ARCADIS Design & Consultancy for natural and built assets

City of Ann Arbor, Michigan

Water Cost of Service Review & Rate Structure Alternative Analysis

Presented by: Robert Ryall, PE
and Matt Carpenter, PE
March 11, 2019

Robert Ryall Qualifications

- 20-Years Water Industry Experience with over 200 Rate and Financial Studies Completed
- Arcadis National Financial Services Practice Lead
- Active Member of AWWA Rate and Charges and Finance, Accounting, and Management Controls Committees
- Contributing Author of M1 Manual; Principles of Water Rates, Fees, and Charges in addition, M29 Manual; Water Utility Capital Financing

Matt Carpenter's Qualifications

- 20-Years Water Industry Management Experience including serving as the former Deputy Utilities Director in Dayton, Ohio (midwestern water, wastewater and stormwater utility serving 400,000 people).
- Numerous midwestern Rate and Financial studies
- Arcadis Michigan and Ohio Regional Vice President
- Expertise includes
  - Financial Services
  - Water Treatment Facilities
  - Utility Management, Asset Management, Capital Planning

Utility Operating Structures

Enterprise Fund

- Utility fully funded with rate revenues
- Cost are recovered based on proportional use of services received
- All customers of the utility pay for services received
- Most common structure

General Government

- Utility funded with tax proceeds
- Rates are based on income and/or property values
- Some customers of the utility may not pay for services (no earned income or do not own personal property)
- Extremely uncommon structure

Privatized Utility

- Utility owned by private corporation
- Utility earns a profit at the expense of rate payers
- Regulated by Public Service Commission and less accountable to local citizenry
- Somewhat common, particularly in certain geographical areas

AWWA M1 Manual; Principals of Water Rates, Fees, and Charges, Seventh Edition, page 4, summarized

Cost Allocation Methodologies

Methodology	Considerations
Utility Basis	• Common rate methodology for electric and gas utilities • Most commonly used for water utilities when setting private utility rates or establishing wholesale rates • Considers Operation & Maintenance expenses, Depreciation, and Return on Rate Base
Commodity Demand & Base Extra Capacity	• Commodity Demand and Base Extra Capacity methods are more similar than different • Cost allocation methodology identified by the American Water Works Association; M1 Manual • Generally recognized and accepted by government-owned utilities • Costs are distributed to customer classes based on usage; average day, maximum day, and maximum hour • Considers the cash flow needs of the utility; Operation & Maintenance expenses, debt service, and direct capital investment

Objectives of Cost-Based Rate Making

Rates should provide **Full Cost Recovery;** rates that recover the full cost of operating the system.

Rates should be **cost based and equitable;** fair apportionment of cost from different classes of rate payer.

Rates should be **easy to understand and administer.**

Rates should be **legal and defendable.**

Rates should be **stable and predictable in terms** of revenue and customer perception.

AWWA M1 Manual; Principals of Water Rates, Fees, and Charges, Seventh Edition, page 4, summarized

Rate Setting Process

Revenue Requirements

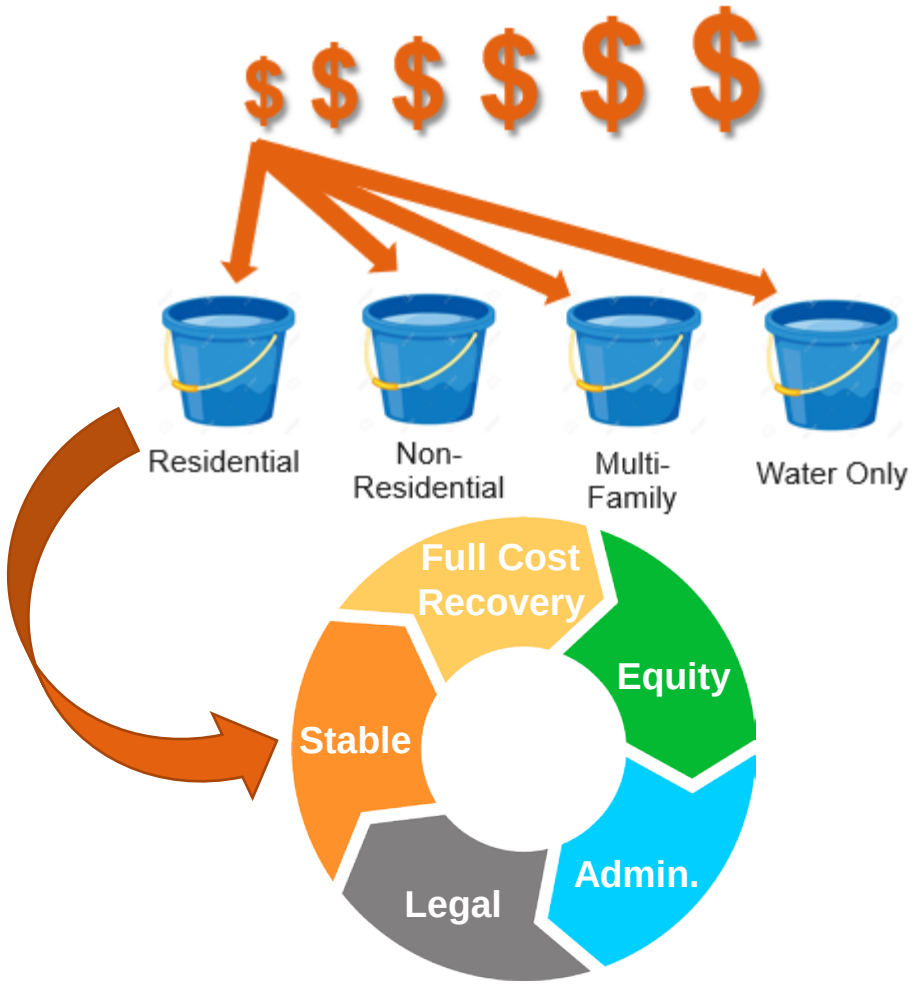
Compares the revenue of the utility to its expenses (operating, debt, capital) to determine the overall level of revenue adjustment needed.

Cost of Service

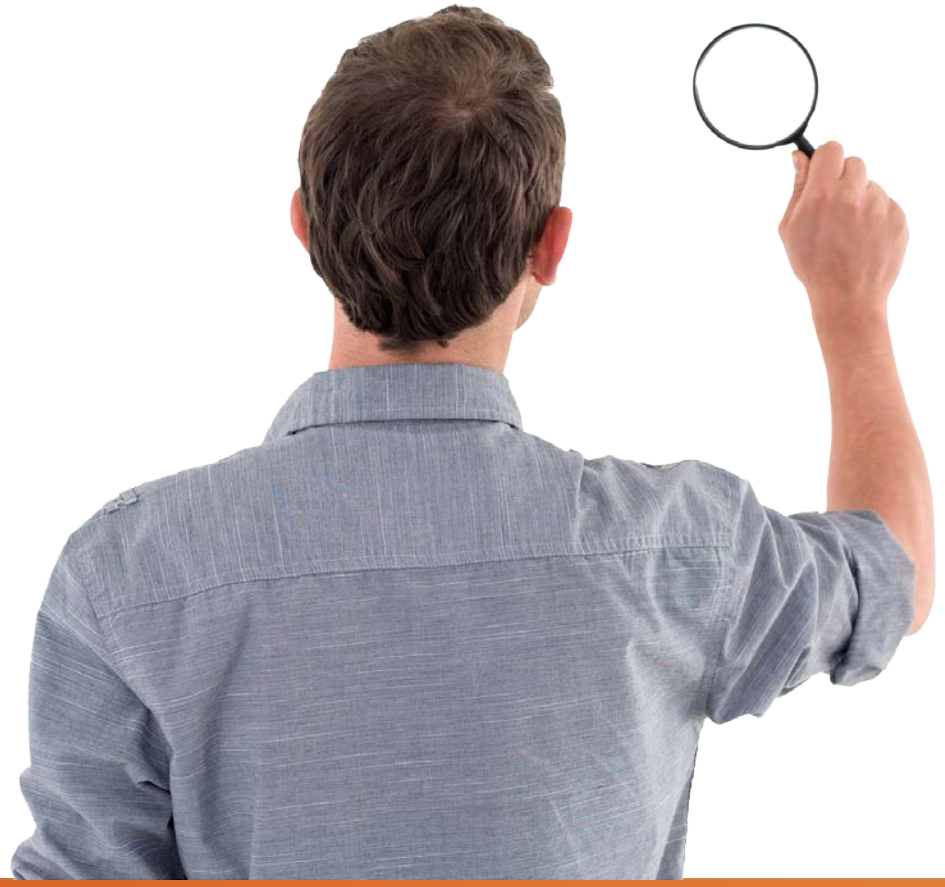
Allocates the revenue requirements (costs) to the various customer classes in a fair and equitable manner.

Rate Design

Develops rates for each customer class to meet the revenue requirements of the utility, along with any other rate goals and objectives (i.e. conservation).



Peer Review Scope



1. Review Rate Study Results for Compliance with Industry Best Practices
2. Identify Alternative Rate Structure Options
   (Alternative Options calculated by Stantec using the existing model)
3. Presentation to City Council

Review Rate Study Results - Revenue Sufficiency

Sewer	Water
Revenue Sufficiency ✓	Revenue Sufficiency ✓

For Water and Sewer Revenue Sufficiency, consideration of the following has been met:

- 10-year Forecast Period
- Minimum Reserve Targets
- Debt Service Coverage Targets
- Capital Funding Plan
- Recommended Annual Rate Revenue Adjustments

Water and Sewer Cost Allocation

Sewer	Water
Revenue Sufficiency ✓	Revenue Sufficiency ✓
Cost of Service ✓	Cost of Service ✓

Guidelines based upon the following industry standards:

- American Water Works Association (AWWA)
- Base-Extra Capacity Method (AWWA Manual M1)
- Water Environment Federation (WEF)

Process

- Water cost allocations based on average day, max day, and max hourly usage, using newly available Automated Metering Infrastructure (AMI) data
- Allocation of costs to customer classes
  - Residential
  - Non-Residential
  - Multi-Family – Newly added Customer Class with this rate study
  - Water Only

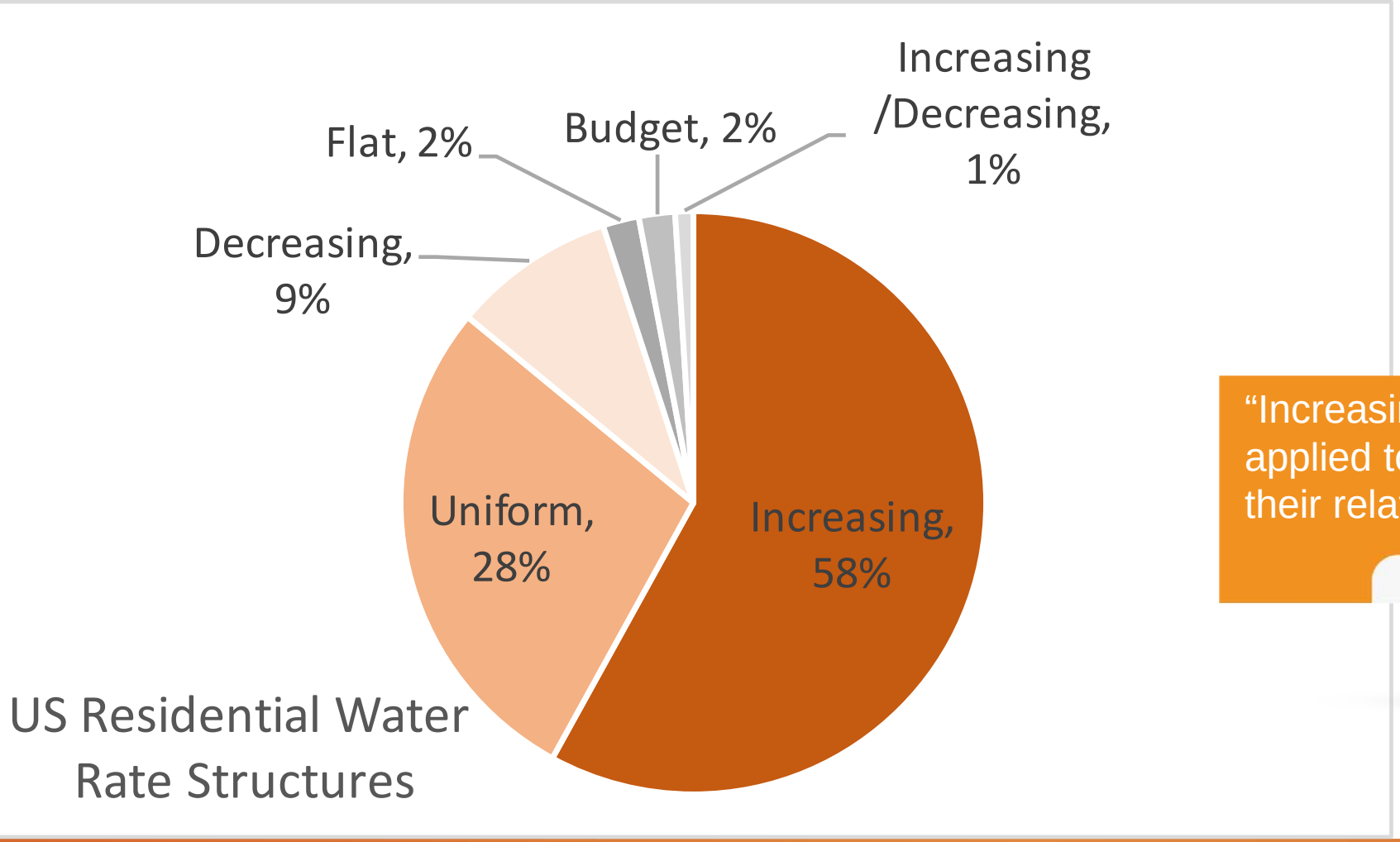
Water Rate Calculation

Sewer	Water
Revenue Sufficiency ✓	Revenue Sufficiency ✓
Cost of Service ✓	Cost of Service ✓
Rate Calculation ✓	Rate Calculation ?

Changes recommended to Water Rate Structure

- No recommended changes to Water Fixed Rates
- No recommended changes to Water Only charge
- Concur with addition of Multi-Family class
- Residential 4th Tier may warrant additional consideration

Benchmarking Information – Residential Structure

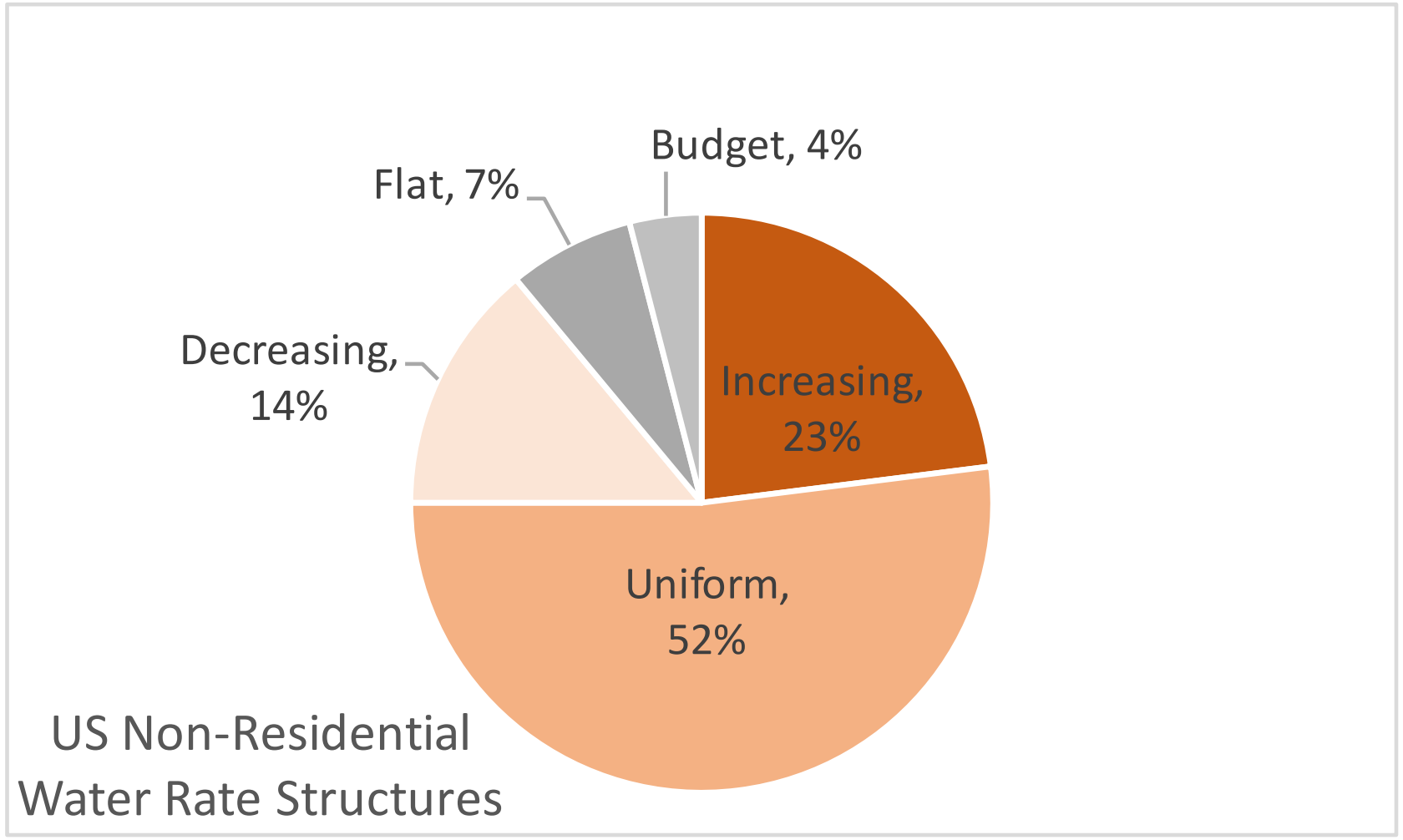


"Increasing block rates are most commonly applied to residential customers because of their relatively homogeneous demand pattern"

Source: AMWA 2018 INSIGHT survey results

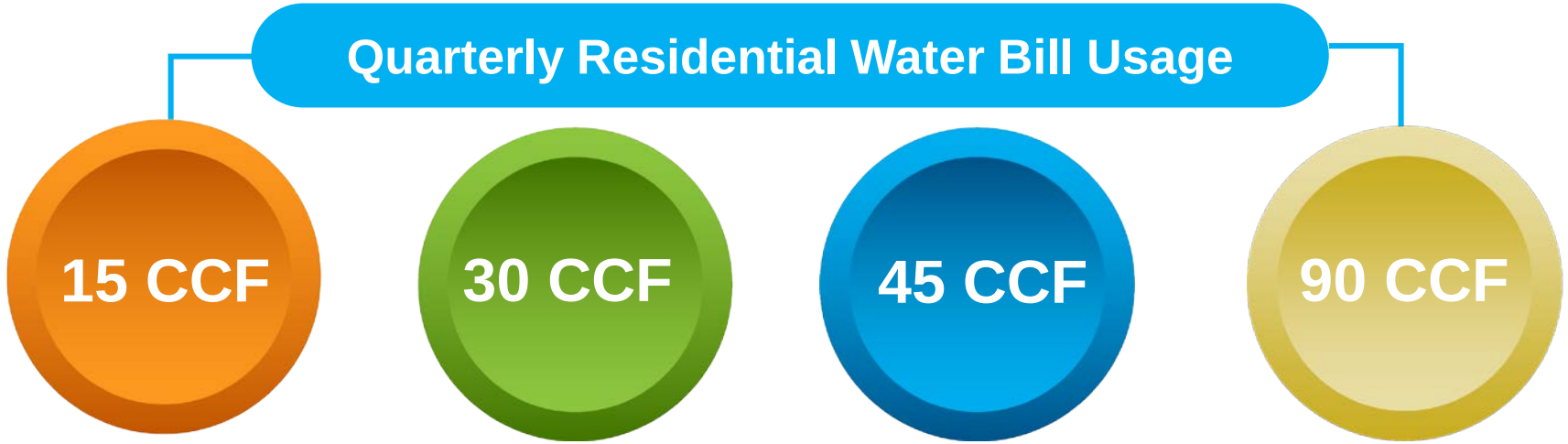
AWWA M1 Manual; Principles of Water Rates, Fees, and Charges, Seventh Edition, page 126

Benchmarking Information – Non-Residential Structure



Source: AMWA 2018 INSIGHT survey results

Benchmarking Information – National Residential Rates



	15 CCF	30 CCF	45 CCF	90 CCF
National Average[1]	$71.91	$114.90	$163.29	$323.67
National 75th Percentile[1]	$86.49	$142.74	$205.38	$399.69
City of Ann Arbor[2]	$48.42	$127.02	$276.54	$846.78
Cumulative Percent of Residential Bills	60%	93%	98%	>99%

1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

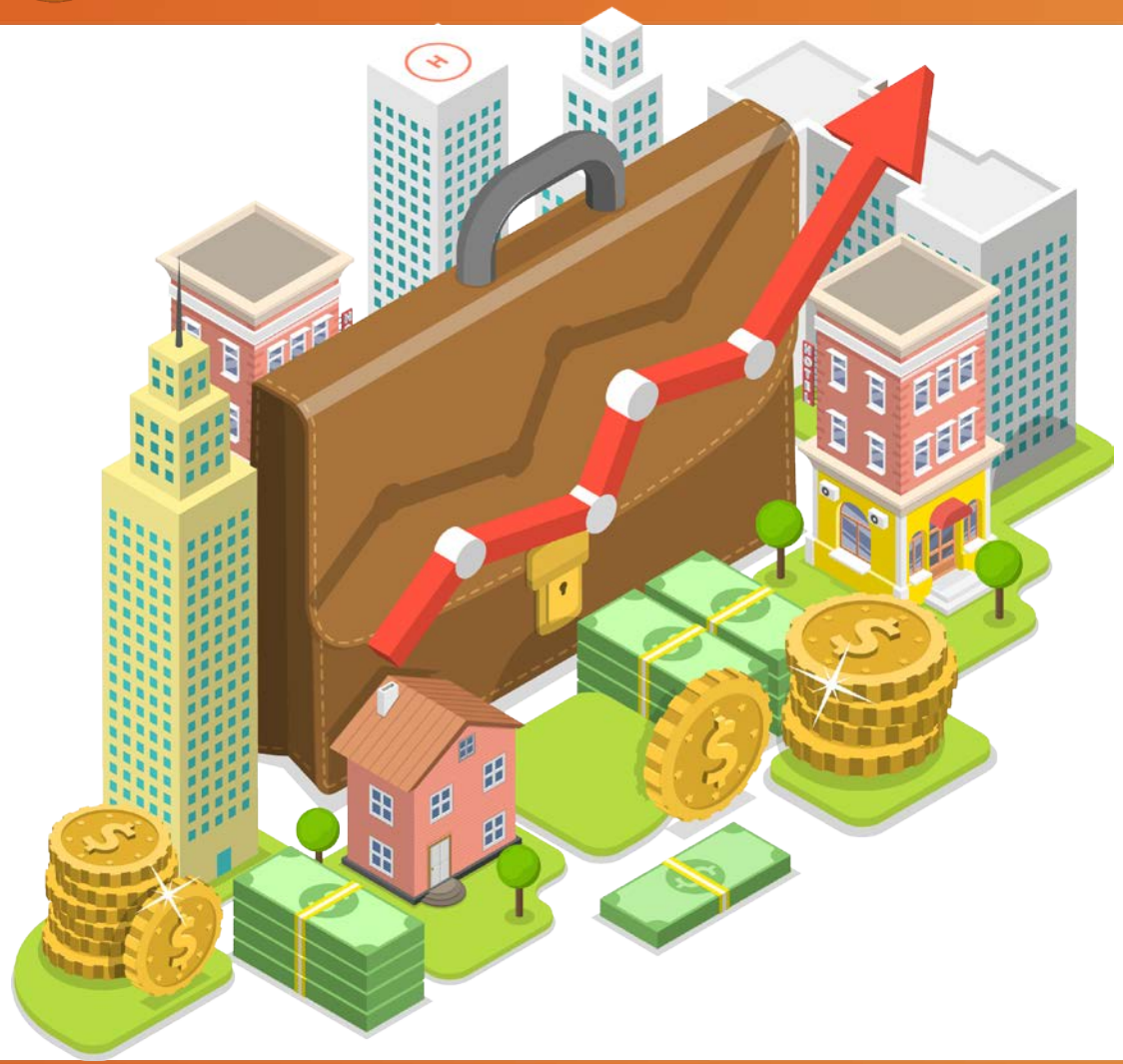
Increasing Block Rate Structure

" There is no single method of setting the size or unit price of the usage blocks under the Increasing Block Rate approach[1]"

" Increasing Block Rates require applying judgement and utility policy regarding the number of blocks, the point at which one block ends and the next begins, and the relative price levels of the blocks[2]"

1 – AWWA M1 Manual; Principals of Water Rates, Fees, and Charges, Seventh Edition, page 126
2 – AWWA M1 Manual; Principals of Water Rates, Fees, and Charges, Seventh Edition, page 125

Water Rate Calculation Alternatives



Residential

- Option 1 – Two Tier Structure – based on Winter and Summer usage
- Option 2 – Based on a consolidation of outdoor usage (consolidating Tiers 3 and 4)
- Option 3 – Uniform Rate (same uniform rate for all usage)
- Option 4 – Resetting Tiers and Tier cost allocation

Non-Residential

- Option A – Seasonal Rate Alternative
- Option B – “Peaking” Alternative – based on updated previous commercial structure

Current and Past Residential Rates

Current Rates

Water	
Base 5/8	$ 20.89
1-9'	$ 1.77
10-18'	$ 2.83
19-36'	$ 6.57
>36'	$ 14.08

Past Rates

Water	
Base 5/8	$ 11.25
1-7'	1.55
8-28'	3.37
>28'	5.89

Current Residential Rates

PROS

Cost Based
Meets Cost of Service Objectives

Conservation
Tiered structure provides conservation signal

Affordability
Limited bill impact to low usage customers

CONS

Revenue Stability
Subject to revenue impacts with usage variations

Strong 4th Tier Rate
($14.08 / CCF)

Perception
Receiving negative customer response

OTHER CONSIDERATIONS

Bill Impact
High usage customers receive higher bills

Unit Cost Variability
Delineation of blocks results in pronounced increase in unit costs

Option 1 – Residential Two-Tier Rates

Current Rates

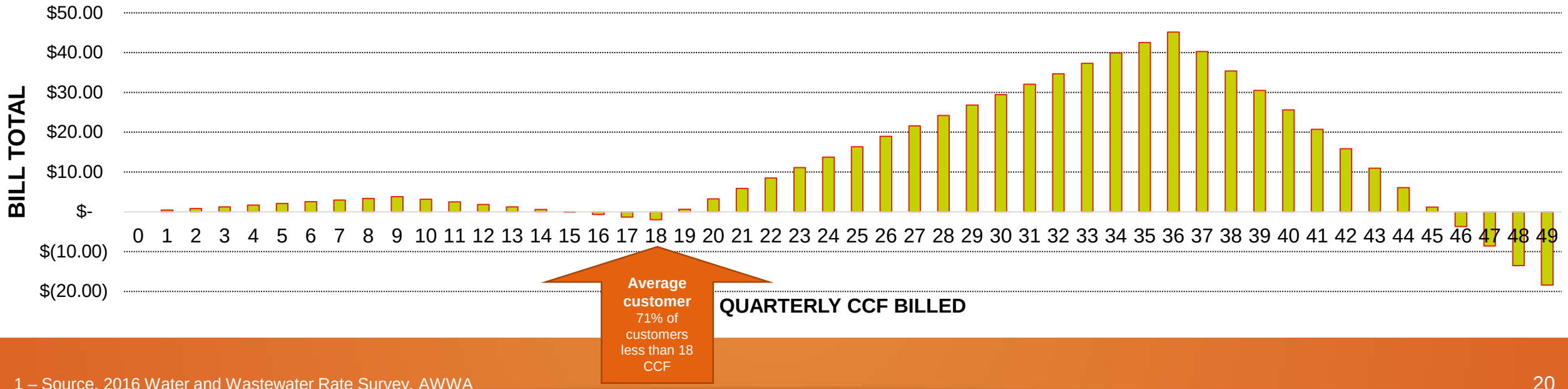
Water	
Base 5/8	$ 20.89
1-9'	$ 1.77
10-18'	$ 2.83
19-36'	$ 6.57
>36'	$ 14.08

2 Tiers

Water	
Base 5/8	$ 20.89
1-18'	2.19
>18'	9.19

Option 1 – Residential Two-Tier Rates

	15 CCF 60%	30 CCF 93%	45 CCF 98%	90 CCF >99%
National Average[1]	$71.91	$114.90	$163.29	$323.67
National 75th Percentile [1]	$86.49	$142.74	$205.38	$399.69
City of Ann Arbor Current [2]	$48.42	$127.02	$276.54	$846.78
Option 1 – Two-Tier [2]	$48.37	$153.53	$277.60	$649.79



1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Option 1 – Residential Two-Tier Rates

PROS

Cost Based
Meets Cost of Service Objectives

Simplicity
Easier to understand than 4-tiers

Compatibility
Consolidates existing rate structure tiers

Eliminates
4th Tier Rate

CONS

Conservation
"Weaker" price signal when compared to 3 and 4 tier structures

Bill Impact
Residential customers will see bill changes

OTHER CONSIDEATIONS

Bill Impacts
Bills between 20 and 45 CCF will increase (20% of bills)

Bills above 45 CCF will decrease

Option 2 – Residential Three-Tier Rates
(Consolidate Tiers 3 and 4)

Current Rates

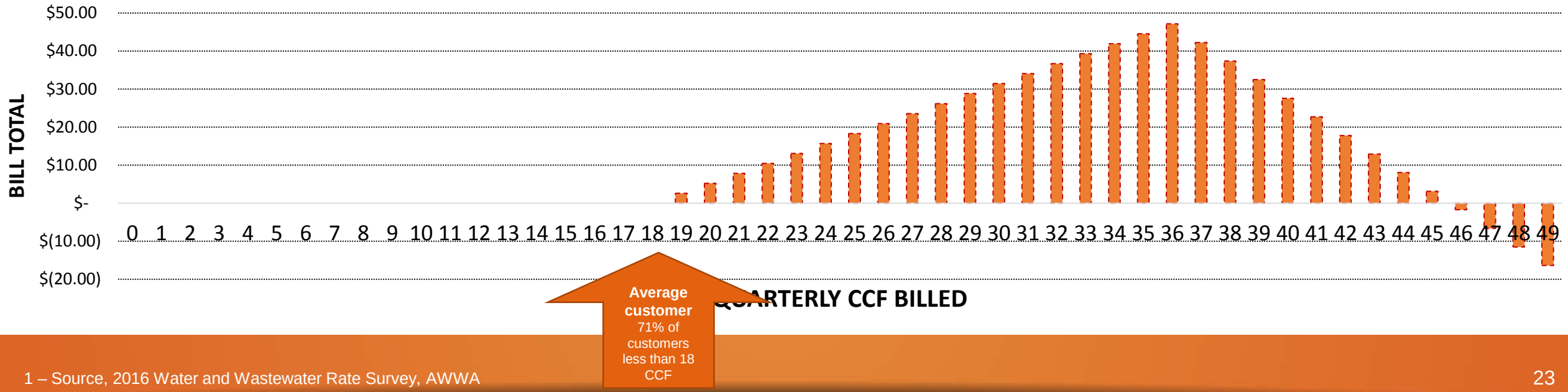
Water	
Base 5/8	$ 20.89
1-9'	$ 1.77
10-18'	$ 2.83
19-36'	$ 6.57
>36'	$ 14.08

3 Tiers-Consolidate

Water	
Base 5/8	$ 20.89
1-9'	$ 1.77
10-18'	$ 2.83
>18	$ 9.19

Option 2 – Residential Three-Tier Rates
(Consolidate Tiers 3 and 4)

	15 CCF 60%	30 CCF 93%	45 CCF 98%	90 CCF >99%
National Average[1]	$71.91	$114.90	$163.29	$323.67
National 75th Percentile [1]	$86.49	$142.74	$205.38	$399.69
City of Ann Arbor Current [2]	$48.42	$127.02	$276.54	$846.78
Option 2 – Three-Tier Consolidate [2]	$48.42	$155.31	$279.38	$651.57



1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Option 2 – Residential Three-Tier Rates (Consolidate Tiers 3 and 4)

PROS

Cost Based
Meets Cost of Service Objectives

Simplicity
Easier to understand than 4-Tier

Compatibility
Consolidates existing rate structure tiers

Eliminates
4th Tier Rate

CONS

Bill Impact
Residential customers will see bill changes

OTHER CONSIDERATIONS

Bill Impacts
Bills below 18 CCF will not change

Bills between 20 and 45 CCF will increase (20% of bills)

Bills above 45 CCF decrease

Option 3 – Residential Uniform Rates

Current Rates

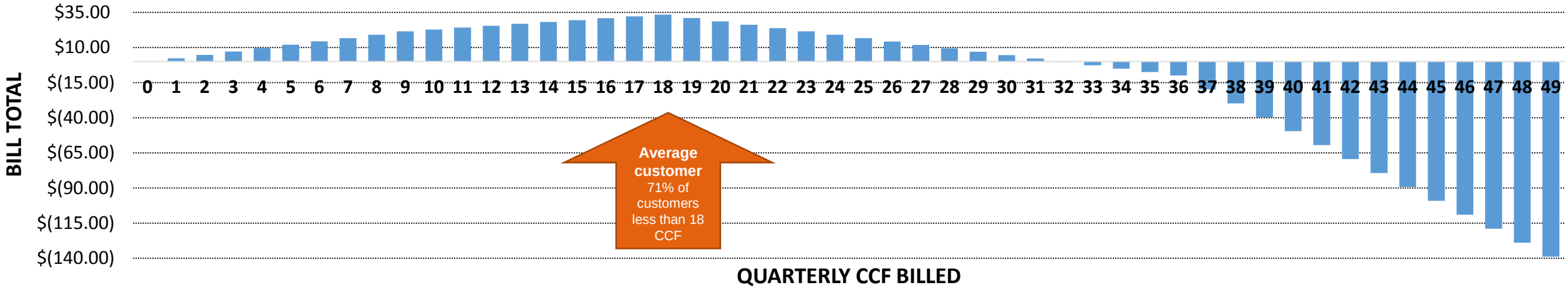
Water	
Base 5/8	$ 20.89
1-9'	$ 1.77
10-18'	$ 2.83
19-36'	$ 6.57
>36'	$ 14.08

Uniform

Water	
Base 5/8	$ 20.89
All Use	$ 4.16

Option 3 – Residential Uniform Rates

	15 CCF 60%	30 CCF 93%	45 CCF 98%	90 CCF >99%
National Average[1]	$71.91	$114.90	$163.29	$323.67
National 75th Percentile [1]	$86.49	$142.74	$205.38	$399.69
City of Ann Arbor Current [2]	$48.42	$127.02	$276.54	$846.78
Option 3 – Uniform [2]	$74.96	$131.12	$187.28	$355.76



1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Option 3 – Residential Uniform Rates

PROS

Cost Based
Meets Cost of Service Objectives

Simplicity
Easily understood and implemented

Revenue Stability
Generally more stable than other more complex rate forms

Consistency
A uniform residential rate structure is the same as other customer classes

CONS

Equity
Given residential usage patterns, other rate forms will provide greater equity

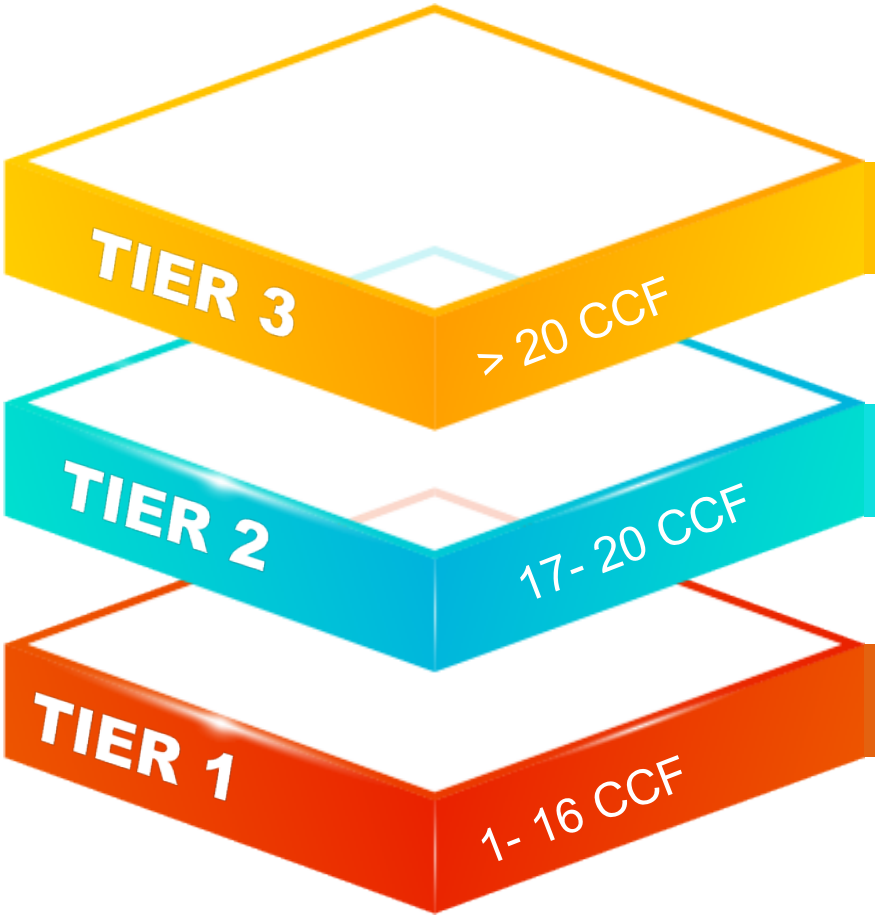
Structural Change
Uniform residential rates are a change from the existing and past structures

Affordability
Negatively impacts lower consumption customers, which can create affordability issues

OTHER CONSIDERATIONS

Price Signal
Lower consumption customer bills will increase, and higher consumption bills will decrease thereby not promoting conservation

Option 4 – Residential Three-Tier (Resetting Tiers)



Tier Volumes	Basis for Tier Rates	
Above Average Usage	Maximum Consecutive 90 Day Usage	Represents above average use considering a quarterly billing cycle
Average Outdoor Usage	Summer Average Usage	Correlates with average outdoor water usage
Average Indoor Usage	Winter Average Usage	Correlates with average indoor water usage

Option 4 – Residential Three-Tier (Resetting Tiers)

Current Rates

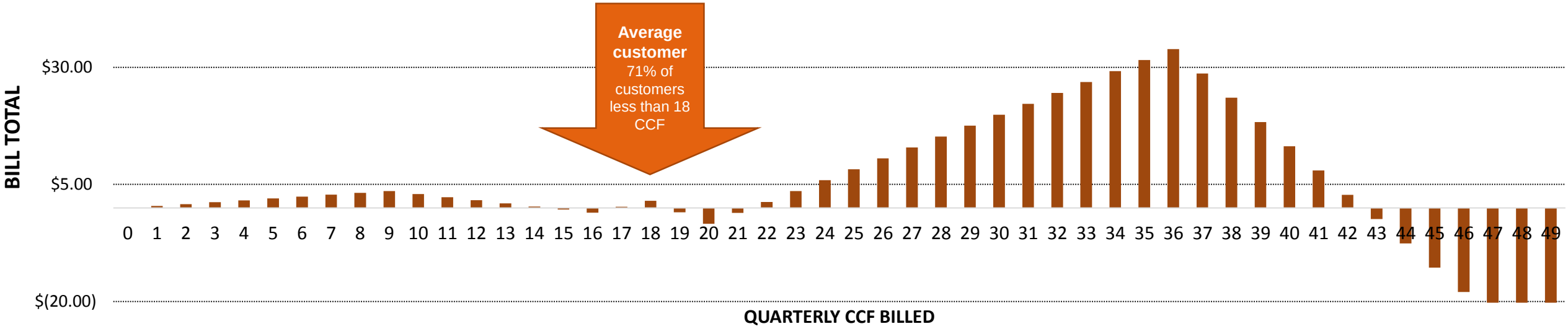
Water	
Base 5/8	$ 20.89
1-9'	$ 1.77
10-18'	$ 2.83
19-36'	$ 6.57
>36'	$ 14.08

Resetting Tiers

Water	
Base 5/8	$ 20.89
1-16'	2.17
17-20'	4.10
>20'	8.90

Option 4 – Residential Three-Tier (Resetting Tiers)

	15 CCF 60%	30 CCF 93%	45 CCF 98%	90 CCF >99%
National Average[1]	$71.91	$114.90	$163.29	$323.67
National 75th Percentile [1]	$86.49	$142.74	$205.38	$399.69
City of Ann Arbor Current [2]	$48.42	$127.02	$276.54	$846.78
Option 4 – Three-Tier Resetting [2]	$48.10	$144.91	$265.06	$625.51



1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Option 4 – Residential Three-Tier (Resetting Tiers)

PROS

Cost Based
Meets Cost of Service Objectives

Perception
Eliminates high 4th Tier Rate

Methodology
Tier design is correlated with customer usage; winter usage, summer usage, maximum 3-months

CONS

Bill Impact
Residential customers will see bill changes

OTHER CONSIDERATIONS

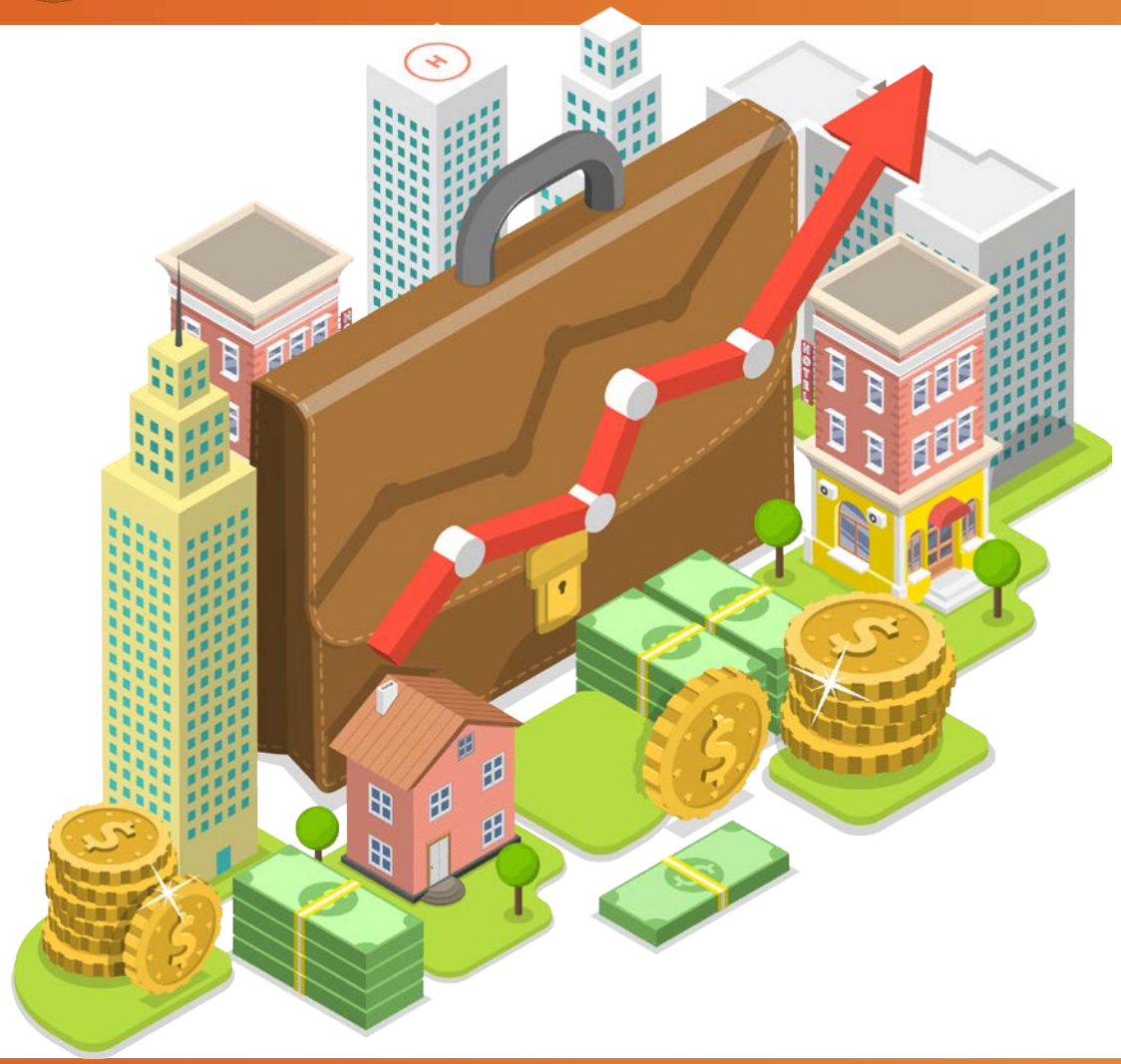
Bill Impacts
Minimal impact for usage below 23 CCF (less than $5 per quarter)

Bills for usage between 22 and 42 CCF will increase; some as much as $34 per quarter (36 CCF)

Bills above 43 CCF will decrease

Tier Thresholds
Tier usage thresholds change from the existing structure

Water Rate Calculation Alternatives



Residential

- Option 1 – Two Tier Structure – based on Winter and Summer usage
- Option 2 – Based on a consolidation of outdoor usage (consolidating Tiers 3 and 4)
- Option 3 – Flat Rate (same uniform rate for all usage)
- Option 4 – Resetting Tiers and Tier cost allocation

Non-Residential

- Option A – Seasonal Rate Alternative
- Option B – “Peaking” Alternative – based on updated previous commercial structure

Current and Past Non-Residential Rates

ARCADIS

Current Rates

Water	
All Non-Residential Customers	$ 3.83

Non-Residential / Commercial

90 CCF

National Average[1]	$304.77
National 75th Percentile [1]	$383.28
City of Ann Arbor Current [2]	$330.42

Past Rates

Water	
Peak 1, factor less than 5	$ 3.81
Peak 2, factor between 5 and 8	$ 7.26
Peak 3, factor greater than 8	$ 12.44

1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Current Non-Residential Rates

PROS

Cost Based
Meets Cost of Service Objectives

Revenue Stability
Single rate flattens revenue impacts with usage variations

Simplicity
Easier to administer

Industry Practice
Uniform rates are consistent with industry practice

CONS

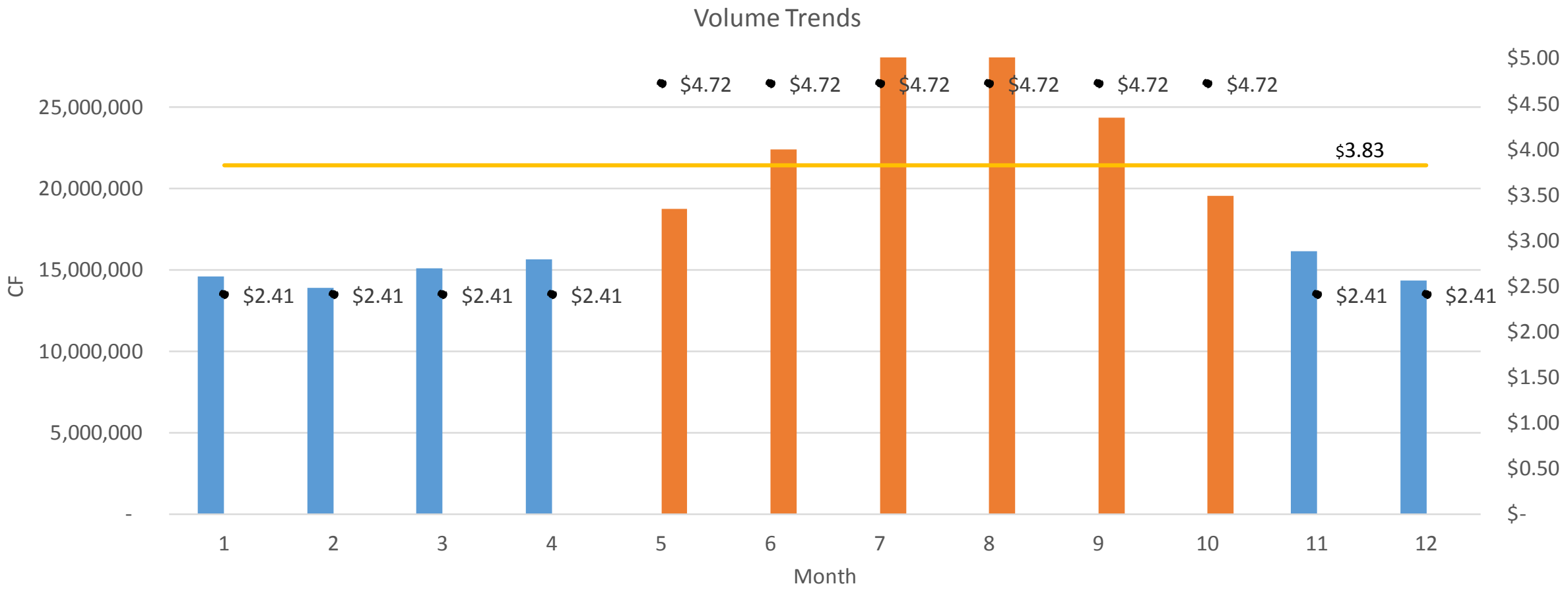
Perception
More difficult to explain why residential class has inclining block structure

Conservation
Weaker conservation signal as higher usage does not cause higher unit cost

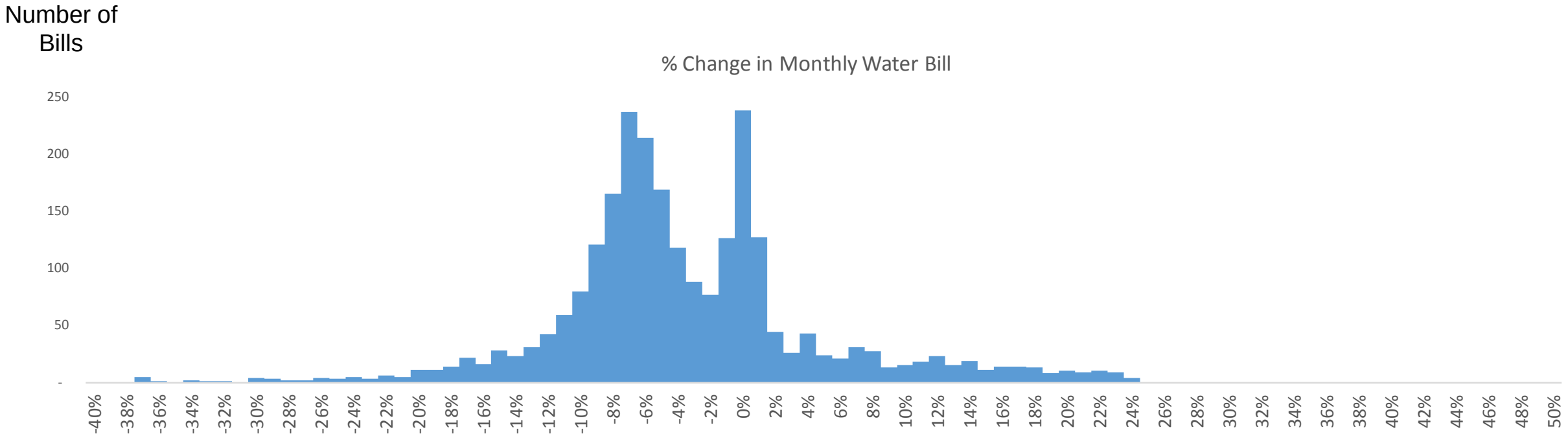
OTHER CONSIDERATIONS

Bill Impact
Higher peaking customers receive lower bills than under previous structure

Option A – Non-Residential (Seasonal Alternative)



Option A – Non-Residential (Seasonal Alternative)



Option A – Non-Residential (Seasonal Alternative)

PROS

Cost Based
Meets Cost of Service Objectives

Conservation
Greater conservation signal

Comparable
Similar structure when compared to Residential

Consistent
Same rates for all Non-residential customers

CONS

Bill Impact
Non-Residential customers will see bill changes

Customer Awareness
New structure for Non-residential customers and may require customer education.

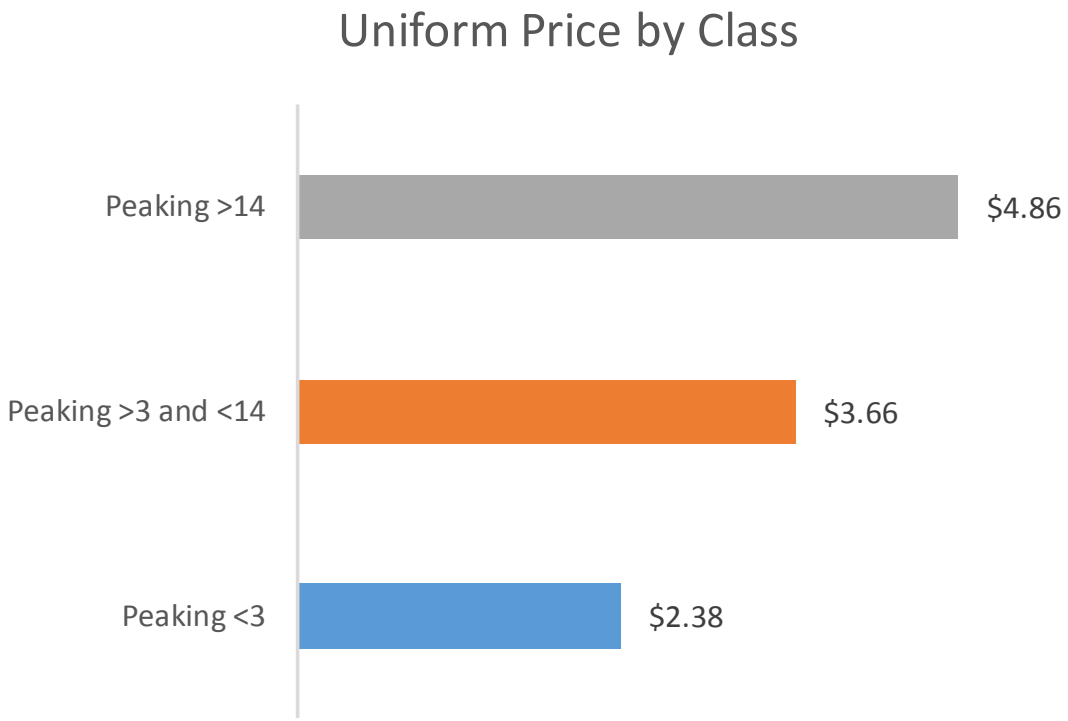
Revenue Stability
Price signal may result in curtailed usage and lower revenues

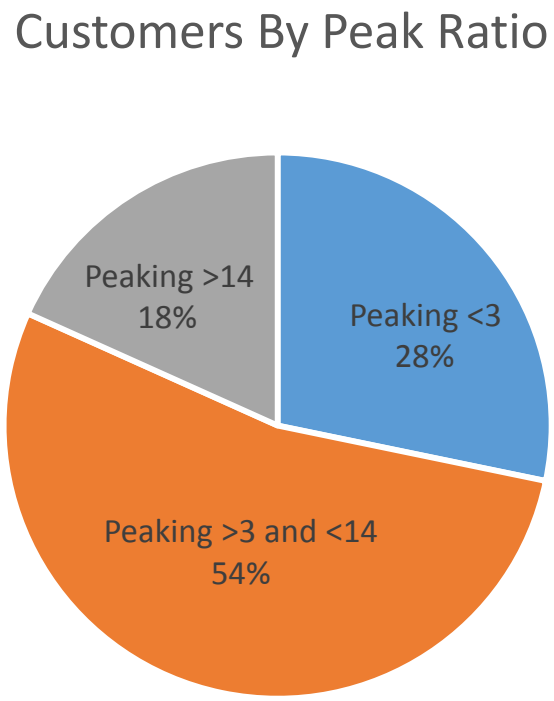
OTHER CONSIDERATIONS

Seasonality
Clear seasonal usage pattern within the Non-residential class

Administrative Effort
More effort to implement than uniform rate

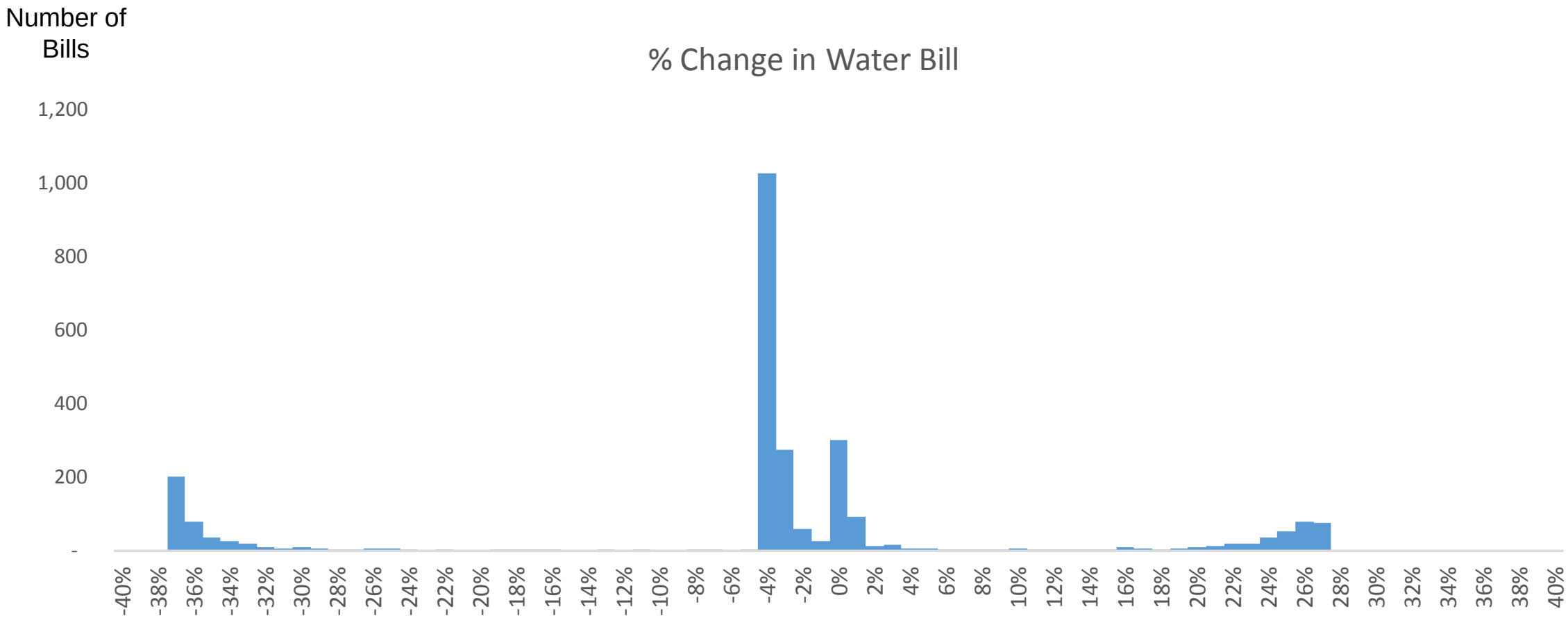
Option B – Non-Residential ("Peaking" Alternative)





This alternative is being presented, however it is currently not feasible to be automated in the City's billing system.

Option B – Non-Residential ("Peaking" Alternative)



This alternative is being presented, however it is currently not feasible to be automated in the City's billing system.

Option B – Non-Residential ("Peaking" Alternative)

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PROS

Cost Based
Meets Cost of Service Objectives

Conservation
Greater conservation signal

CONS

Bill Impact
Some significant bill impacts

Simplicity (or lack of)
Structure is more complicated to explain and understand

Significant Administrative Efforts
Administration effort to initially classify customers and maintain records as changes occur over time

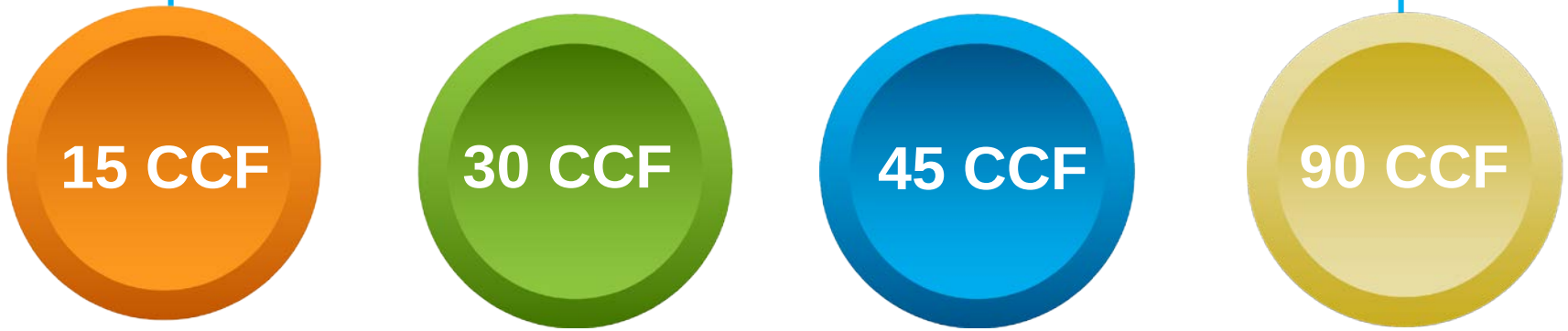
Implementation
Billing System is not set up for this rate structure

OTHER CONSIDERATIONS

Impact to University
Some University establishments, such as the stadium, would be high "Peaking" customers

Residential Summary

Quarterly Residential Water Bill Usage



	15 CCF	30 CCF	45 CCF	90 CCF
National Average[1]	$71.91	$114.90	$163.29	$323.67
National 75th Percentile [1]	$86.49	$142.74	$205.38	$399.69
City of Ann Arbor Current [2]	$48.42	$127.02	$276.54	$846.78
Option 1 – Two-Tier [2]	$48.37	$153.53	$277.60	$649.79
Option 2 – Three-Tier Consolidate [2]	$48.42	$155.31	$279.38	$651.57
Option 3 – Uniform [2]	$74.96	$131.12	$187.28	$355.76
Option 4 – Three-Tier Resetting [2]	$48.10	$144.91	$265.06	$625.51
	60%	93%	98%	>99%

1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Average Residential Customer Summary

Quarterly Residential Water Bill Usage

18 CCF

71.5% of customers

City of Ann Arbor Current [2]	$56.06
Option 1 – Two-Tier [2]	$54.28
Option 2 – Three-Tier Consolidate [2]	$56.06
Option 3 – Uniform [2]	$86.19
Option 4 – Three-Tier Resetting [2]	$57.43

2 – Includes 10% early payment discount

Non-Residential Summary

Non-Residential

90 CCF

National Average[1]	$304.77
National 75th Percentile [1]	$383.28
City of Ann Arbor Current [2]	$330.42
Option A – Seasonal (Winter) [2]	$215.40
Option A – Seasonal (Summer) [2]	$402.51
Option B – Peak <3 [2]	$212.97
Option B – Peak >3 & <14 [2]	$316.65
Option B – Peak <14 [2]	$413.85

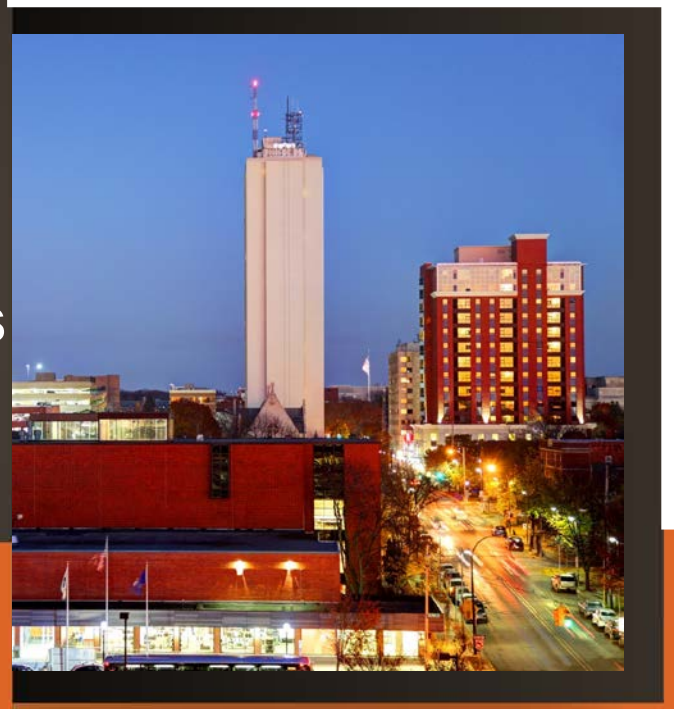
1 – Source, 2016 Water and Wastewater Rate Survey, AWWA
2 – Includes 10% early payment discount

Questions and Discussion

ARCADIS Design & Consultancy for natural and built assets

City of Ann Arbor, Michigan

Water Cost of Service Review & Rate Structure Alternative Analysis



Thank You for Your Time and Attention