

# Strategies to Enhance Resilience of Utility Finances

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Water and Wastewater Finance Strategies Workshop  
Environmental Finance Center, UNC School of Government  
February 2021

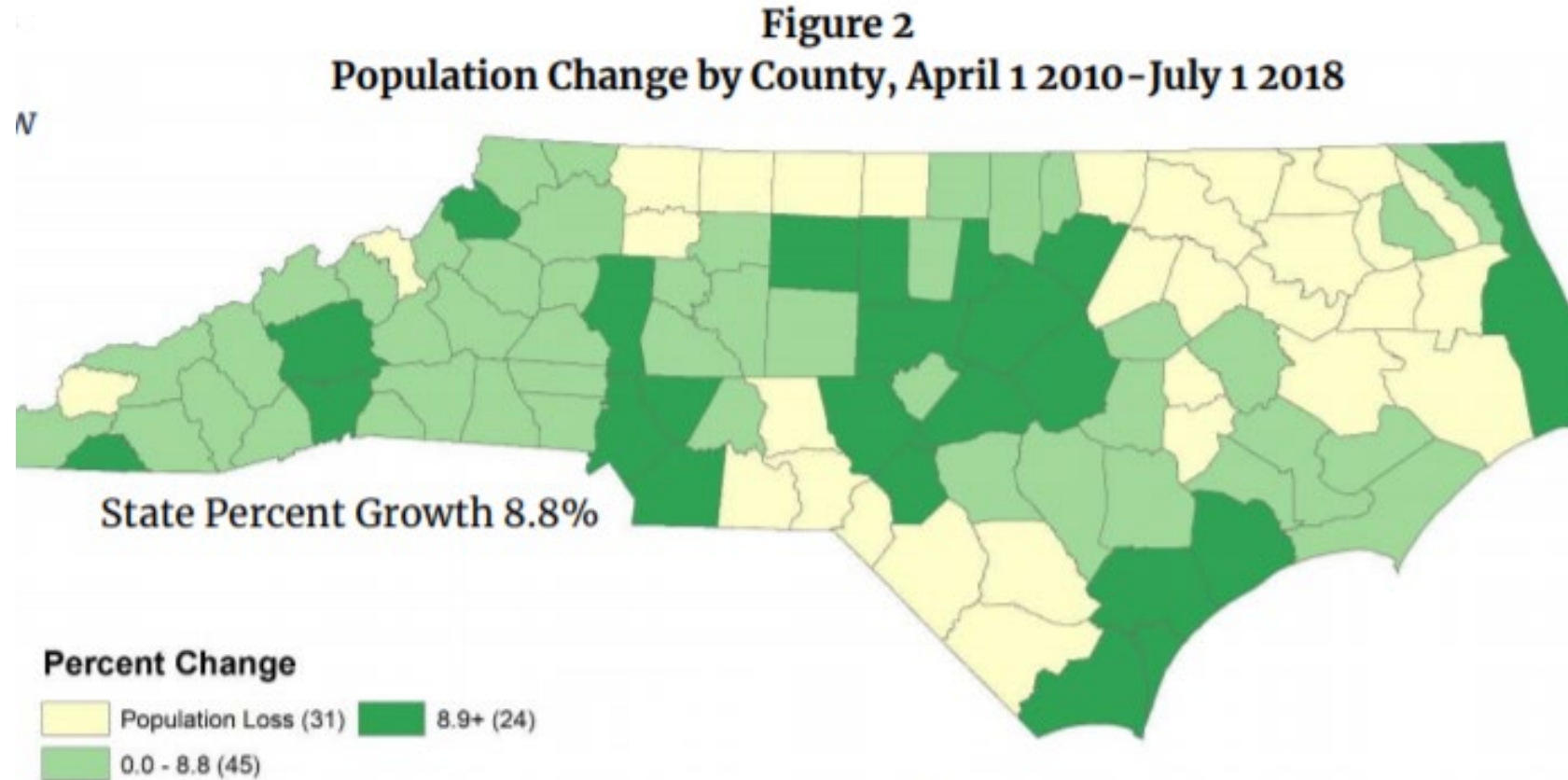


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[www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)

# External challenges to utility financial viability

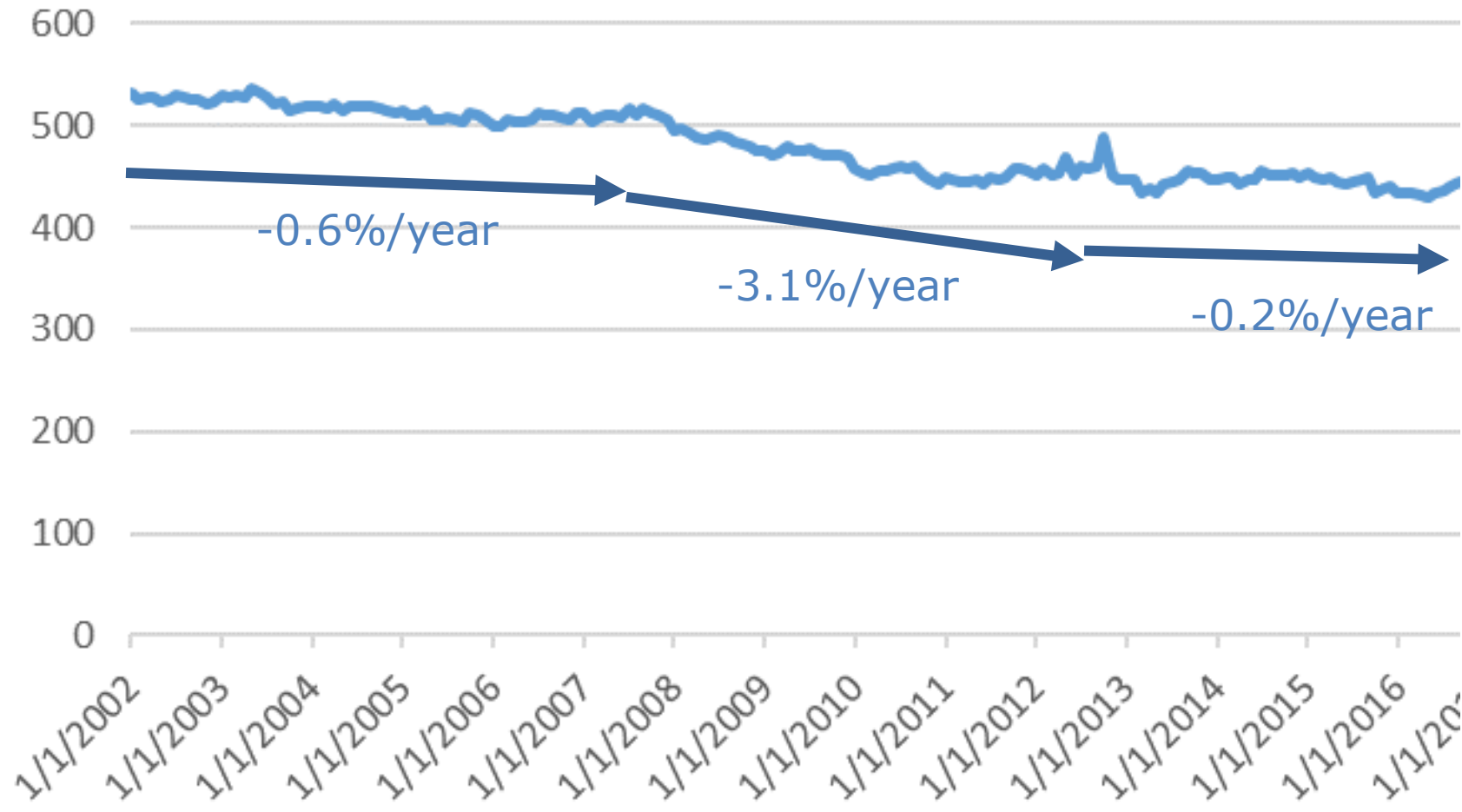
# Population Declines in Many Rural Communities



Source: NC OSBM Population Estimates, Vintage 2018

Source: North Carolina Office of State Budget & Management, "North Carolina's Changing Population Dynamic", <https://files.nc.gov/ncosbm/documents/files/Population-Dyanmic-2020Report.pdf>

# Declining Number of Active Water Accounts Over Decades



Water system in North Carolina

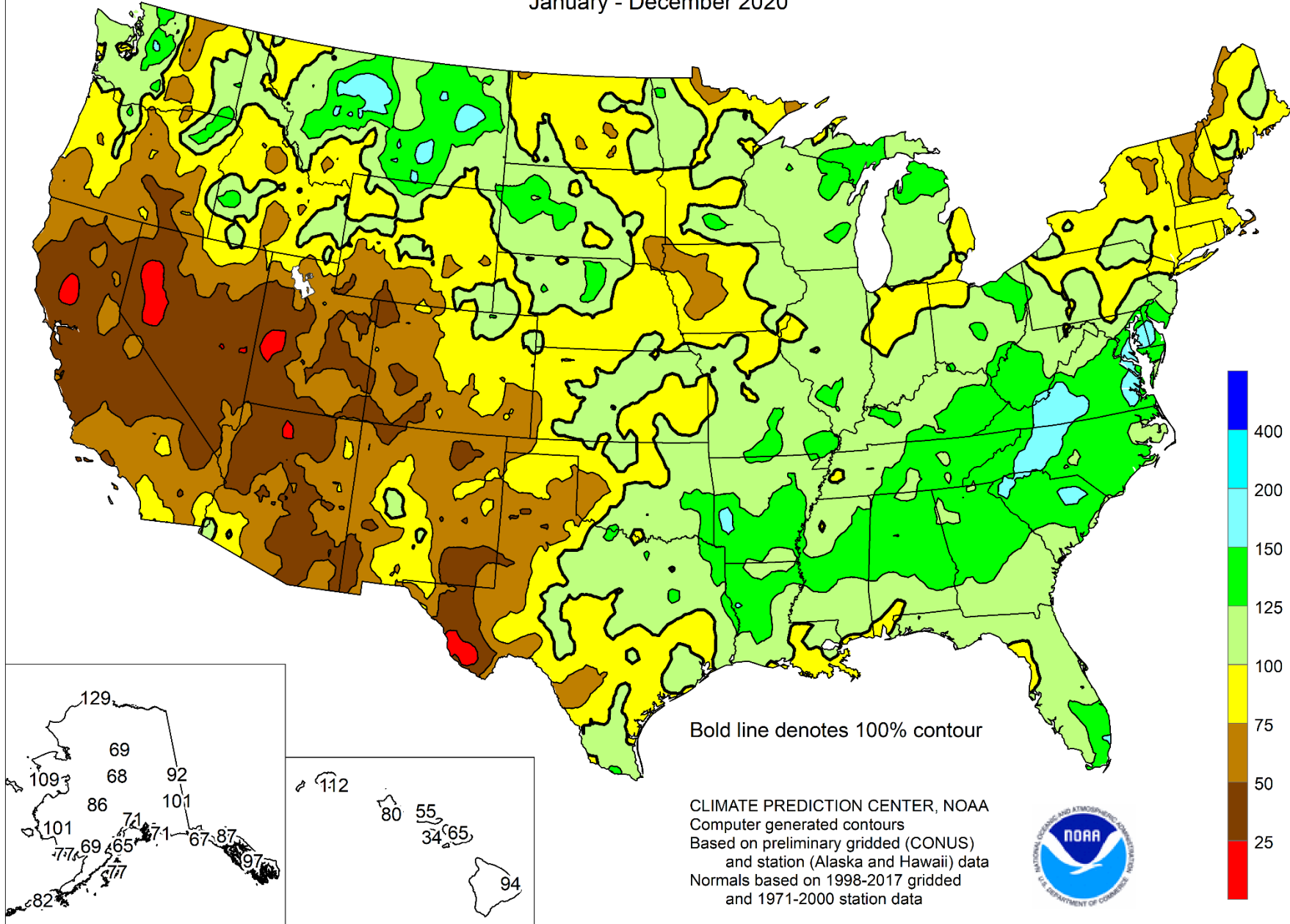
# Hurricane and Flooding



Water system in North Carolina

## Percent of Normal Precipitation

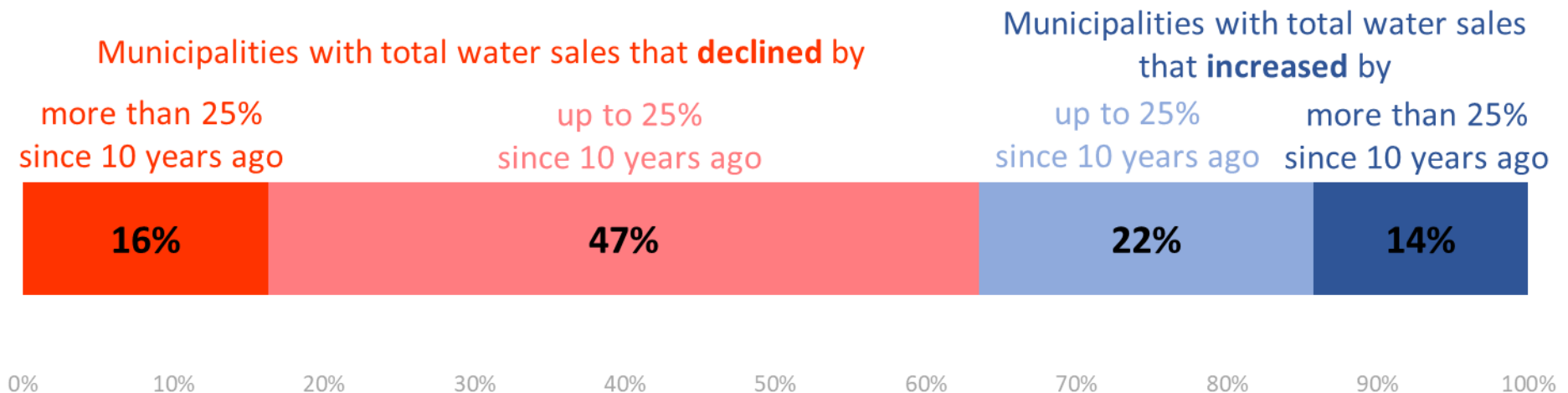
January - December 2020



# Changes in climate, drought and precipitation

# Many in North Carolina Are Experiencing Declining Water Sales

In FY2017, **63%** of municipalities in North Carolina **sold less water** than they did in FY2008 (ten years prior)  
n = 203 municipalities with water sales data



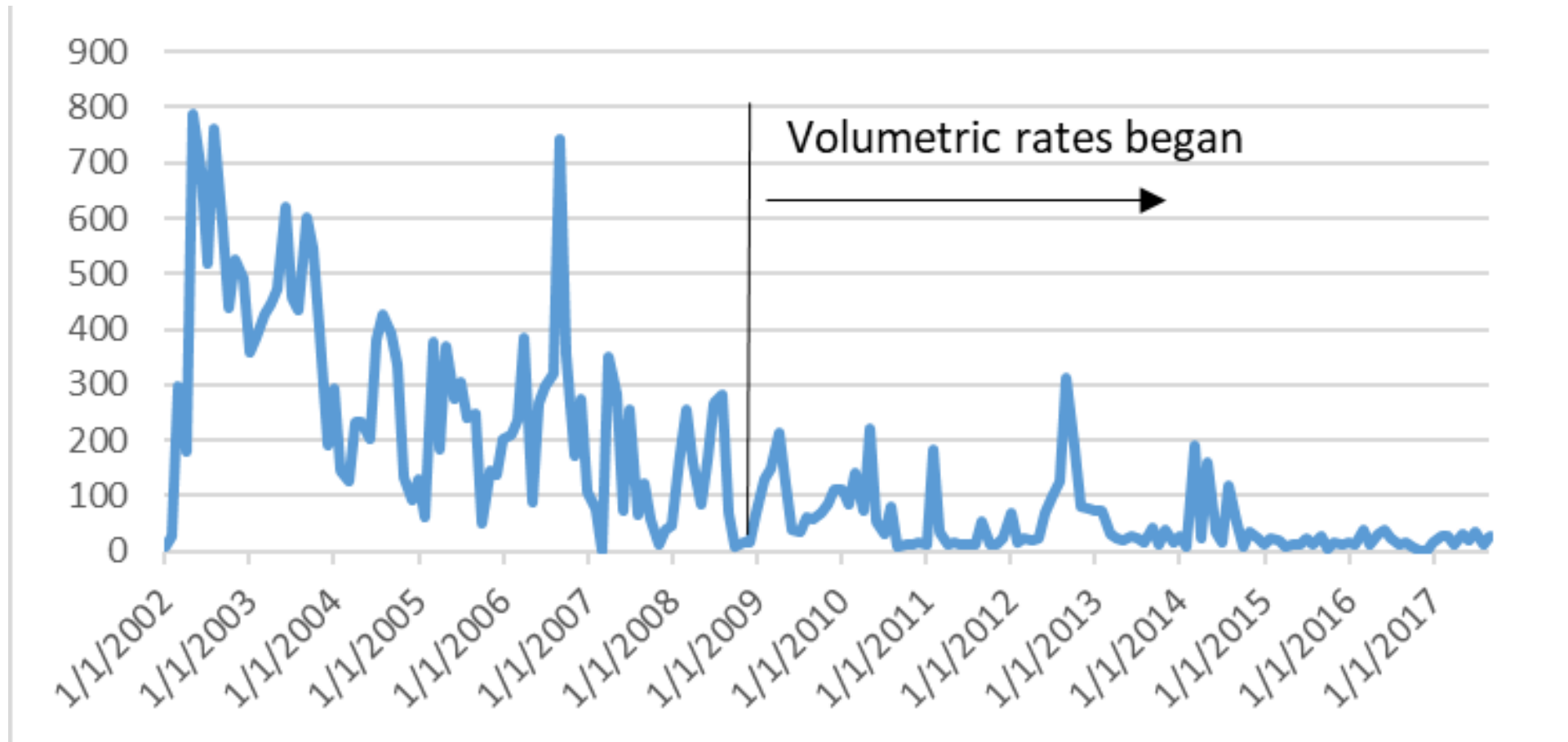
Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

Source: North Carolina Department of State Treasurer, Division of State and Local Government's Annual Financial Information Reports for FY2008 and FY2017 for municipalities. Municipalities with missing water sales data in either year were excluded from this analysis.

Proportionally the same for small water systems.

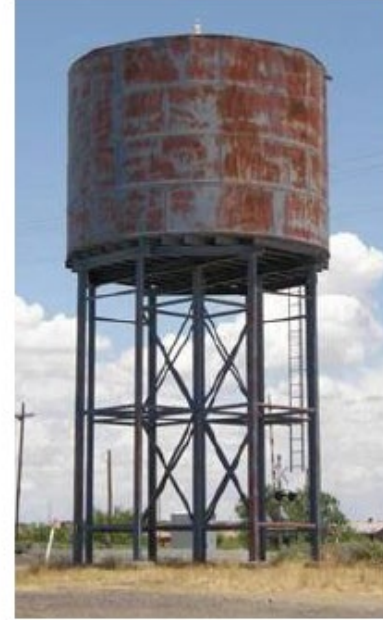
# Loss or Reduction of Industry/Large Users

Volumetric sales to the single largest customer (small industrial plant)



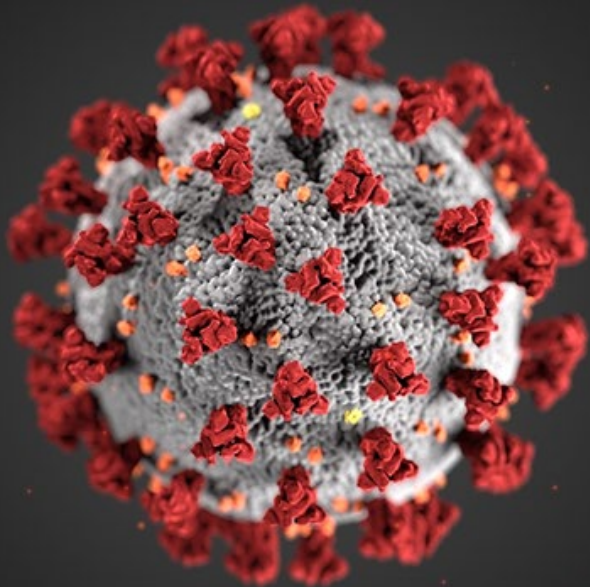


# Rising Capital Costs





# And then there was 2020



NC Governor Roy Cooper

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## Governor Cooper Extends Moratorium on Utility Cut Offs and Implements Evictions Moratorium

Raleigh

May 30, 2020

Governor Roy Cooper signed Executive Order No. 142 to extend the prohibition of utility shut-offs and implement a moratorium on evictions. The Order goes into effect today with the Governor's signature.

### Contact Information

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919-814-2100

# Financial Strategies for Resiliency



# Financial Strategies for Resiliency

- Careful reduction and management of operating costs
- Planning for asset management and capital costs
- Build up reserves
- Set and track financial performance targets
- Plan and budget for
- Revenue enhancement
- Rate adjustment approaches
- Alternative rate designs



# Careful Reduction and Management of Operating Costs



Reduce non-revenue water



Energy management



Asset management to reduce maintenance



Partner with other utilities



Monitor expenditures over time



# Planning for asset management and capital costs

- Re-examine the need for expansions
- Partner with other utilities on regional capital projects to reduce costs and achieve higher priority points
- Create an asset management plan and a capital improvement plan
- Explore and test funding scenarios (debt vs. cash)
- Learn about different subsidized funding programs
- Look into debt refinancing if applicable
- Find out how to achieve a (higher) credit rating

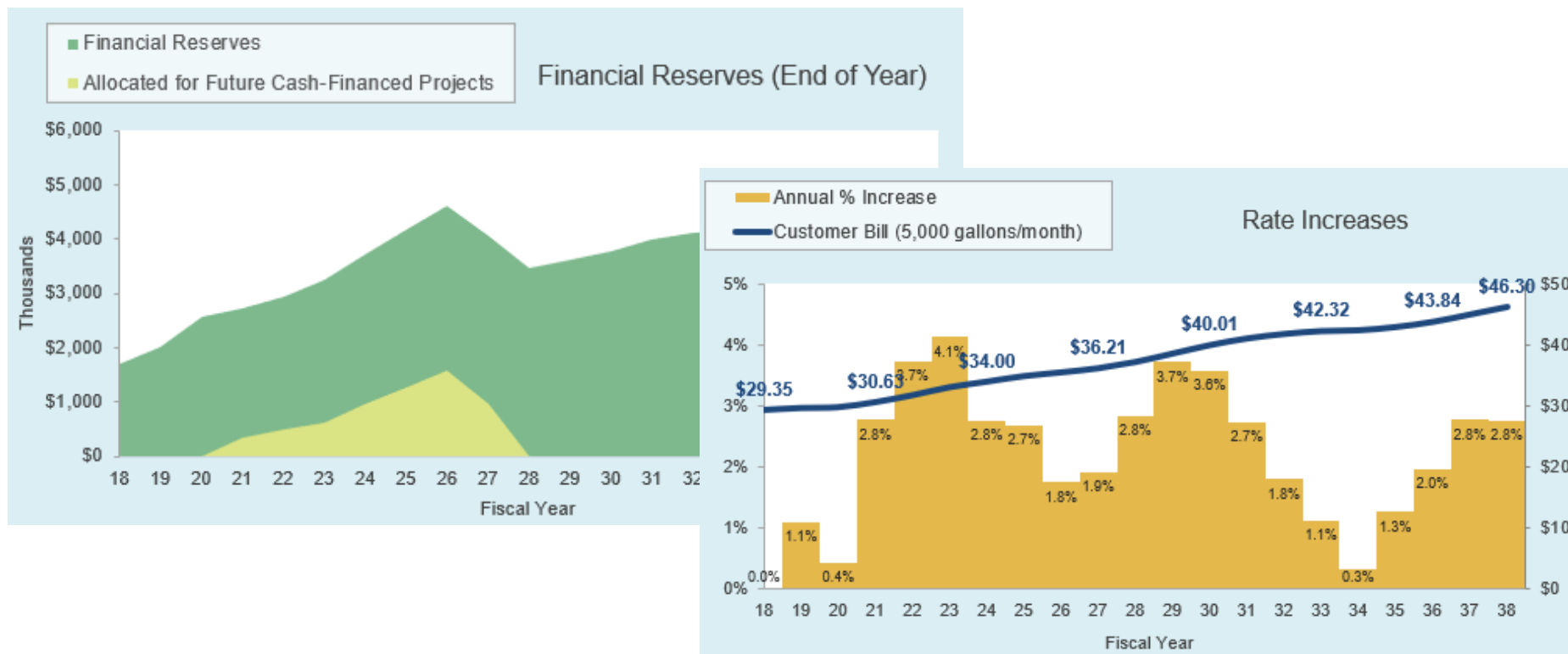


# Plan to Pay: Scenarios to Fund your C.I.P.

<http://efc.sog.unc.edu> or <http://efcnetwork.org>

Find the most up-to-date version in Resources / Tools

List your capital projects and compare different scenarios for funding them by automatically estimating the impact on your rates.



Excel®-based

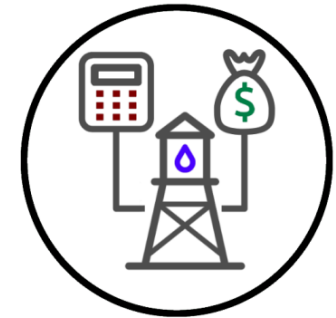
Free to download

Free to use

# What is the Value of an SRF Loan? Subsidized Loan Calculator

<https://efc.sog.unc.edu/resource/what-value-srf-loan-subsidized-loan-calculator>

Enter subsidized loan terms and this dashboard calculates the “grant equivalent” value of the loan compared to financing through a bond or commercial loan



## Visualizing the Value (of a State Revolving Fund Loan)

JUNE 3, 2020 / AUSTIN THOMPSON / 2 COMMENTS

Print PDF

Imagine a town called “Smallville.” Smallville, as you might guess, is small. The town’s water utility needs a new water tank, and they need it now. Like most systems across the US, Smallville’s system is aging and has significant

Read the blog post

<https://efc.web.unc.edu/2020/06/03/visualizing-the-value-of-a-state-revolving-fund-loan/>

Tableau®-based

Online calculator

Free to use



# Build Up Reserves

Reserves are funds built up over time that you can use for various purposes.

Build reserves early: *before* signs of problems.

If you are already suffering from loss of customers or water use, it might be too late, unless you can raise rates quickly.



# Many Types of Reserve Funds

- Operating Reserves
- Repair Fund
- Emergency Fund
- Rainy Day Fund (Revenue Shortfall Fund)
- Rate Stabilization Reserves
- Debt Service Reserves
- Capital Reserves
- Renewal and Extension Reserves
- Others?

# How Much Do You Need In Your Reserves?

- Look into setting a minimum target for a reserve fund to cover a reasonable decline in revenues so that you can continue to operate the water system and buy yourself enough time to make additional adjustments to mitigate the loss.
- Consider, for instance, a reserve that would cover at least three or four months of all O&M expenses. More would be better. For long-term resilience, aim for more than a year.



# Examples of Targets for Reserves by Large Utilities (in 2014)

| Utility                                   | Reserve Fund Targets   |
|---|--|
| City of Minneapolis, MN                   | <b>15%</b> of revenue budget for the next year   |
| Orange Water and Sewer Authority, NC      | The greater of <b>33% of O&amp;M budget</b> or 20% of the total estimated cost of the succeeding 3 years of the CIP budget |
| Baltimore Dept. of Public Works, MD       | Minimum of <b>90 days</b> cash on hand   |
| Charlotte Water, NC                       | <b>100%</b> of operating expenses for the current budget   |
| Water District No.1 of Johnson County, KS | The Board will be notified when the rate stabilization reserve reaches a <b>minimum level of \$2 million</b>               |

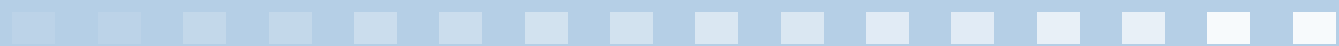
Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.

# Example of Target for Reserves by a Small Water System

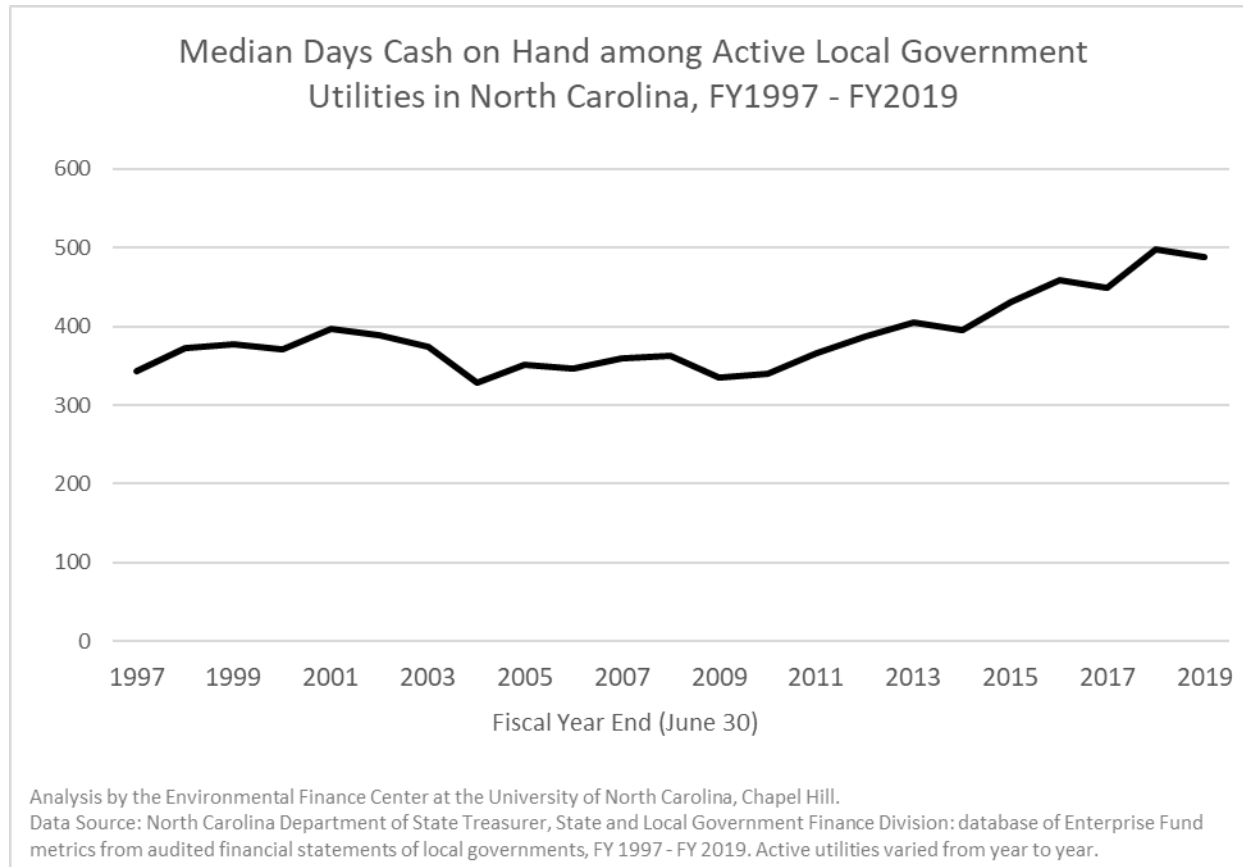
Town of Shallotte, NC (2,300 accounts):

“Our Board of Aldermen have always used a 90% rule: keeping **at least 90% of current budget** on hand in case of emergencies.

Being a coastal community, we realize that a hurricane could do significant damage.”



# W/WW Reserves in North Carolina Leading Up to 2020



## Water System Reserves During the COVID-19 Pandemic

APRIL 16, 2020 / CHRISTIAN LUTZ / 0 COMMENTS

[Print](#) [PDF](#)

Local governments have an increased public health responsibility to ensure that people have access to clean water during the COVID-19 pandemic. During this time, many utilities are refraining from shutting off customers' water, despite unpaid bills. In more than a dozen states, mandates have even been put in place to

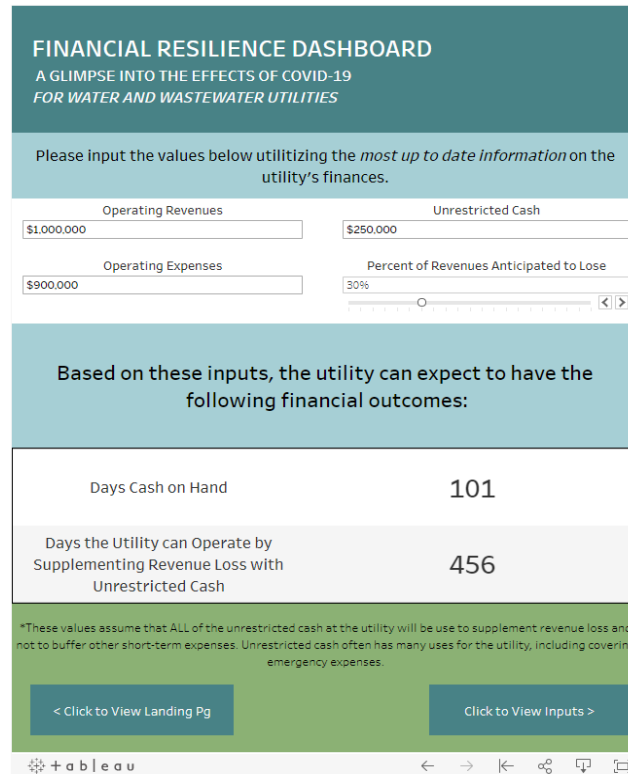
64% of local government utilities in NC had >365 days cash on hand at the end of FY2019 (less than 50% prior to FY2011).

Read the blog post <https://efc.web.unc.edu/2020/04/16/water-system-reserves-during-the-covid-19-pandemic/>

# Financial Resilience Dashboard

<https://efc.sog.unc.edu/resource/financial-resilience-dashboard-glimpse-effects-covid-19-water-and-wastewater-utilities>

How long will your unrestricted cash and reserves offset different levels of revenue losses and still cover expenditures on O&M?



**FINANCIAL RESILIENCE DASHBOARD**  
A GLIMPSE INTO THE EFFECTS OF COVID-19  
FOR WATER AND WASTEWATER UTILITIES

Please input the values below utilizing the *most up to date information* on the utility's finances.

|                                   |  |
|-----------------------------------|--|
| Operating Revenues<br>\$1,000,000 | Unrestricted Cash<br>\$250,000                 |
| Operating Expenses<br>\$900,000   | Percent of Revenues Anticipated to Lose<br>30% |

Based on these inputs, the utility can expect to have the following financial outcomes:

|   |     |
|---|-----|
| Days Cash on Hand   | 101 |
| Days the Utility can Operate by Supplementing Revenue Loss with Unrestricted Cash | 456 |

\*These values assume that ALL of the unrestricted cash at the utility will be used to supplement revenue loss and not to buffer other short-term expenses. Unrestricted cash often has many uses for the utility, including covering emergency expenses.

< Click to View Landing Pg      Click to View Inputs >

+ a b l e a u

[North Carolina-specific version](#) with pre-populated FY2019 data

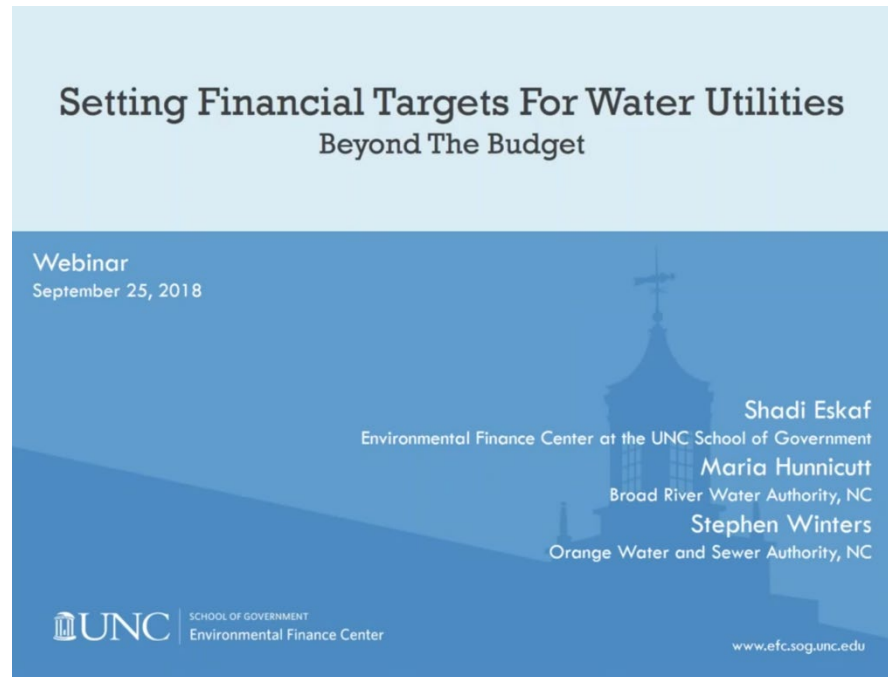
Tableau®-based

Online calculator

Free to use

# Set Up and Track Financial Performance Targets

Set up specific financial performance targets, measure and monitor performance indicators, and adjust financial decisions to maintain success.



More information and examples from NC utilities on a recorded webinar:

<https://efc.sog.unc.edu/event/setting-financial-targets-water-utilities-beyond-budget>



# Examples of Financial Performance Targets

- Minimum Reserves / Cash on Hand
- Working Capital Reserves
- Debt Service Coverage Ratio
- Debt Burden or Debt-Per-Customer
- Cash Financing of Capital Projects
- Rates Affordability
- Credit Rating



# Examples of Financial Performance Targets (in 2014)

| Financial Metric                | Policy Target  |
|---------------------------------|--|
| Debt Service Coverage Ratio     | <ul style="list-style-type: none"><li>• Parity coverage of 1.5x</li><li>• Total coverage of 1.2x</li></ul>   |
| Debt Load                       | <ul style="list-style-type: none"><li>• Debt service less than 40% of total revenue requirements</li></ul>   |
| Capital Funding                 | <ul style="list-style-type: none"><li>• Minimum of 25% of annual capital expenses funded through rate-funded capital (PAYGO)</li></ul>               |
| Days Cash on Hand               | <ul style="list-style-type: none"><li>• 180 days</li></ul>   |
| O&M Budget Escalation           | <ul style="list-style-type: none"><li>• Maximum annual O&amp;M budget escalation of 5%</li></ul>   |
| Operating Reserve Fund          | <ul style="list-style-type: none"><li>• Minimum fund balance of 90 days of annual O&amp;M expenses</li></ul>   |
| Capital Reserve Fund            | <ul style="list-style-type: none"><li>• Minimum fund balance of 25% of annual Capital expenses</li></ul>   |
| Rate/Revenue Stabilization Fund | <ul style="list-style-type: none"><li>• Minimum fund balance target of 5% of projected annual revenues</li></ul>                                     |
| Rate Revenue Composition        | <ul style="list-style-type: none"><li>• Minimum of 25% of annual revenue from fixed charges</li></ul>  |
| Rate Increases                  | <ul style="list-style-type: none"><li>• Minimum of automatic rate increases indexed to inflation</li></ul>   |
| Service Affordability           | <ul style="list-style-type: none"><li>• Maximum annual bill of an average customer of 2% of median household for each water and wastewater</li></ul> |

Targets should be customized for each utility based on objectives, conditions, and purpose. Do not copy-and-paste another utility's.

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Evidence of Success in North Carolina

When comparing NC utilities against others of similar size, similar number of FTEs, and similar presence/absence of a full-time utility manager, the EFC found statistical evidence that:

- Utilities that started using financial targets by 2013 →
  - Had higher operating ratios in FY2017
  - Were twice as likely to have higher operating revenues than operating expenses in FY2017



# Plan and Budget for Use Reductions

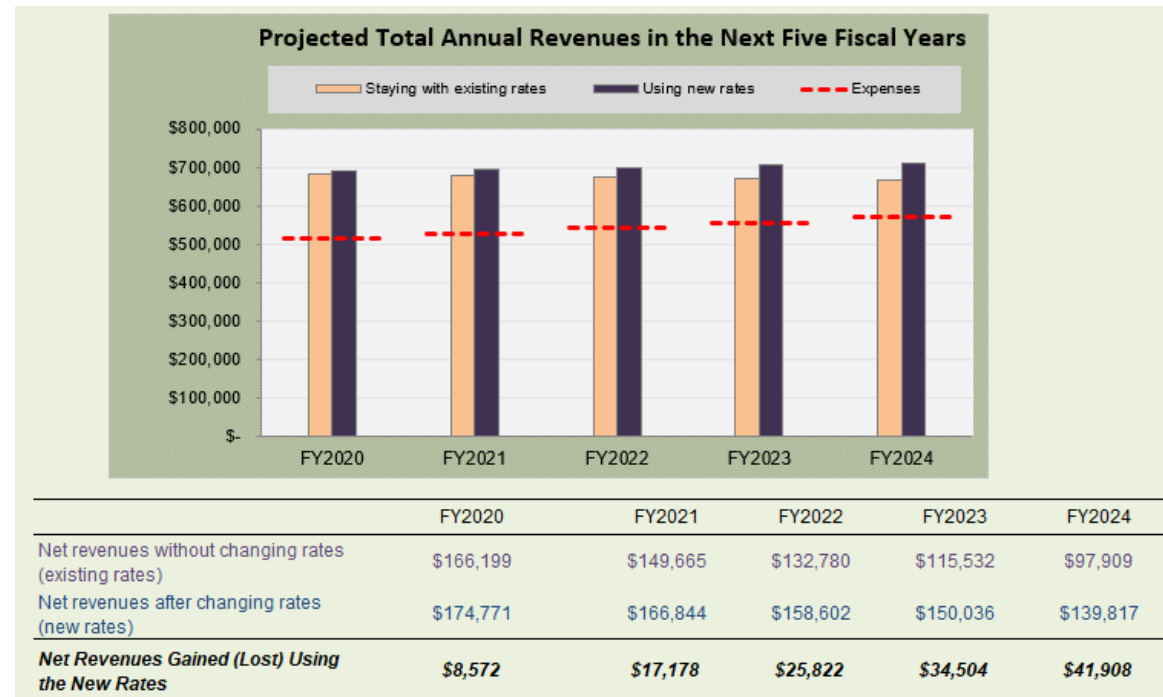
- Conservative forecasts
- Run scenarios, not a single forecast
- Look at your long-term trends to inform forecast
- Incorporate short-term and long-term reductions in demand
- Assess the likelihood and consequence of sudden, significant decline in use
- Establish a policy or protocol to move any “excess revenue” into a reserve fund

# Water & Wastewater Rates Analysis Model

<http://efc.sog.unc.edu> or <http://efcnetwork.org>

Find the most up-to-date version in Resources / Tools

Cash-flow model to compare different rates on your projected fund balance to determine sufficiency of covering costs.



Excel®-based

Free to download

Free to use

# AWE Sales Forecasting and Rate Model

<http://www.financingsustainablewater.org/>

The screenshot displays the website for Financing Sustainable Water, which is a project of the Alliance for Water Efficiency. The main navigation bar includes links to HOME, WATER EFFICIENCY, BUILDING RATES, IMPLEMENTATION, FISCAL SUSTAINABILITY, TOOLS, and RESOURCE SEARCH. The current page is titled "AWE Sales Forecasting and Rate Model".

**FINANCING SUSTAINABLE WATER**  
Rates. Revenue. Resources.

A project of the **Alliance for Water Efficiency**

HOME WATER EFFICIENCY BUILDING RATES IMPLEMENTATION FISCAL SUSTAINABILITY **TOOLS** RESOURCE SEARCH

Home • Tools • [AWE Sales Forecasting and Rate Model](#)

**Building Better Water Rates for an Uncertain World**

**AWE Sales Forecasting and Rate Model**

Rate Model Video Tutorials

Request Tools

**Rate Model User Guide**

**Appendices: Costing Methods, Demand Forecasting and Revenue Modeling**

**Communications Tools**

**RATES HANDBOOK**  
Building Better

## AWE Sales Forecasting and Rate Model

The AWE Sales Forecasting and Rate Model is a new analytical tool that can explicitly model the effects of rate structures. Typical water rate models assume that future sales are known with certainty, and do not respond to price, weather, the economy, or supply shortages — that is to say, not the world we live in. The AWE Sales Forecasting and Rate Model addresses this deficiency and enables analysis of the following:

- Customer Consumption Variability – weather, drought/shortage, or external shock
- Demand Response – Predicting future block sales (volume and revenue) with empirical price elasticities
- Drought Pricing – Contingency planning for revenue neutrality
- Probability Management – Risk theoretic simulation of revenue risks
- Fiscal Sustainability – Sales forecasting over a 5 Year Time Horizon

The Rate Design Module can answer these questions:

- What effect would increasing the top tier rate by 15% have on water demand?
- Will shifting to seasonal rates cause water use to increase or decrease?
- What block rate design could allow us to preserve our current level of revenue while reducing demand?
- How should we adjust rates to support our water demand management objectives during water shortages?
- What proportion of customer bills will

**Figure 1: Impact of Rate Design Changes on Water Demand and Revenue**

This figure consists of three tables and a chart illustrating the impact of various rate design changes on water demand and revenue.

| Scenario           | Top Tier Rate (\$/cu ft) | Block Rate (\$/cu ft) | Seasonal Rate (\$/cu ft) | Water Demand (cu ft) | Revenue (\$) |
|--------------------|--------------------------|-----------------------|--------------------------|----------------------|--------------|
| Current            | 1.00                     | 0.50                  | 0.25                     | 100,000              | 100,000      |
| Top Tier +15%      | 1.15                     | 0.50                  | 0.25                     | 90,000               | 100,000      |
| Block Rate +15%    | 1.00                     | 0.575                 | 0.25                     | 90,000               | 100,000      |
| Seasonal Rate +15% | 1.00                     | 0.50                  | 0.2875                   | 90,000               | 100,000      |

| Scenario           | Top Tier Rate (\$/cu ft) | Block Rate (\$/cu ft) | Seasonal Rate (\$/cu ft) | Water Demand (cu ft) | Revenue (\$) |
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| Seasonal Rate +15% | 1.00                     | 0.50                  | 0.2875                   | 90,000               | 100,000      |

Single-Family Customer Class RSE Impact Histogram

The histogram shows the distribution of RSE (Relative Sales Error) for the Single-Family Customer Class. The x-axis represents the RSE value, ranging from -10 to 10. The y-axis represents the frequency of occurrences, ranging from 0 to 100. The distribution is centered around 0, indicating that the model's predictions are generally accurate.

# Structural and Managerial Strategies for Resiliency

# Structural and Managerial Strategies for Resiliency

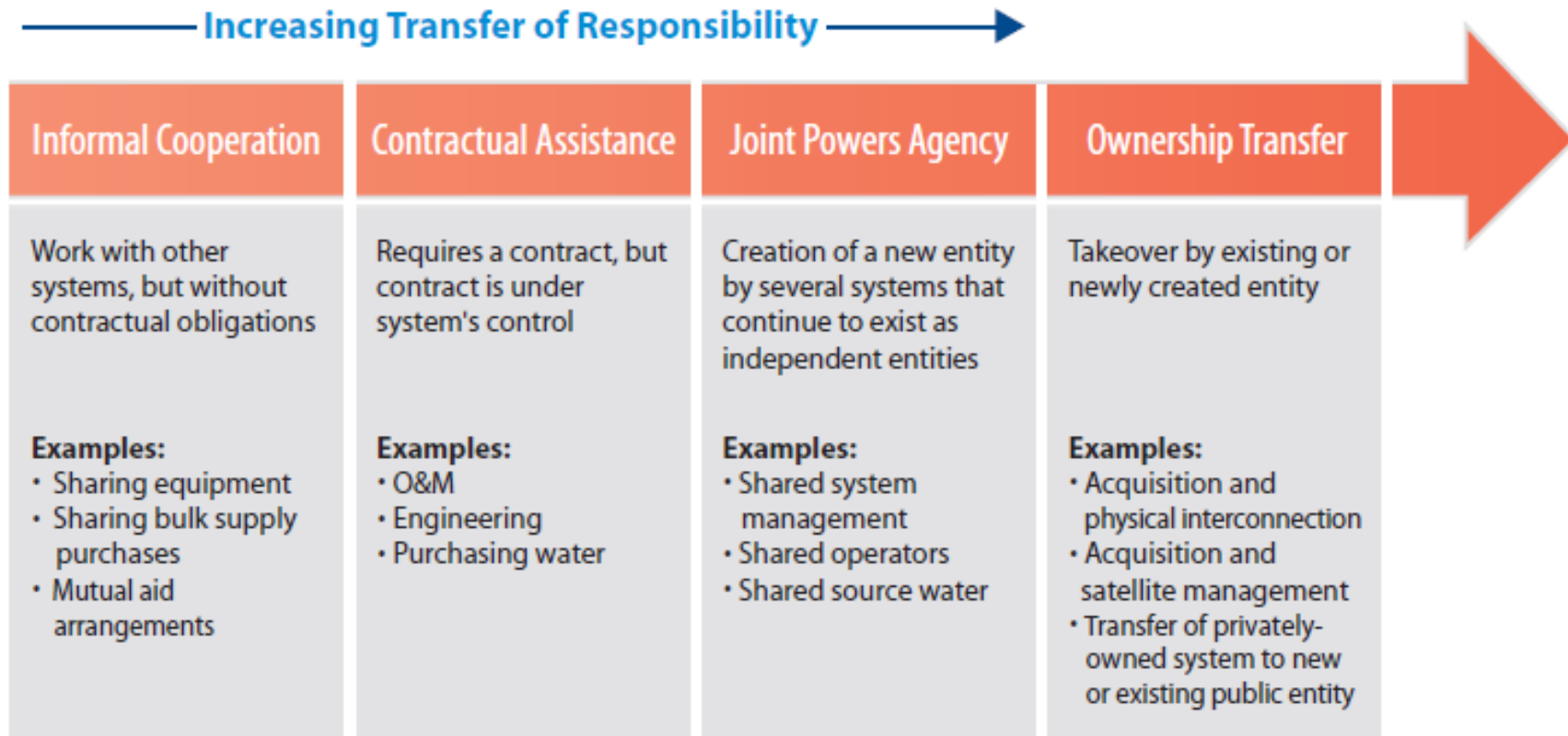
- Assist with economic development efforts
- Partnerships with other water systems
- Communication



# Partnerships with Other Utilities

- Share services
- Sell excess water to other water systems
- Buy water from another water system and reduce or eliminate the need for treatment
- Consolidate with other water systems to create a regional utility
- Transfer ownership of your water system

# Spectrum of Partnership with Other Utilities

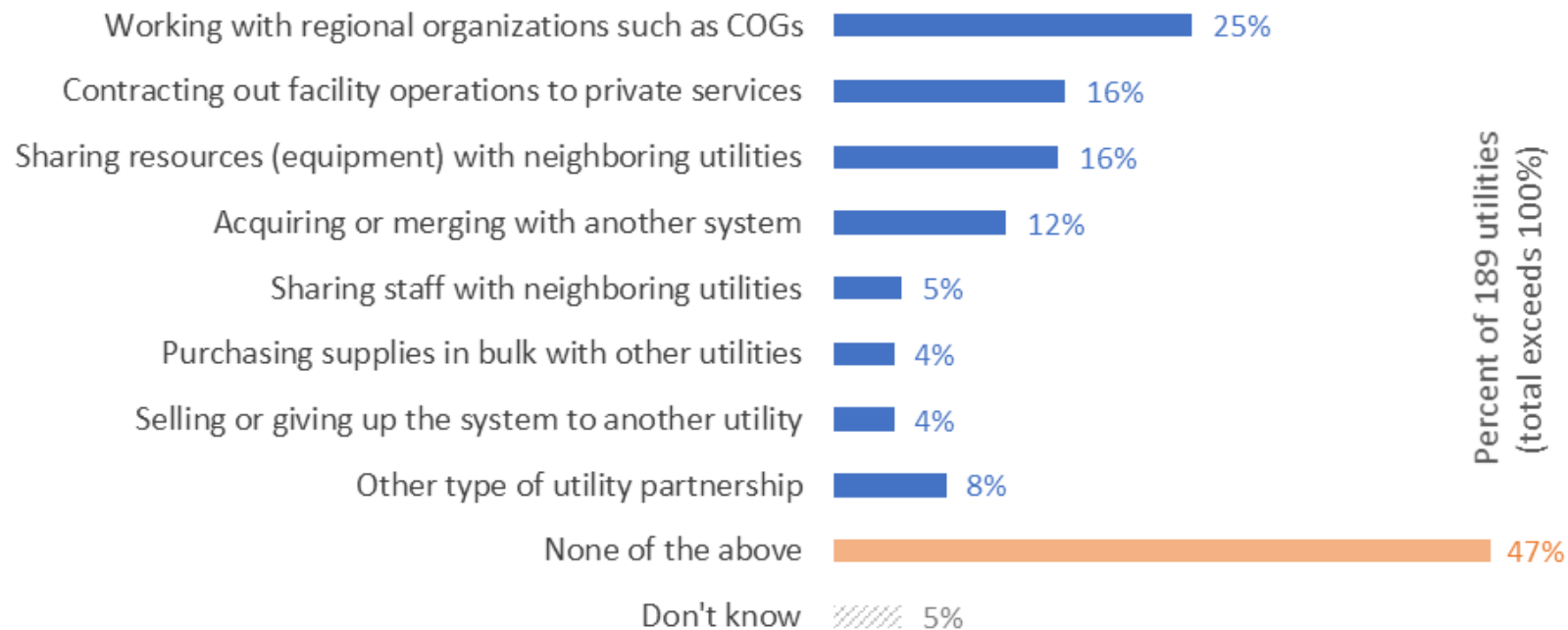


Any kind of collaboration can be helpful

# Partnerships in NC

**Partnership activities that North Carolina utilities are currently engaged in or are considering.** Excludes interconnections and wholesale purchase/sale agreements for water or wastewater treatment and delivery between utilities.

n = 189



Source: 2017 North Carolina Water and Wastewater Utility Management Survey conducted by the Environmental Finance Center at the UNC School of Government and the North Carolina League of Municipalities.

# A lot to be considered in crafting an interlocal agreement



<https://vimeo.com/digitalpmedia/review/372993470/18aeaef9a2>

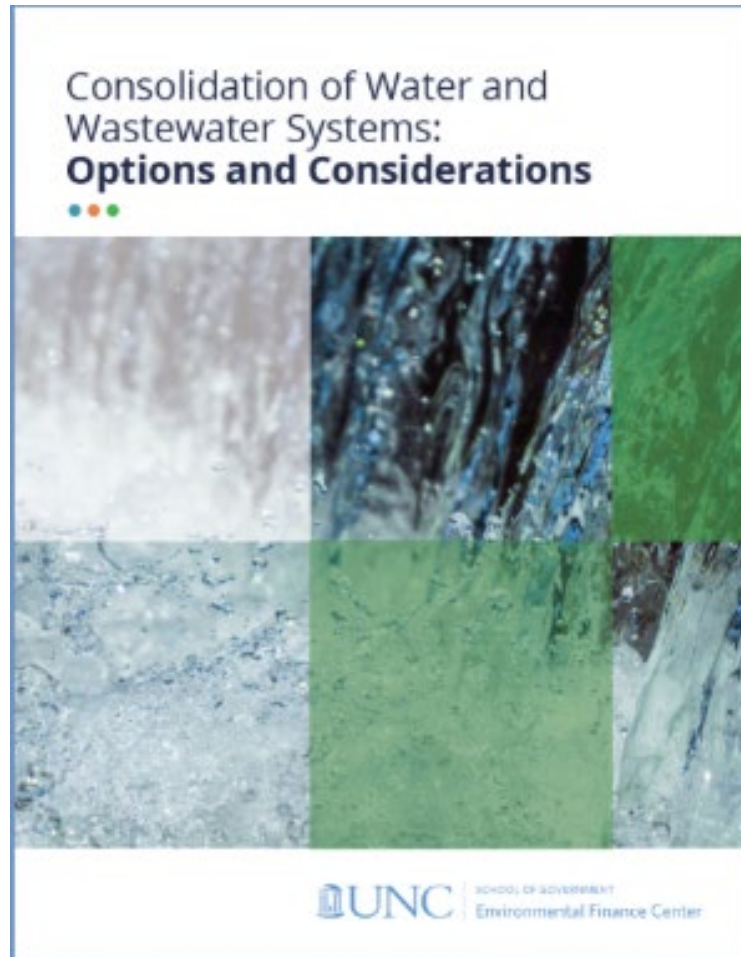


<https://efc.sog.unc.edu/project/utility-regionalization-and-consolidation>

# Interlocal agreement considerations described in the guide

1. Defining Current and Future Service Areas
2. Annexation and Growth
3. Key Usage Thresholds
4. Meter Maintenance
5. Water Quality Concerns
6. Water Pressure
7. Adequate Payment for Use of Capital
8. Calculation and Modification of Commodity Charges
9. Reselling Water or Capacity
10. Handling Supply Interruptions and Shortages and Emergencies
11. Transferability of Conservation Status/Measures/Emergency Reduction
12. Non-Revenue Water

# Consolidation Considerations



<https://efc.sog.unc.edu/project/utility-regionalization-and-consolidation>

# Forms of Consolidation

- Direct Acquisition - one higher-capacity utility absorbing another in its entirety.
- Joint Merger - two or more utilities often, but not necessarily, of similar capacity consolidating to become a new entity that is jointly owned by the participating utilities.
- Balanced Merger - hybrid of the other two types and involves two or more utilities consolidating and creating a governance structure that is designed to allow for participation by the previously existing utilities in future decision-making.
- Consolidation of Governance/Operations/Management

# Existing NC Models

- Municipality operating as a regional utility – Raleigh
- Water and sewer authority – Cape Fear PUA
- Single county government – Harnett County (125k)
- Joint Management Agency – W-S/Forsyth County
- Metropolitan Water District and Metropolitan Sewerage District – special purpose unit of gov/fewer than 5 in NC
- Sanitary District – public health focused
- Private Nonprofit Associations/Water Cooperatives – Davidson Water (50k connections)
- Investor-Owned Utilities – Aqua NC (regulated by NCUC)



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