Smart Management for Small Water Systems

Asset Management for Small Systems in Minnesota

January 11, 2018

www.efcnetwork.org

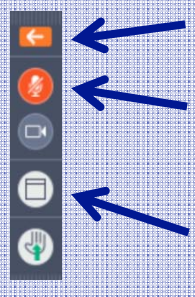
EFCN environmental finance center network

American Water Works Association

This program is made possible under a cooperative agreement with the U.S. EPA.

Logistics

Opening the control panel



Show your control panel

All phones/microphones are muted for the duration of the webinar

Toggle between full screen/window screen view

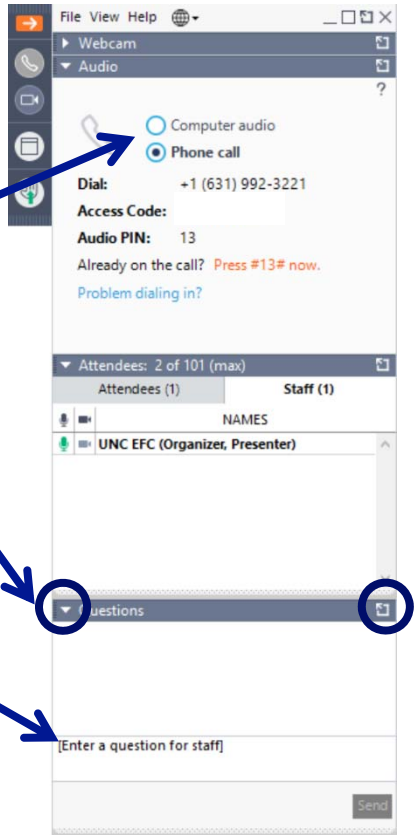
Using the control panel

Audio: please choose between computer audio or phone call

If you do not hear audio right now, please check your speaker volume or enter #[your Audio PIN]# if using phone

Click ▶ to open in Control Panel

Submit **questions** in the Questions box at any time, and press [Send]



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Registrants of this Webinar

About the Environmental Finance Center Network (EFCN)

The Environmental Finance Center Network (EFCN) is a university-based organization creating innovative solutions to the difficult how-to-pay issues of environmental protection and improvement. The EFCN works with the public and private sectors to promote sustainable environmental solutions while bolstering efforts to manage costs.

The Smart Management for Small Water Systems Program

This program is offered free of charge to all who are interested. The Program Team will conduct activities in every state, territory, and the Navajo Nation. All small drinking water systems are eligible to receive free training and technical assistance.

What We Offer

Individualized technical assistance, workshops, small group support, webinars, eLearning, online tools & resources, blogs

The Small Systems Program Team

- Environmental Finance Center at The University of North Carolina at Chapel Hill
- Environmental Finance Center at Wichita State University
- EFC West
- New England Environmental Finance Center at the University of Southern Maine
- Southwest Environmental Finance Center at the University of New Mexico
- Syracuse University Environmental Finance Center
- Environmental Finance Center at the University of Maryland
- American Water Works Association (AWWA)

UNC ENVIRONMENTAL FINANCE CENTER

WSU WICHITA STATE UNIVERSITY HUGO WALL SCHOOL OF PUBLIC AFFAIRS Environmental Finance Center

EFCWest Environmental Finance Center West

New England Environmental Finance Center

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Environmental Finance Center Syracuse University

ENVIRONMENTAL FINANCE CENTER

American Water Works Association

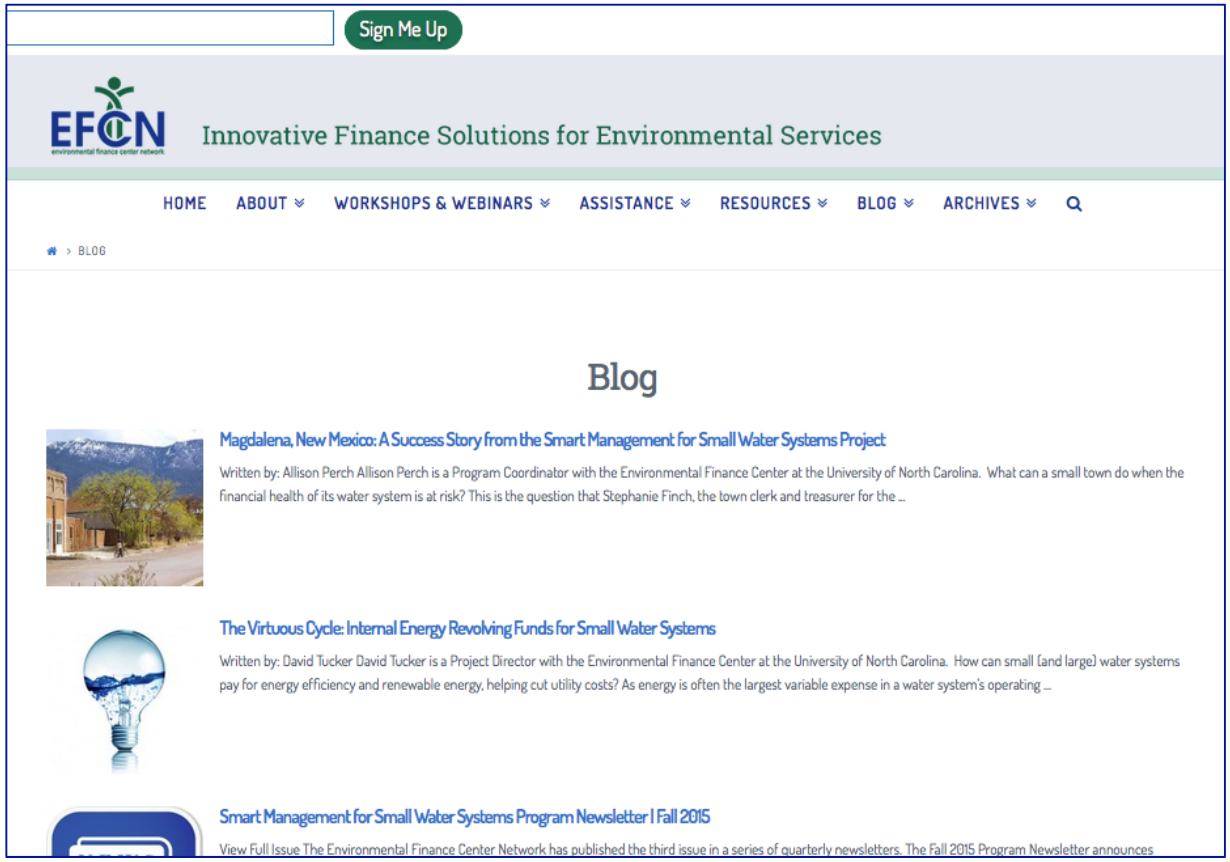
Areas of Expertise

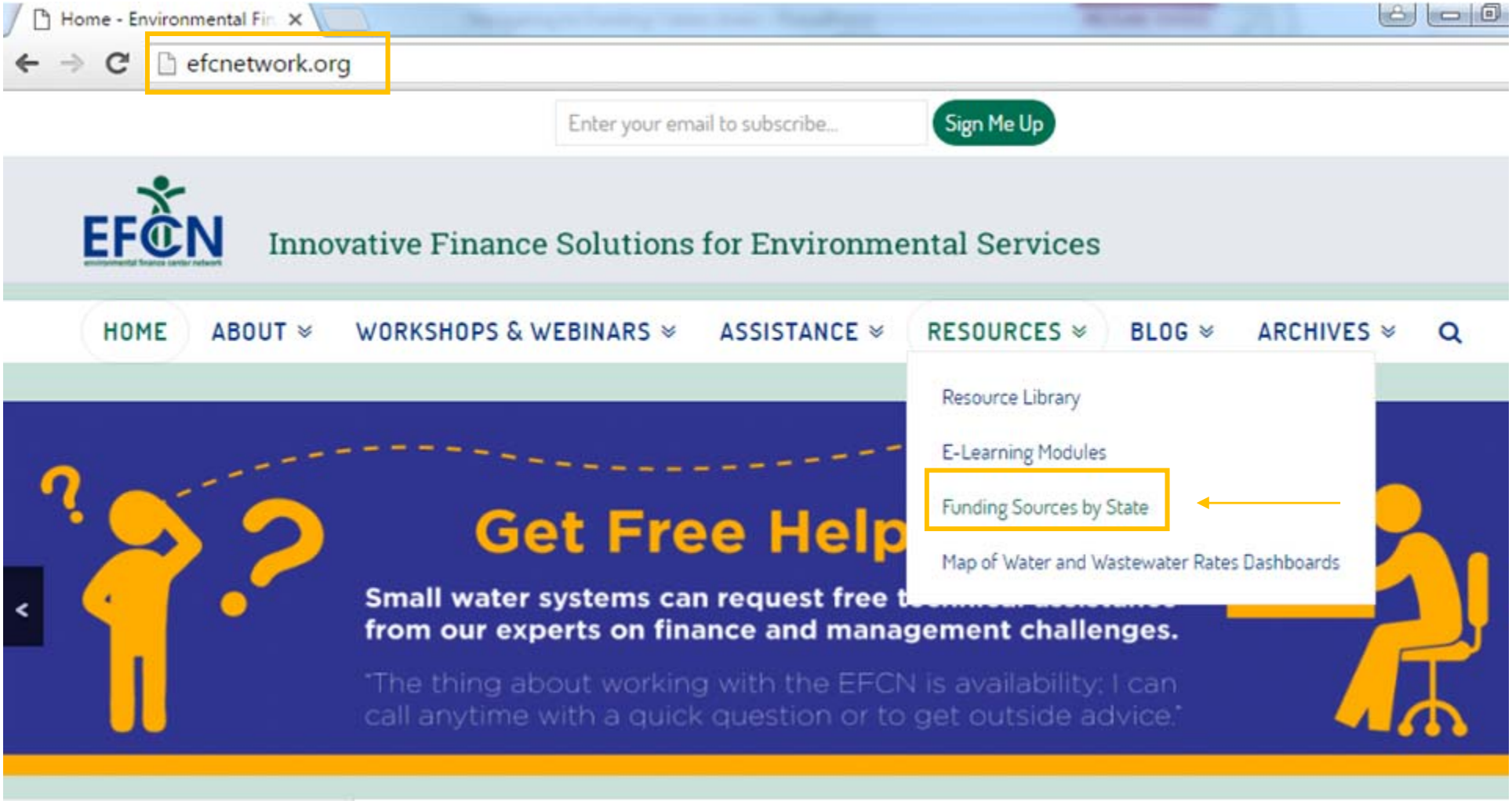
- Asset Management
- Rate Setting and Fiscal Planning
- Leadership Through Decision-making and Communication
- Water Loss Reduction
- Energy Management Planning
- Accessing Infrastructure Financing Programs
- Workforce Development
- Water Conservation Finance and Management
- Collaborating with Other Water Systems
- Resiliency Planning
- Managing Drought

Small Systems Blog

Learn more about water finance and management through our Small Systems Blog! Blog posts feature lessons learned from our training and technical assistance, descriptions of available tools, and small systems “success stories.”

efcnetwork.org/small_systems_blog/





Navigating to Funding Tables

Step 1: efcnetwork.org
Step 2: Select “Funding Sources by State” under the Resources Tab

Funding Sources by State

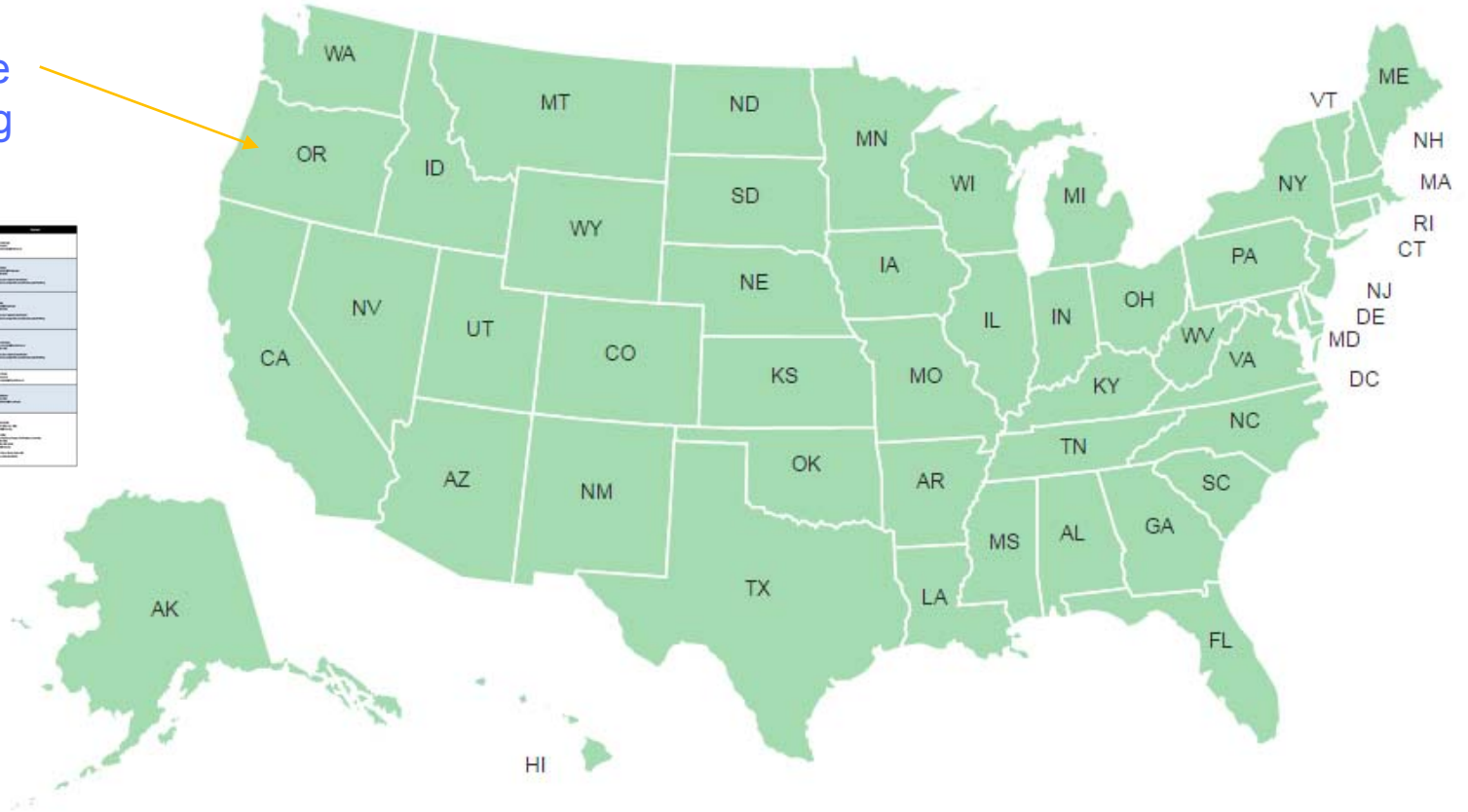
efcnetwork.org/funding-sources-by-state/

Funding Sources by State

Note: Some states may have additional resources listed below the map.

Click on the map below to view funding sources for each state:

Click on an individual state to view funding table.



Minnesota's Funding and State Specific Tools

Water & Wastewater Funding in Minnesota

State Programs

- Clean Water Revolving Fund (CWRF) - wastewater and storm water infrastructure
- Drinking Water Revolving Fund (DWRF) - drinking water infrastructure
- Point Source Implementation Grant (PSIG) - pollutant-based grants
- Water Infrastructure Fund (WIF) - affordability grants for drinking water & wastewater infrastructure

Federal Programs

- USDA – Rural Development (RD) - grants for drinking water & wastewater infrastructure

MN Funding Contacts

State Programs Financial Questions (PFA)

Becky Sabie, 651-259-7470
rebecca.sabie@state.mn.us
http://mn.gov/deed/PFA/

State Programs Technical Questions

Drinking Water (MDH)

Chad Kolstad, 651-201-3972
chad.kolstad@state.mn.us
www.health.state.mn.us/divs/eh/water/dwrf/

Wastewater/Storm Water (MPCA)

Bill Dunn, 651-757-2324
bill.dunn@state.mn.us
www.pca.state.mn.us/ppl

Federal Programs (USDA – RD)

Terry Louwagie, 651-602-7810
terry.louwagie@mn.usda.gov
www.rd.usda.gov/mn

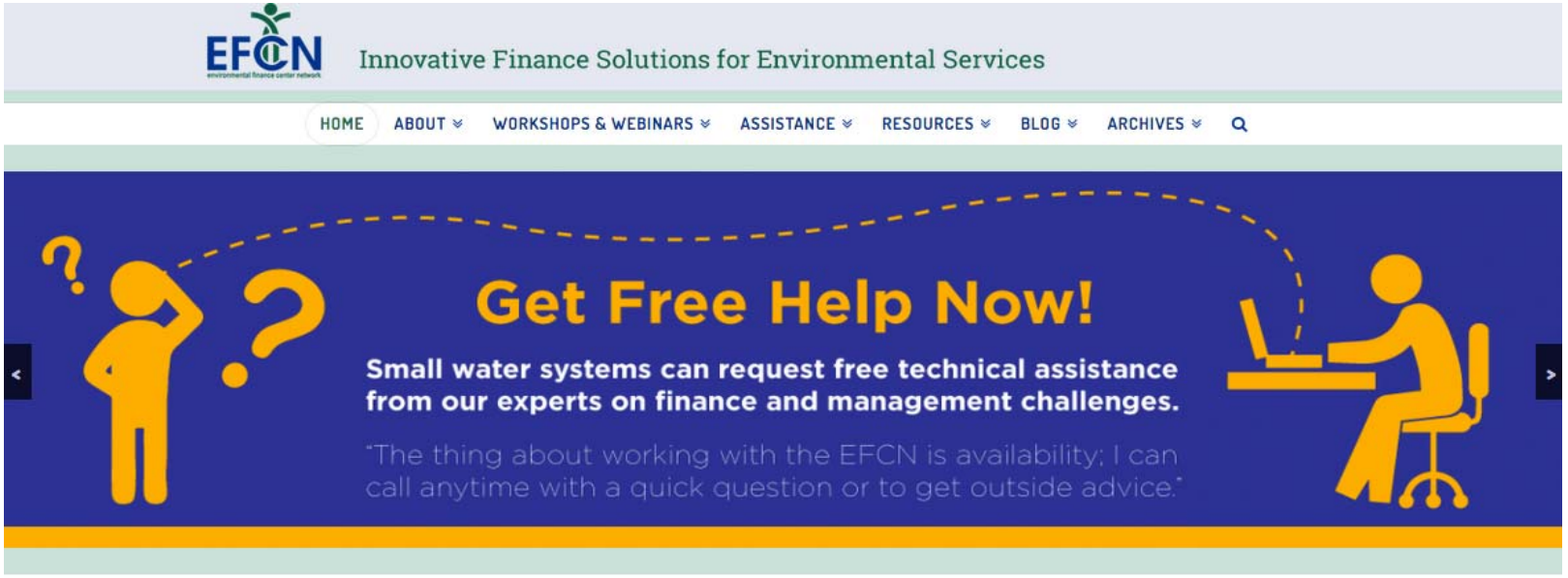
Asset Management in Minnesota

- All MN funding partners strongly encourage asset management

- MDH/MPCA/PFA have worked in partnership with MN Rural Water Association (MRWA) to develop an asset management spreadsheet
  - http://www.mrwa.com/assetmgmt.html
  - Both water and wastewater spreadsheets are available
  - Intended for very small systems (< 1,000)
  - MRWA's staff can assist with questions

Visit the EFCN Website – *www.efcnetwork.org*

to request free technical assistance, find state funding tables and more



Funding Tables By State

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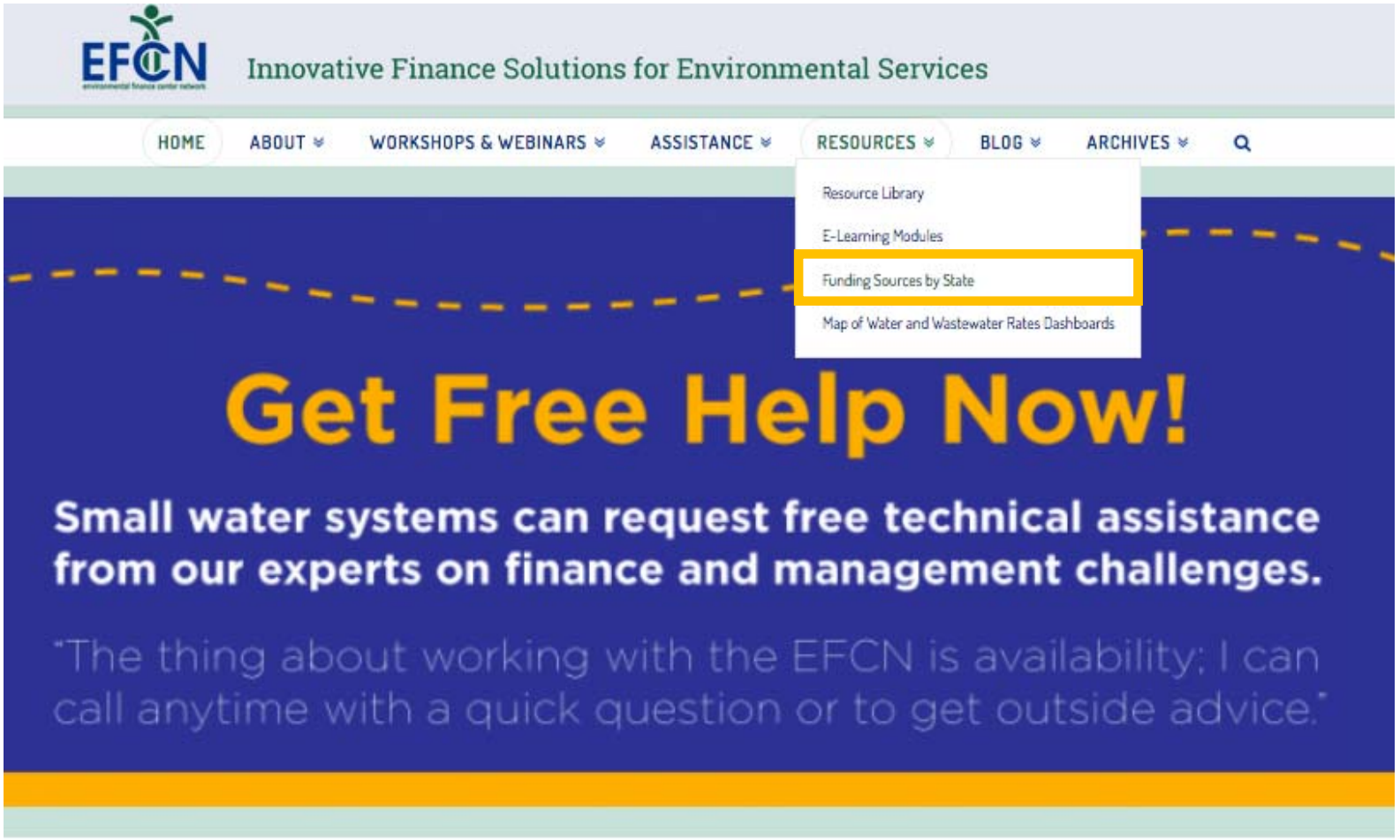

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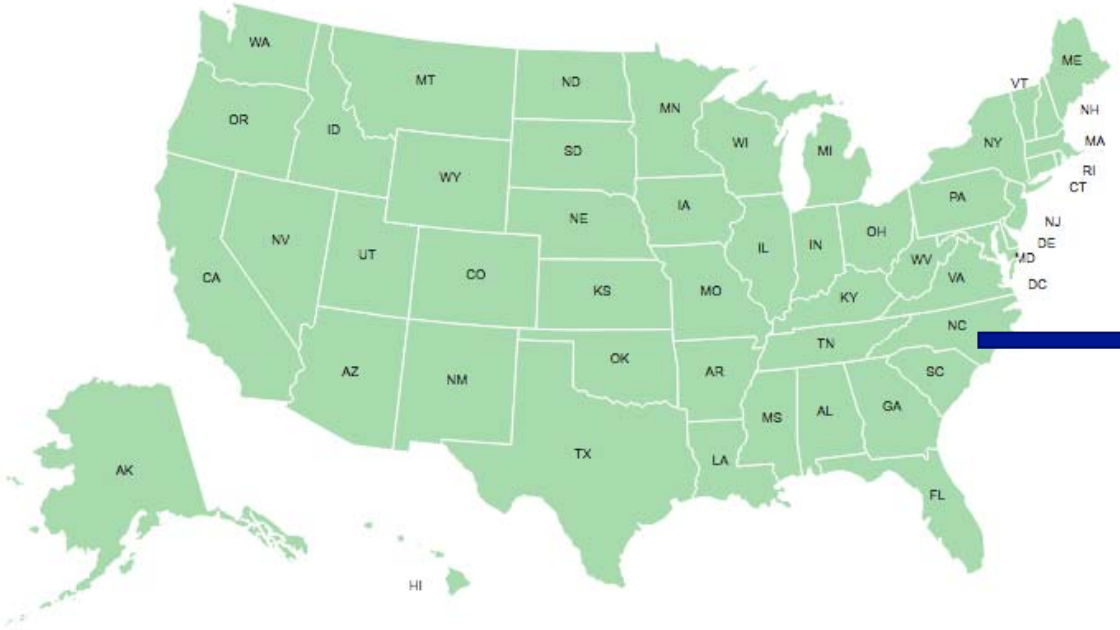

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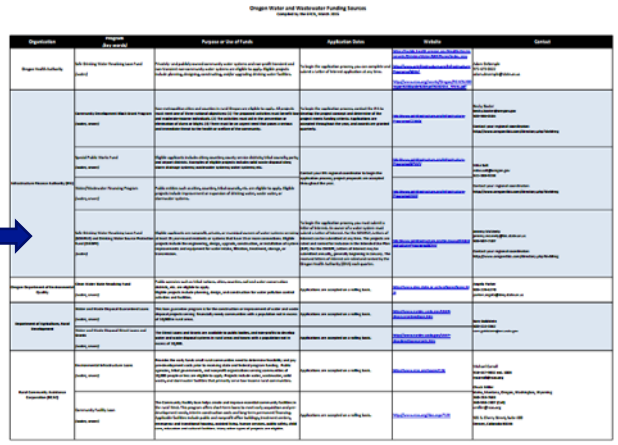
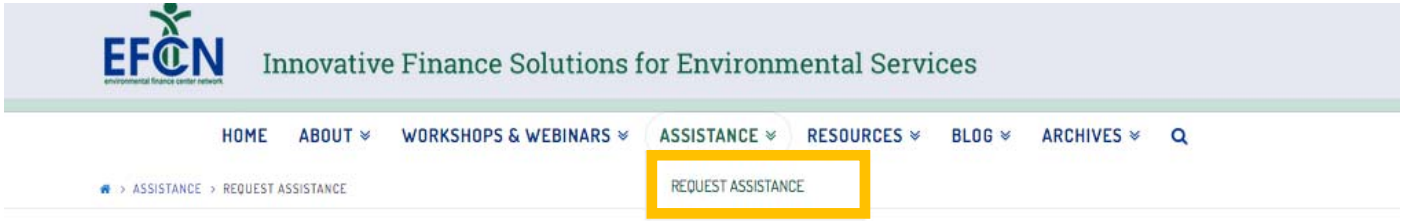


Request Technical Assistance

Select “Request Assistance” under the Assistance Tab off the EFCN homepage to access and submit the TA request form electronically.



Overview of Asset Management

THE AM THOUGHT PROCESS CONSISTS OF 5 CORE COMPONENTS

ASSETS

What assets do you manage, where are they, what condition are they in, and how much are they worth?

SERVICE LEVEL

What level of service do you want to provide for your customers?

FUNDING

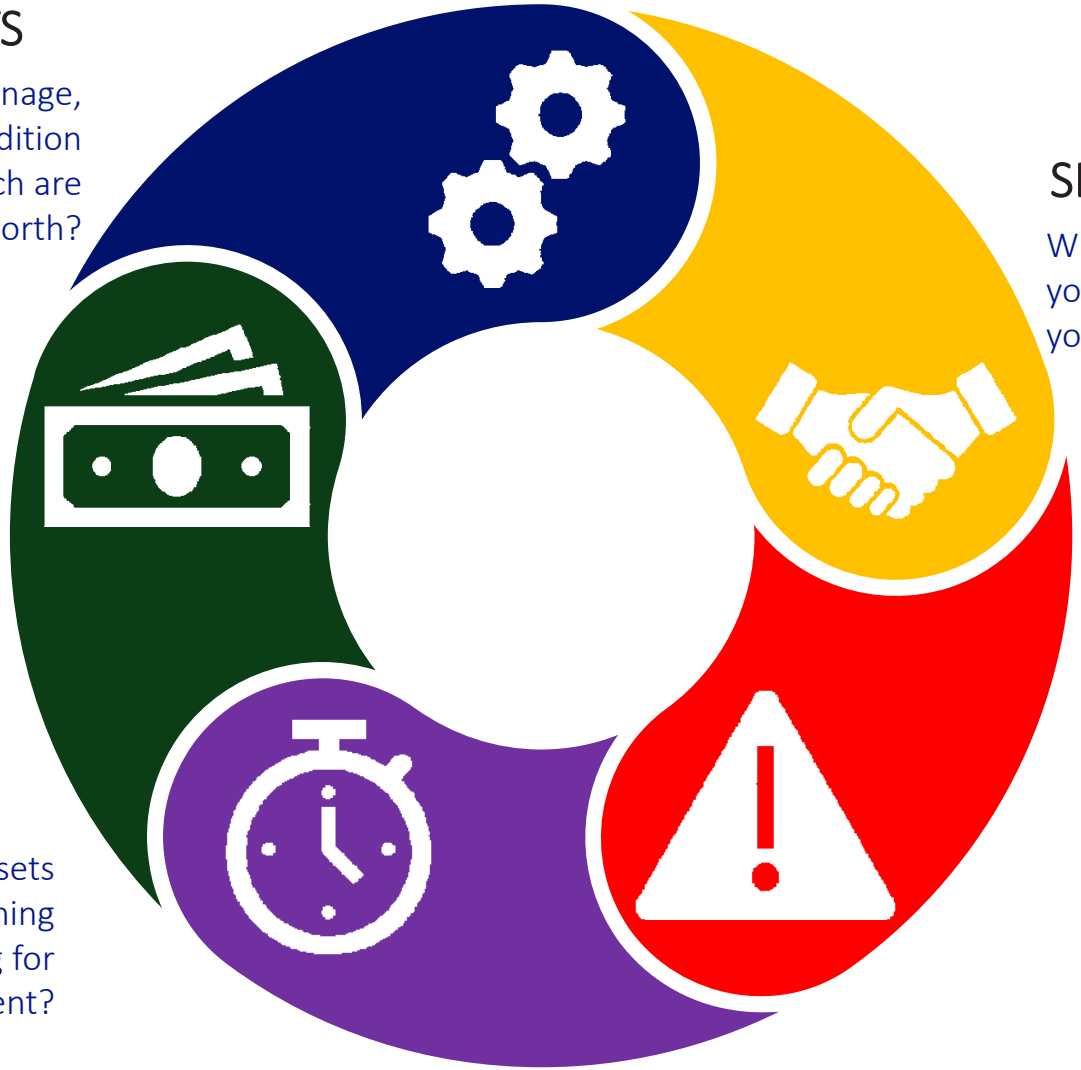
Do you have funding sources to provide the capital you need for O&M and replacement?

CRITICALITY

How important is it that specific assets keep functioning?

LIFE CYCLE

How long will your assets last? Are you maintaining them and preparing for replacement?



Current State of the Assets

What assets do you own?

Where are they located?

What condition are they in?

What is their remaining useful life?

What is their replacement value?

Level of Service

- Customer service in asset management terms is called level of service
- Defines the major goals of the utility (defines what level of service the utility will provide)
- Service and Costs are related

Criticality

What is the likelihood that an asset will fail?

What is the consequence if the asset does fail?

Likelihood	Negligible	Minor	Marginal	Critical	Catastrophic
Near Certain	Low	Medium	High	High	High
Highly Likely	Low	Medium	Medium	High	High
Likely	Low	Low	Medium	Medium	High
Unlikely	Low	Low	Low	Medium	Medium
Remote	Low	Low	Low	Low	Low

Consequence

Optimizing Life Cycle Costs

Operate

- Energy Management
- Water Loss Reductions

Maintain

- Maintenance Schedules
- Budgets

Capital Projects

- Repair
- Rehabilitate
- Replace

Life Cycle Costing is About Balance O&M, Repairs and Replacement

Long Term Funding Strategies

What are your funding needs?

- Day to day expenses (O&M)
- Capital Expenditures (Long Term Expenses)

Where will the money come from?

- O&M – General funds, other funds, rates, fees, penalties
- Capital Projects– System Funds and/or Outside Funding (Grants and Loans)

Benefits of Asset Management

Why would I want to take on Asset Management?

Efficiency

- Work Efficiency
  - Reduce field time: Don't have to look for assets
  - Know where spare parts are and have the right parts
  - Know which O&M tasks to do and when (and which ones not to do)
- Financial Efficiency
  - Investments in Maintenance Pay Off in Long-Term Savings!!!
  - Energy reductions lead to cost savings
  - Water loss reductions lead to cost savings

fewer accidents, more efficient operation/service, more sustainable utility

Improved Emergency Response

Knowing where assets are located allows for a quicker response and quicker resolution of the problem

Dealing with Natural Disasters

Other Benefits

- Enhanced Communications – Greater acceptance of rates
- Improved CIP process – no longer a wish list, but a fact based, prioritized, time defined project plan
- Improved Knowledge Management

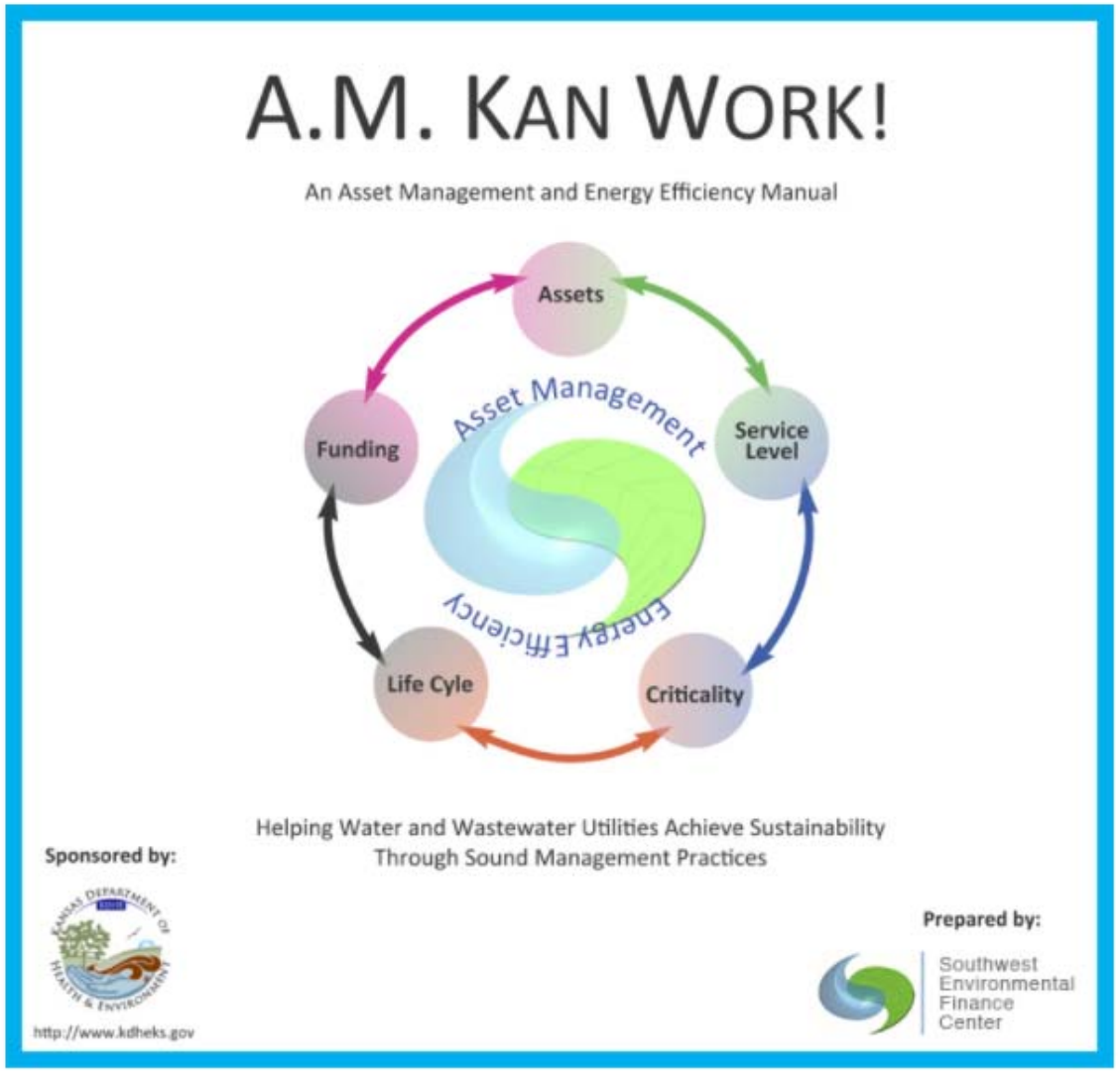
Who Can Asset Management Benefit?

Governing Body

Operations and Management Staff

EFCN's Asset Management Tools

http://southwestefc.unm.edu/asset-management/



http://southwestefc.unm.edu/asset-management/

Kansas Department of Health and Environment

Appendix F

ASSET MANAGEMENT IQ

Front
Section 1
Section 2
Section 3
Section 4
Section 5
Section 6
Results

An Asset Management IQ Test is presented here in order to help you review the concepts of the various core components of Asset Management. Both the test and a scoring table are also available as a printable pdf, which may be copied for use by multiple personnel within your utility.

In the web version of the test, clicking on a choice will automatically enter the number of points for that option and keep track of the score for each section of the Asset Management IQ as well as the total cumulative score. If a new answer is selected, the new choice and the new points will appear and the old points will be removed.

If the user completes the entire Asset Management IQ tool (all 30 questions) before starting Asset Management, it will provide a baseline evaluation at the beginning of Asset Management. Comparing the scores of each of the six sections will show which areas have the biggest gaps in terms of Asset Management activities. These scores may provide information about where efforts should be focused. You may wish to start with areas that are the weakest, offering a large improvement with a little effort, or with areas that are strong, which would offer a chance to get started in a familiar area.

As the utility progresses, the Asset Management IQ can be repeated and the scores compared to previous scores. At a minimum, you may wish to repeat the Asset Management IQ every year.

It should be noted that a total score of 150 would represent best practice in all areas of Asset Management. Not all utilities will be interested in achieving this goal. The utility should set its own target levels. The tool is meant to help utilities gauge their progress over time.

PREV 1 2 3 4 5 6 7 8 NEXT

Asset Management IQ Section I

A. Is Asset Management terminology understood throughout the organization?
(Click on the answer that most accurately describes your situation.)

0	No one within the organization understands terminology nor has any knowledge of Asset Management concepts. (0 points)
	One person within organization understands Asset Management concepts and terminology. (1 point)
	Less than 50% of the organization's personnel (a few key people within the organization) understand Asset Management concepts and terminology. (2 points)
	More than 50% of the organization's personnel understand Asset Management concepts and terminology. (3 points)
	All[1] of the organization's personnel understand Asset Management concepts and terminology. (4 points)
	Throughout the entire organization personnel would be able to state what AssetManagement is and understand Asset Management concepts and terminology. (5 points)

[1]All refers to greater than 90% of the organization's personnel.

Current State of the Assets

Inventory Tools

Beginning the Inventory Process

- Determine what assets to track
  - Monetary cut-off
  - Asset categories that are/aren't valuable (meter, not meter can)
  - Existing software ties
- Determine how to store the data
  - Spreadsheet recommended to start
- Determine how to consistently number assets
  – Smart ID numbers recommended
  - AM Kan Work! has examples

Tools Available

Reference Guide for Asset Management
Inventory and Risk Analysis

Inventory	
Necessary Data	**Optional Data**
• Asset size - diameter and/or flow rate • Asset location • Installation date • Condition - Visible inspection, then update as needed with Maintenance history, age • Useful life (varies with type, if unknown an estimate is 50 years)	• Model number • Supplier name & phone • Under warranty • Warranty expiration date • Manufacturer • Manufacturer's recommended O&M • Maintenance records: last date hydrant was flushed or exercised • Operational • Color (if useful) • Were design specifications followed? • Asset use

Provides you with information on what you may want to include in your inventory and where you can look for such data

http://southwestefc.unm.edu/asset-management/

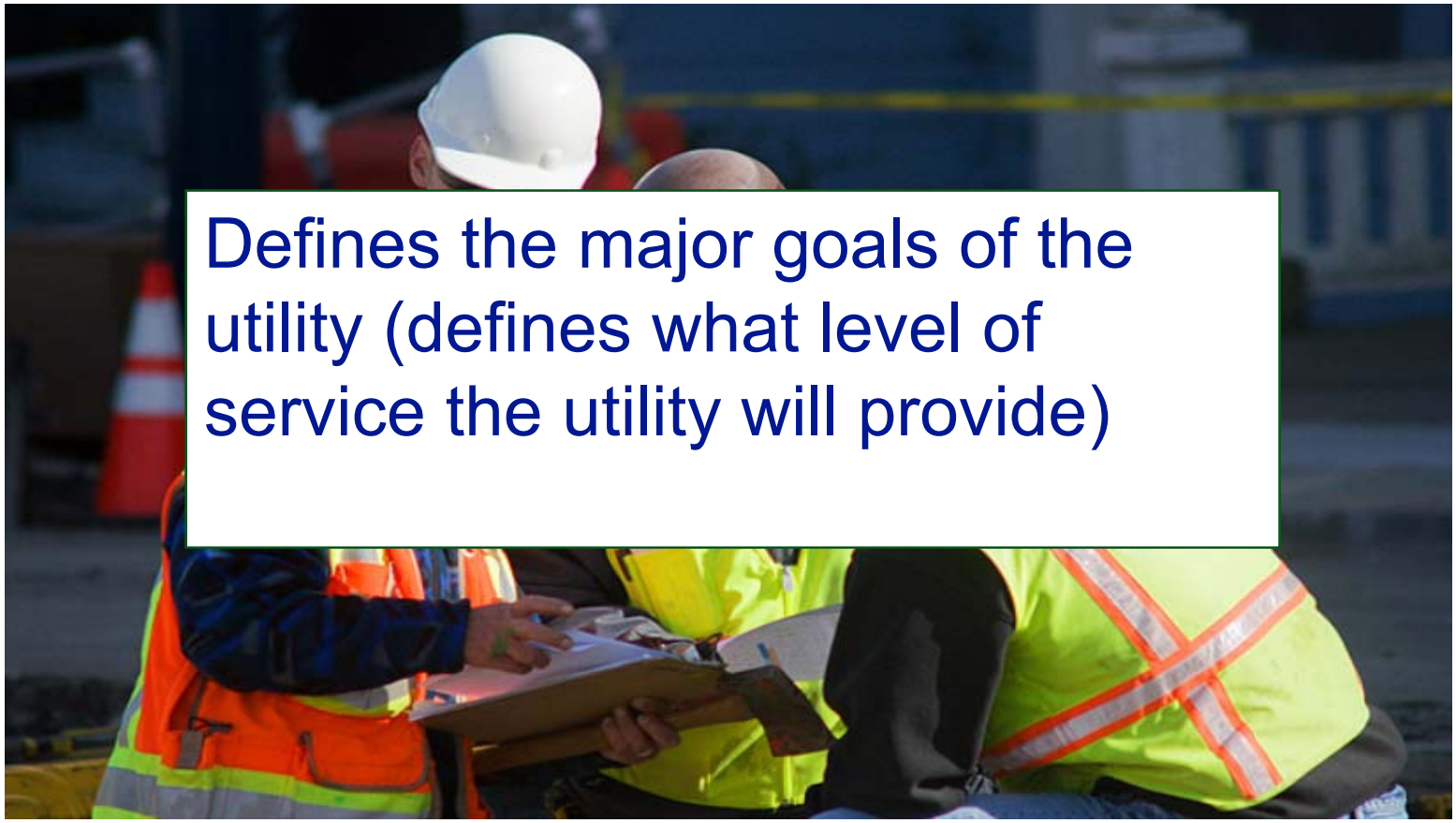
Structures for Inventory

- Microsoft Excel spreadsheet
- Microsoft Access database
- Mapping assistance

Level of Service

Tools Available

CUSTOMER SERVICE IN ASSET MANAGEMENT TERMS



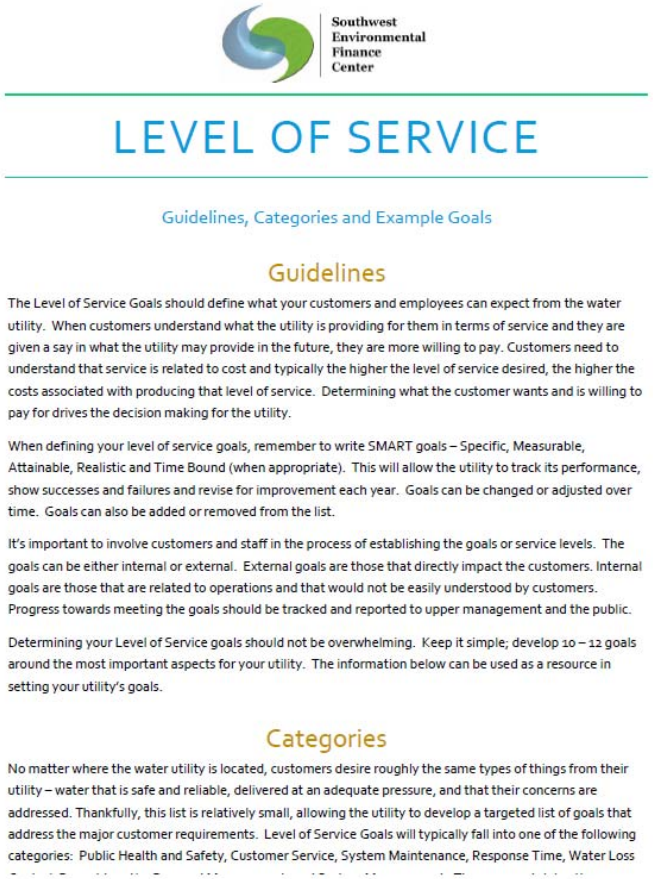
CALLED LEVEL OF SERVICE

SMART Goals - Documentation

- What information is needed to measure if you are meeting the goal?
- How frequently should the information be collected?
- Results of measurement
- Determining if you are meeting the goal

Tools Available

Level of Service: Guidelines, Categories, and Example Goals



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LEVEL OF SERVICE

Guidelines, Categories and Example Goals

Guidelines

The Level of Service Goals should define what your customers and employees can expect from the water utility. When customers understand what the utility is providing for them in terms of service and they are given a say in what the utility may provide in the future, they are more willing to pay. Customers need to understand that service is related to cost and typically the higher the level of service desired, the higher the costs associated with producing that level of service. Determining what the customer wants and is willing to pay for drives the decision making for the utility.

When defining your level of service goals, remember to write SMART goals – Specific, Measurable, Attainable, Realistic and Time Bound (when appropriate). This will allow the utility to track its performance, show successes and failures and revise for improvement each year. Goals can be changed or adjusted over time. Goals can also be added or removed from the list.

It's important to involve customers and staff in the process of establishing the goals or service levels. The goals can be either internal or external. External goals are those that directly impact the customers. Internal goals are those that are related to operations and that would not be easily understood by customers. Progress towards meeting the goals should be tracked and reported to upper management and the public.

Determining your Level of Service goals should not be overwhelming. Keep it simple; develop 10 – 12 goals around the most important aspects for your utility. The information below can be used as a resource in setting your utility's goals.

Categories

No matter where the water utility is located, customers desire roughly the same types of things from their utility – water that is safe and reliable, delivered at an adequate pressure, and that their concerns are addressed. Thankfully, this list is relatively small, allowing the utility to develop a targeted list of goals that address the major customer requirements. Level of Service Goals will typically fall into one of the following categories: Public Health and Safety, Customer Service, System Maintenance, Response Time, Water Loss

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LoS Goals - Categories

Public Health and Safety,

Customer Service,

System Maintenance,

Response Time,

Water Loss Control,

Drought and/or Demand Management,

System Management

Southwest Environmental Finance Center

Example Level of Service Goal Measurement

System Size	Level of Service Goal	Goal/Target Level	Data Needed to Measure Goal	Period of Measurement (e.g., weekly, monthly, semi-annual, annual)	Current Level	Meeting Goal, Close to Meeting Goal, Not Meeting Goal
Public Health and Safety						
Any	Meet Federal Safe Drinking Water Act Primary Drinking Water Standards 100% of the time.	100% of the time	SDWA regulations Test Results	Varies based on type of test – follow regs	No violations	Meeting Goal
Any	Meet state and local health based drinking water regulations 100% of the time.	100%	State and Local regs Test Results	Varies based on type of test – follow regs	No violations	Meeting Goal
Any	Maintain high level of confidence in water quality by completing all monitoring and reporting requirements of federal and state regulatory programs and reporting results to customers annually in the consumer confidence report.	Complete all M&R in regs. Provide CCR annually	Federal, State regs Test Results	Testing varies CCR annually	No M&R violations, CCR provided to customers	Meeting Goal
Any	Maintain consistent chlorine residual (minimum of 0.2 mg/L, average of 0.8 mg/L) throughout the distribution system via water line flushing program, as necessary, and proper maintenance of the chlorination system.	Cl residual 0.2 mg/L min.	Test results	Weekly	2 of 50 tests below 0.2 mg/L	Close to Meeting Goal – review flushing and maintenance schedules

Criticality

Tools available

Failure Modes

Mortality

Level of Service

Capacity

Financial Inefficiency

ASESSING CONSEQUENCES?

FINANCIAL

ENVIRONMENTAL

SOCIAL

CONSIDER THE TRIPLE BOTTOM LINE

Tools Available

Reference Guide for Asset Management Inventory and Risk Analysis

Risk - Hydrants (Fire, Flush, Flow Test)

Probability of Failure

- Age
- Condition - rusting, corrosion, leaking seal?
- Frequency of Use - is it opened at least annually as part of a flushing or testing program?
- Routine maintenance completed?
- Pipe size connected to - less than 6 inch may cavitate
- Tools needed to open readily available to fire department and water department?

Consequence of Failure

- Inability to fight a fire - loss of property, loss of life
- Inability to properly flush system - health concerns
- Water damage to nearby structures
- Level of Service Failures

Provides you with lists of characteristics to take into consideration when determining Probability and Consequence of Failure

Tools Available

Criticality of Assets

Allows you to calculate risk for assets

Asset: _____

Date: _____

Consequence (Cost) of Failure	**5**	*5*	*10*	*15*	*20*	*25*
	4	*4*	*8*	*12*	*16*	*20*
	3	*3*	*6*	*9*	*12*	*15*
	2	*2*	*4*	*6*	*8*	*10*
	1	*1*	*2*	*3*	*4*	*5*
Multiplied		**1**	**2**	**3**	**4**	**5**
	Probability of Failure					

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

http://southwestefc.unm.edu/asset-management/

Life Cycle Costing

Tools Available

Optimizing Life Cycle Costs

Operate

- Energy Costs
- Water Loss Audit

Maintain

- Maintenance Schedules
- Budgets

Capital Projects

- Repair History
- Replacement Costs

Updated O&M Tool

United States
Environmental Protection Agency

Preventive Maintenance for Small Public Water Systems Using Ground Water

An Interactive PDF with Suggested Preventive Maintenance Tasks and Logs

Introduction, System Information, Reference, and Contacts

http://southwestefc.unm.edu/asset-management/

Sample of O&M Checklist

DAILY DAILY DAILY RECOMMENDED DUTIES

Recommended Daily Operational Duties

☐	Check master meter(s). Record water production in DAILY WATER WELL PRODUCTION LOGS (pgs 8-13).
☐	Check chemical solution tanks. Record amounts used in DAILY CHEMICAL SOLUTIONS LOGS (pgs 14-16).
☐	Check water levels in storage tanks, and system pressure at storage tanks. Record results in DAILY STORAGE TANK WATER LEVEL LOGS (pgs 17-20), and DAILY PRESSURE TANK WATER LEVEL LOGS (pgs 21-24)
☐	Inspect chemical feed pumps for proper operation. Record solution volumes used, and volume of water treated in DAILY CHEMICAL FEED PUMP LOGS (pgs 25-28).
☐	Check and record chlorine residual at the point of application using an EPA-approved field test kit. Record results in DAILY CHLORINE RESIDUAL LOGS (pgs 29-32).
☐	Check and record chlorine residual in different parts of the distribution system, using an EPA-approved field test kit, so that the entire system is represented weekly. Record results in DAILY CHLORINE RESIDUAL LOGS (pgs 29-32).
☐	Check fluoride concentration in the distribution system. Record results in DAILY FLUORIDE CONCENTRATION LOGS (pgs 33-36).
☐	Inspect well pumps. Record running times, and pump cycle starts in DAILY WELL PUMP LOGS (pgs 37-42).
☐	Inspect booster pump stations. Record running times, pump cycle starts, and suction side and pressure side pressure readings in DAILY BOOSTER PUMP LOGS (pgs 43-46).
☐	Check instrumentation for proper signal input/output. Record results in DAILY INSTRUMENTATION EQUIPMENT CHECK LOGS (pgs 47-52). • *Chlorine residual* • *Fluoride*

Replacement Valuation Tool

Name:	
Date:	
Utility:	

Instructions:
Please input the water system's information in the green boxes. Please input the quantity and, where applicable, the size for each type of asset the utility owns. If the utility has recent unit price information for a specific type of asset listed below, that value can be input in the column labeled "Known Unit Price".

Orange Box: These are the calculated values

Gray Box: Unit Prices

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Asset Type	Asset	Size	Quantity	Unit	Low Range Unit Price:	High Range Unit Price:	Median Range Unit Price:	Known Unit Price:	Low Estimated Value	High Estimated Value	Median Value
Pipeline	Ductil Iron Pipe	4"-6"	199744	per Linear Foot	$ 24.26	$ 130.00	$ 42.50		$ 4,845,789	$ 25,966,720	$ 8,489,120
		8"-10"	87268		$ 33.11	$ 150.00	$ 100.50		$ 2,889,443	$ 13,090,200	$ 8,770,434
		12"-16"	64409		$ 49.64	$ 230.00	$ 90.00		$ 3,197,263	$ 14,814,070	$ 5,796,810
		18"-24"	155250		$ 97.59	$ 320.00	$ 265.00		$ 15,150,848	$ 49,680,000	$ 41,141,250
	Main PVC	4"-6"		per Linear Foot							
		8"-12"									
		14"-20"									
	HDPE			per Linear Foot							
	Service Line	.75"-2		Each							
Valves	Blow Off	2"		Each							
	Gate Valve			Each							
	Air Release Valve	1"-2"		Each							
	PRV	4"-8"		Each							
	Check Valve			Each							
Storage	Ground Storage			Gallons							
	Elevated Storage			Gallons							
	Steel Tank			Gallons							
	Concrete Tank			Gallons							
Hydrant	Fire Hydrant	4"-6"		Each							
Meters	Supply Meters	4"-6"		Each	$ 700.00	$ 8,000.00	$ 1,500.00		$ -	$ -	$ -
	Customer Meters	.75"-2"		Each							
Pumps	Sumbersible Pump	1/2 HP- 30 HP		Each							
	Booster Pump	500 GPM-2000 GPM		Each							
Treatment	Chemical Feed and Storage System			Each							
						Estimated Value Range:			$ 26,083,300	$ 103,551,000	$ 64,197,600

http://southwestefc.unm.edu/asset-management/

Long Term Funding

Tools available

Tools available

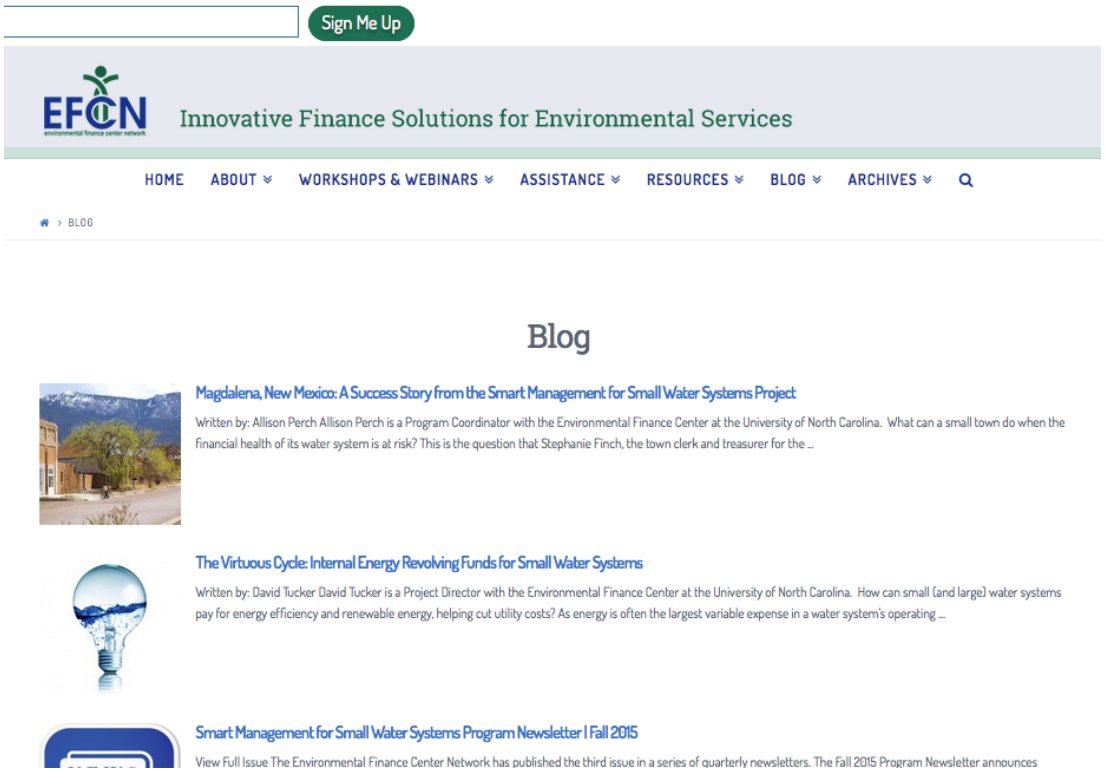
- EFC Network
  - http://efcnetwork.org/resource-library/
  - Water Rate Checkup Tool
  - Water & Wastewater Residential Rates Affordability Assessment Tool
  - Financial Health Checkup for Water Utilities
  - And More
- MN webinar 1/24/17
  - Slides and recording available at : http://efcnetwork.org/events/webinar-minnesota-financial-management-water-wastewater-funding-program-applicants-minnesota/#

Questions?

Small Systems Blog

Learn more about water finance and management through our Small Systems Blog! Blog posts feature lessons learned from our training and technical assistance, descriptions of available tools, and small systems “success stories.”

efcnetwork.org/small_systems_blog/



Smart Management for Small Water Systems

Thank you for participating today, and we hope to see you at a future workshop!

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EFCN environmental finance center network

American Water Works Association