.
Asset Management: A Best Practices Guide (PDF) (4 pp, 247K)

Asset Management for Local Officials
This guide will help you understand the basics of asset management for local officials and local officials' vital role in successfully implementing an asset management program. It is intended for local officials who are directly or indirectly involved in decisions affecting public water systems.
Asset Management for Local Officials (PDF) (2 pp, 86K)

Building an Asset Management Team
This guide will help you understand how forming and having a team can help your system successfully implement asset management and the components of a successful asset management team. It is intended for local officials, owners and operators of public water systems, technical assistance providers, and state personnel.
Building an Asset Management Team (PDF) (2 pp, 78K)

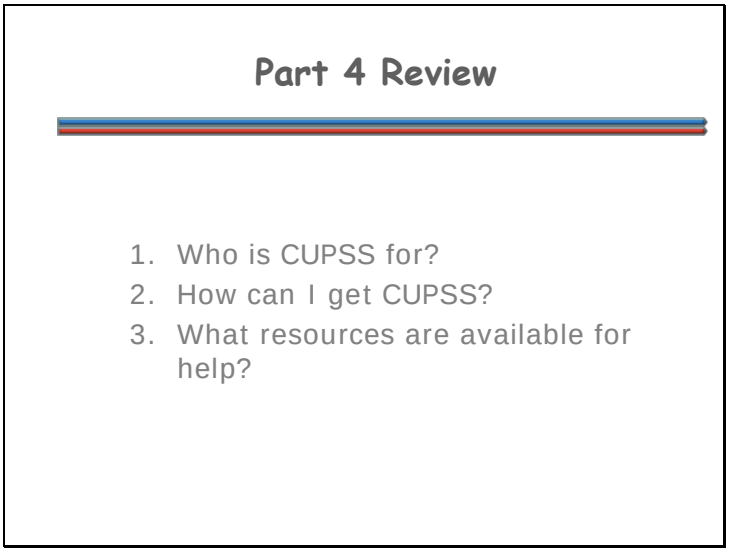
Record Keeping Rules: A Quick Reference Guide
This guide will provide you with more information on what records you are required to keep, the types of system information and additional records you should keep, how long this information should be retained to maintain a comprehensive history of your Public Water System (PWS), the benefits of record keeping and how to keep your records secure.
Record Keeping Rules: A Quick Reference Guide (PDF) (4 pp, 92K)

Setting Small Drinking Water System Rates for a Sustainable Future - STEP Guide Series
This guide is designed to help owners, operators and managers of community water systems (CWSs) serving 3,300 or fewer persons understand the full costs of providing a safe and adequate supply of drinking water to their customers and how to set water rates that reflect those costs. Small publicly or privately owned entities whose primary business is providing drinking water will find this guide useful.
Setting Small Drinking Water System Rates for a Sustainable Future - STEP Guide Series (PDF) (62 pp, 341K)

Preventive Maintenance Card File for Small Public Water Systems Using Ground Water (log cards)
These log cards, along with the accompanying guidance notes booklet, provide a schedule of routine operation and maintenance tasks for small ground water systems. The cards and booklet will help you develop a preventive maintenance program for your system.
Preventive Maintenance Card File for Small Public Water Systems Using Ground Water (log cards) (PDF) (147 pp, 260K)

Other Material
GAO-04-461 Water Infrastructure: Comprehensive Asset Management Has Potential to Help Utilities Better Identify Needs and Plan Future Investments (PDF) (68 pp, 960K)

Slide 47



Navigation: *Use the arrows in the bottom-middle of the screen to navigate backward to previous screens or forward through the lesson screens. When you enter an interactive tool, check the notes to receive instruction on using that tool's navigation. If you do not want to hear the audio, set the sound scale on the bottom left to zero or mute the computer's sound.*

1. Who is CUPSS for?

CUPSS was developed for small drinking water and wastewater systems to help manage their assets. Using CUPSS to implement asset management can:

- Contribute to less crisis decision making (predictive, not reactive decision making)
- Prevent disasters
- Help develop level of resource goals to lower response time, more planning, and higher level of coordination
- Comply with Government Accounting Standards Board (GASB) Statement Number 34 financial reporting procedures. Private companies can also follow the Financial Accounting Standards Board (FASB); helps establish a good credit rating
- Help the utility gain or remain in control of resource demands

2. How can I get CUPSS?

Download CUPSS from www.epa.gov/cupss or order a CD from cupss@epa.gov

3. What CUPSS resources are available for help?

- CUPSS User’s Guide
- CUPSS Workbook
- Tutorials/training
- CUPSS Web site (www.epa.gov/cupss)
- CUPSS Email (cupss@epa.gov)

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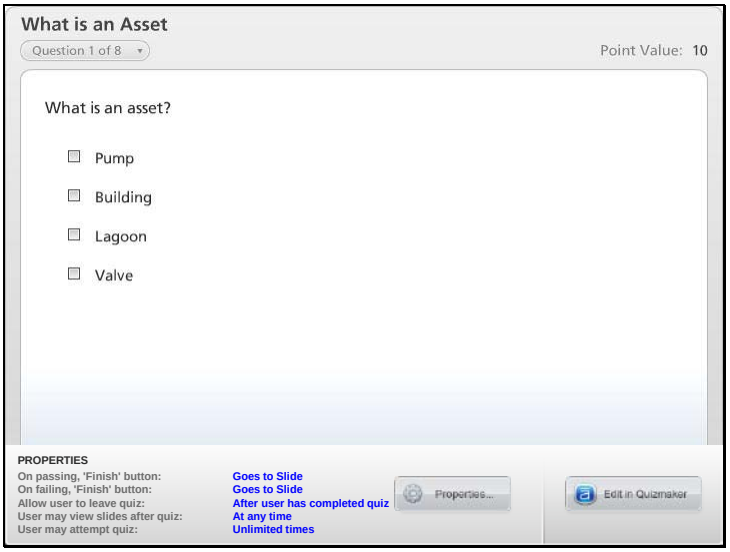
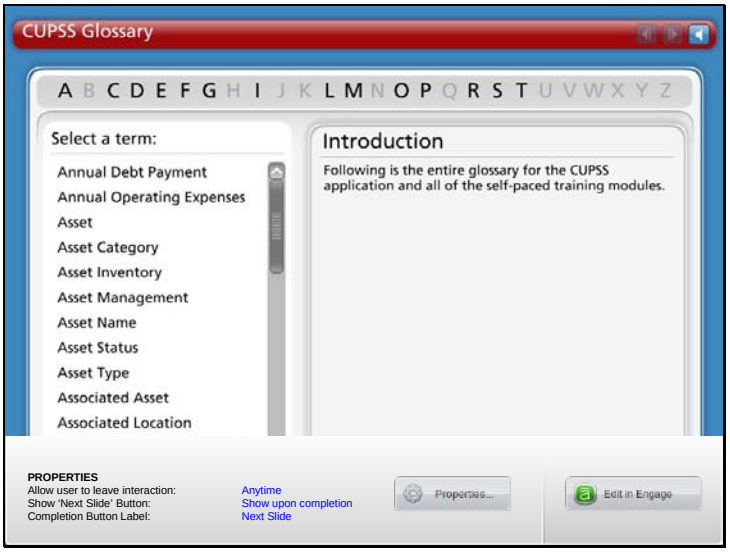
Navigation: *Use the arrows in the bottom-middle of the screen to navigate backward to previous screens or forward through the lesson screens. When you enter an interactive tool, check the notes to receive instruction on using that tool's navigation. If you do not want to hear the audio, set the sound scale on the bottom left to zero or mute the computer's sound.*

Congratulations! You have completed Lesson 1 and are now ready for Lesson 2 of the CUPSS Self-Paced Training!

Slide 49


What is an Asset
Question 1 of 8
Point Value: 10
What is an asset?
Pump
Building
Lagoon
Valve
PROPERTIES
On passing, 'Finish' button: Goes to Slide
On failing, 'Finish' button: Goes to Slide
Allow user to leave quiz: After user has completed quiz
User may view slides after quiz: At any time
User may attempt quiz: Unlimited times
Properties...
Edit in Quizmaker

Slide 50


CUPSS Glossary
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Select a term:
Annual Debt Payment
Annual Operating Expenses
Asset
Asset Category
Asset Inventory
Asset Management
Asset Name
Asset Status
Asset Type
Associated Asset
Associated Location
Introduction
Following is the entire glossary for the CUPSS application and all of the self-paced training modules.
PROPERTIES
Allow user to leave interaction:
Anytime
Show 'Next Slide' Button:
Show upon completion
Completion Button Label:
Next Slide
Properties...
Edit in Engage