



## City of Tempe, Arizona

### Water & Sewer Rate Study

#### *Stakeholder Working Group Meeting #4 – Rate Structure Workshop*

*August 11, 2020*

# A Comprehensive Rate Study is A Series of Connected Investigations

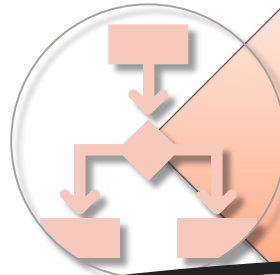
How Much?



## Revenue Sufficiency

- Policies & targets
- System investment needs and funding
- Sustainable operations

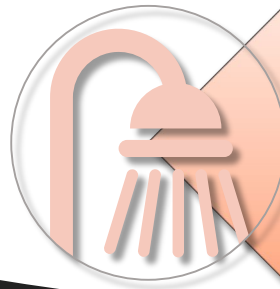
From Whom?



## Defensible Allocation Methods

- Industry accepted approaches
- Inter and intra class proportionality
- Correct and appropriate units of service

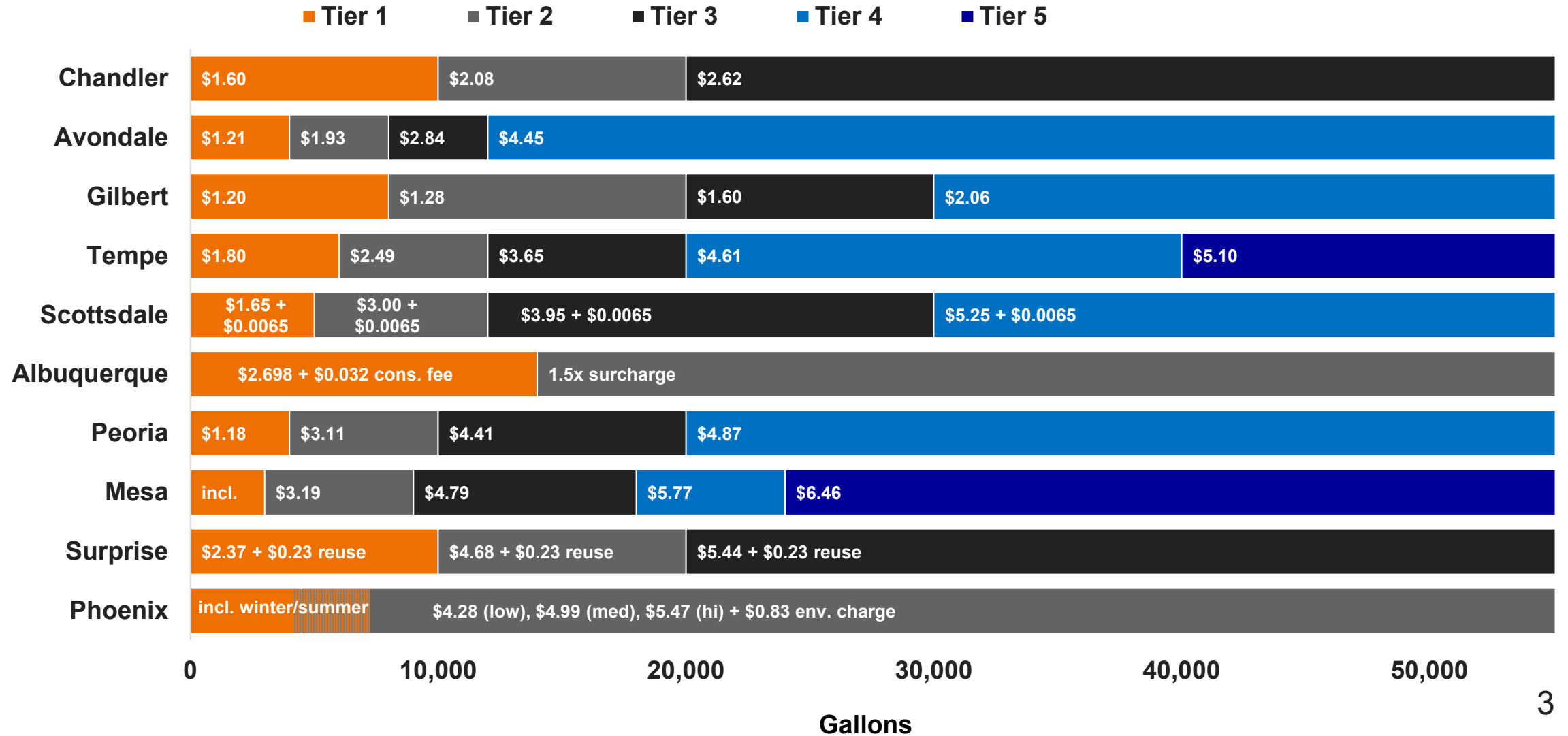
How to Collect?



## Simple, Equitable & Sustainable Rates

- Balance affordability and financial objectives
- Revenue stability
- Promote community goals of conservation

# Rate Comparisons are Rather Complex



## What we will cover for water utility

### **Rate increase scenarios**

### **Recap of cost allocation process**

- Customer usage patterns and characteristics
- Recommended customer classes
- Cost allocation methodology
- Allocations and current revenue by customer class

### **Review initial rate structures for each class**

**Goal: Understand basis of new rate structures and corresponding impact to customer bills**

**Ask lots of questions & provide comments!**

## What we will cover for sewer utility

No changes proposed to sewer rates.

# Water Rate Increase Scenarios

# Scenario 1: “Levelized” plan of rate increases



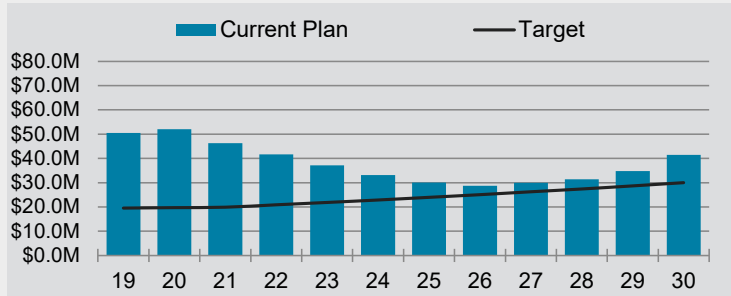
## CITY OF TEMPE, AZ - WATER



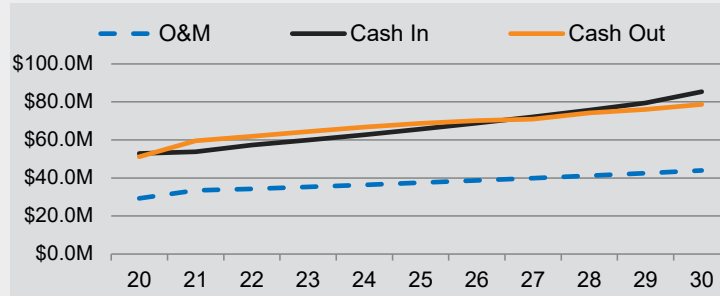
CALC SAVE CTRL LAST OVR

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2025	FY 2030
Water Rate Increases	0.00%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	30.61%	70.70%
Single Family Water Bill	\$32.26	\$34.05	\$35.88	\$37.84	\$39.94	\$42.12	\$44.45	\$46.92	\$49.48	\$52.19	\$55.05		

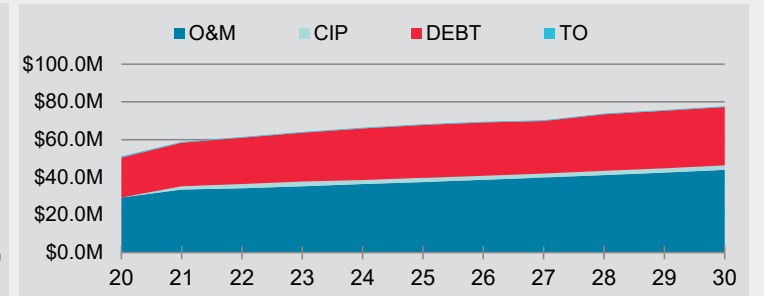
Operating Fund



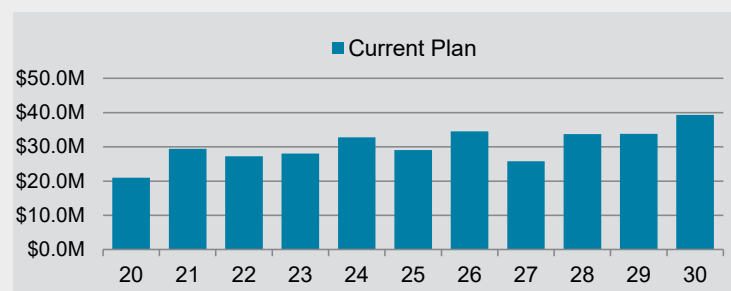
Revenues vs. Expenses



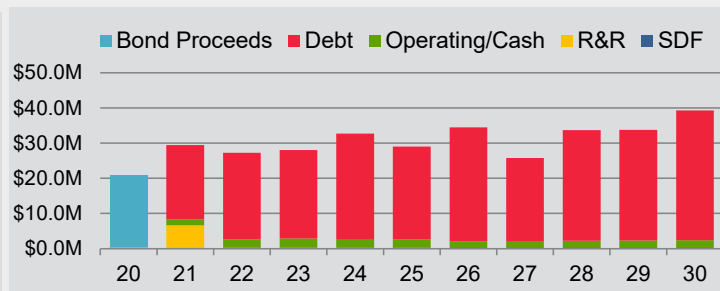
Expenses by Type



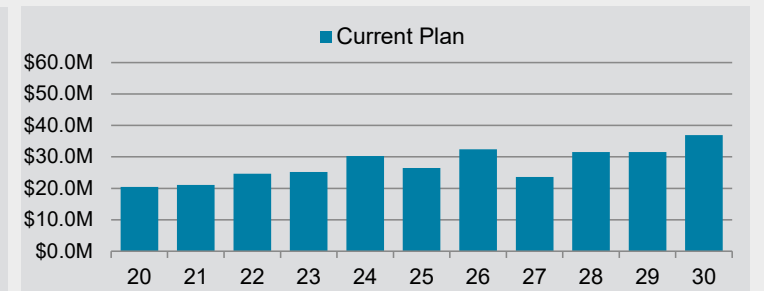
CIP Spending



CIP Funding



Borrowing



# Scenario 2: Lower FY 2021 rate increase



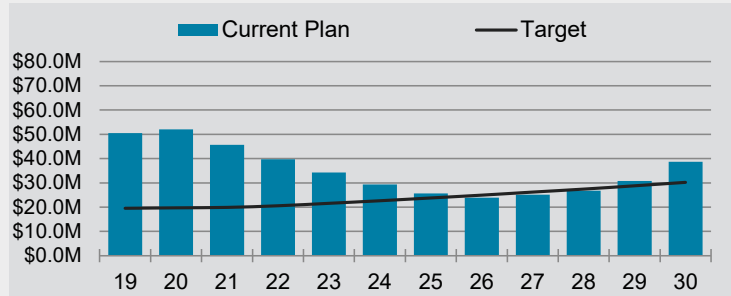
## CITY OF TEMPE, AZ - WATER



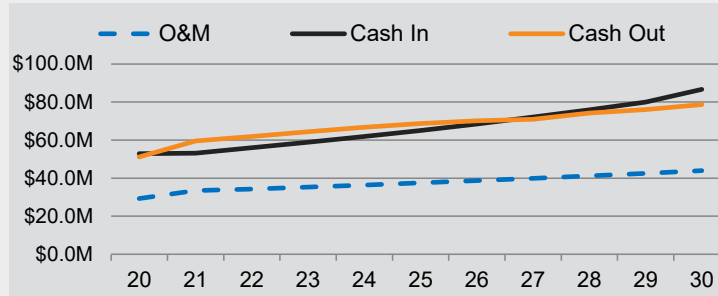
CALC SAVE CTRL LAST OVR

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2025	FY 2030
Water Rate Increases	0.00%	2.75%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	29.74%	73.74%
Single Family Water Bill	\$32.26	\$33.16	\$35.13	\$37.24	\$39.44	\$41.78	\$44.28	\$46.93	\$49.78	\$52.79	\$55.96		

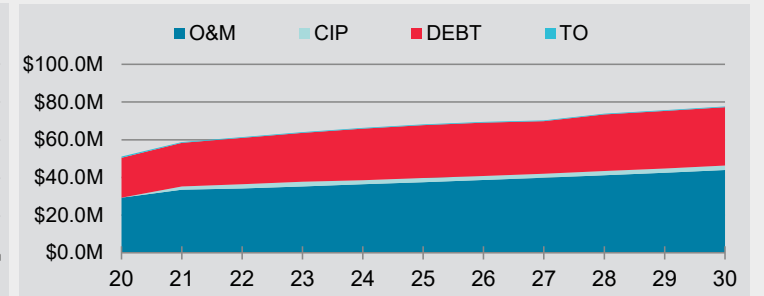
Operating Fund



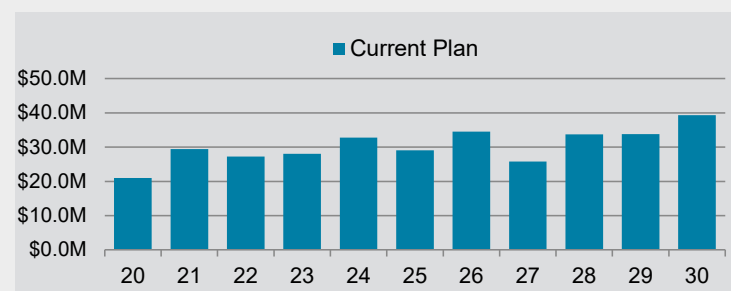
Revenues vs. Expenses



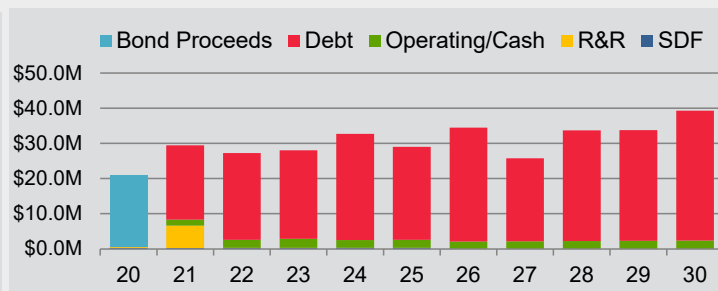
Expenses by Type



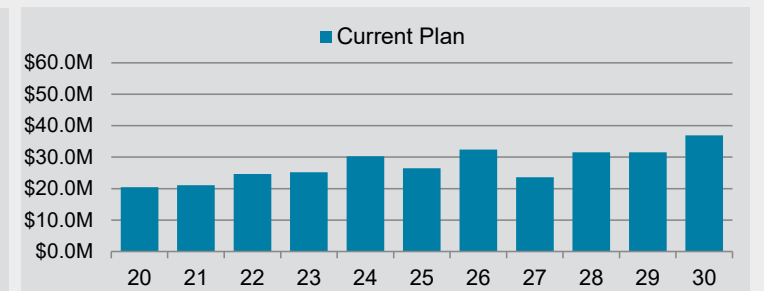
CIP Spending



CIP Funding



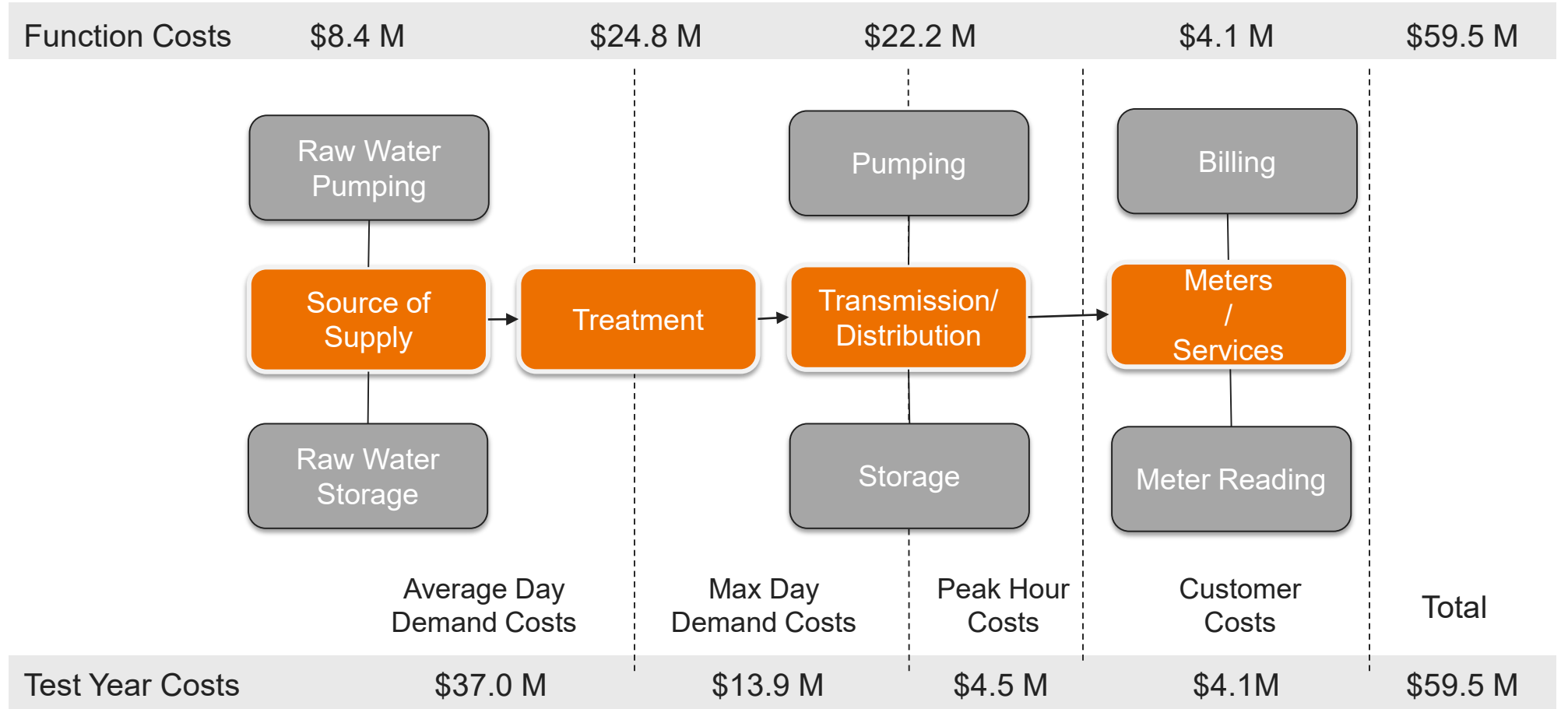
Borrowing



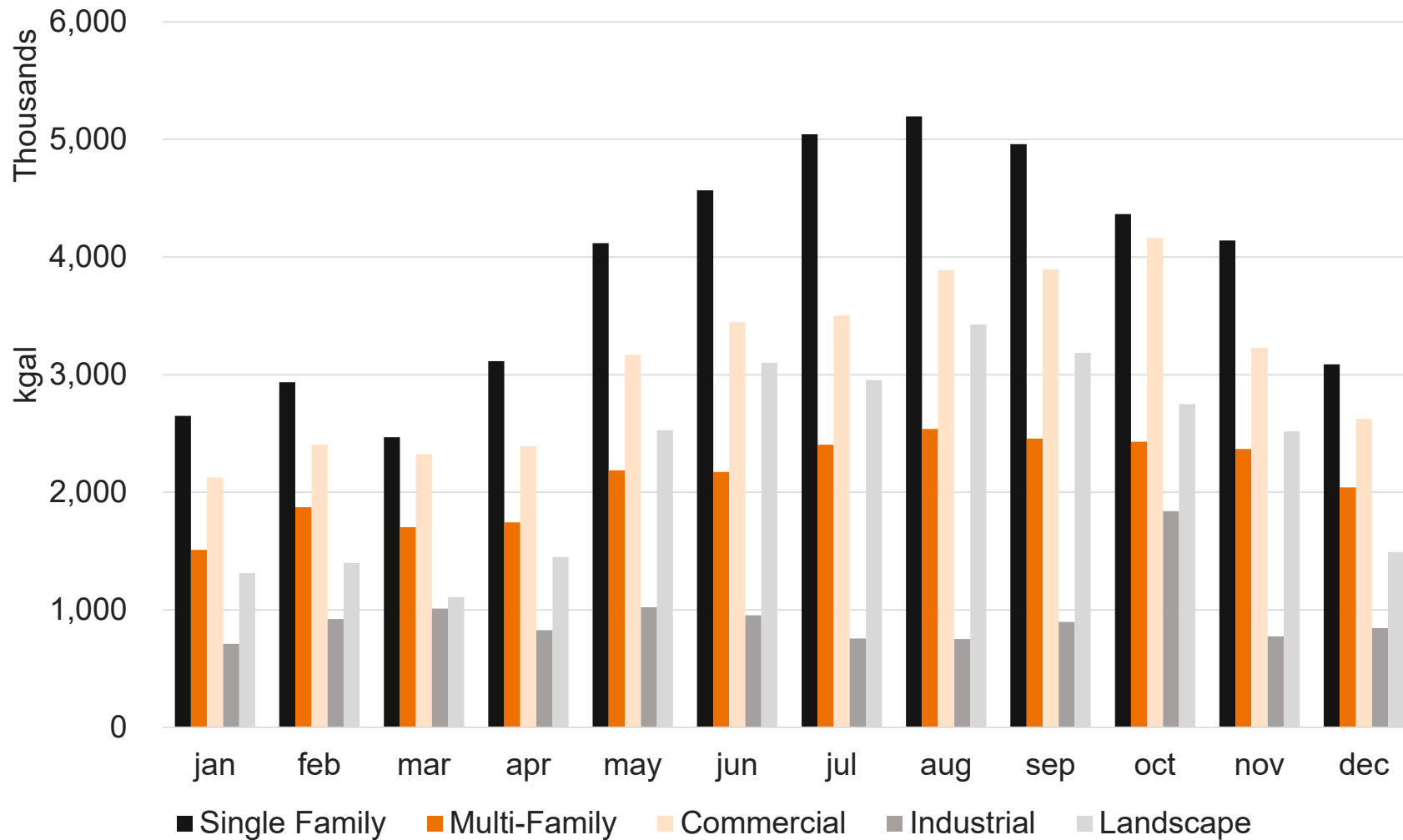


# Water Cost of Service Recap

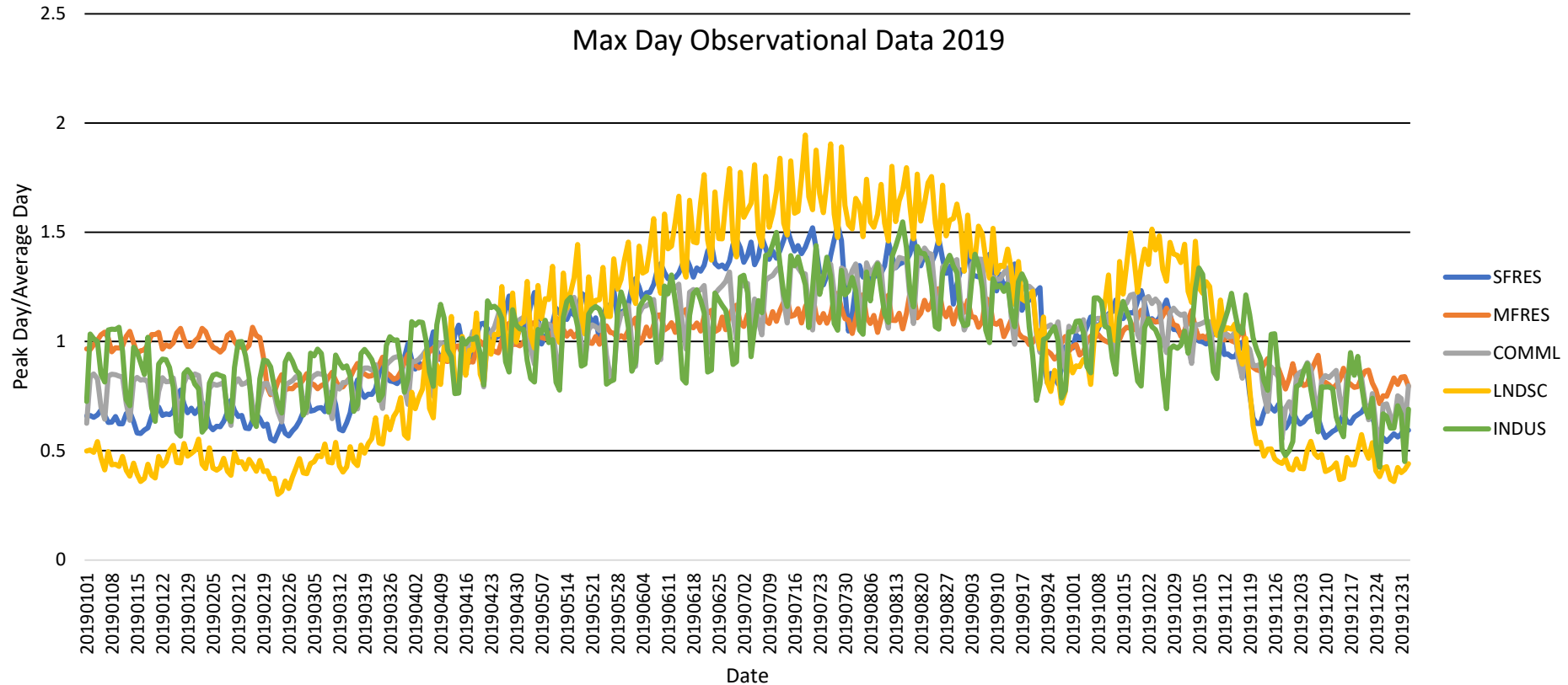
# Functionalizing System Costs



# Summary of 2019 monthly water use

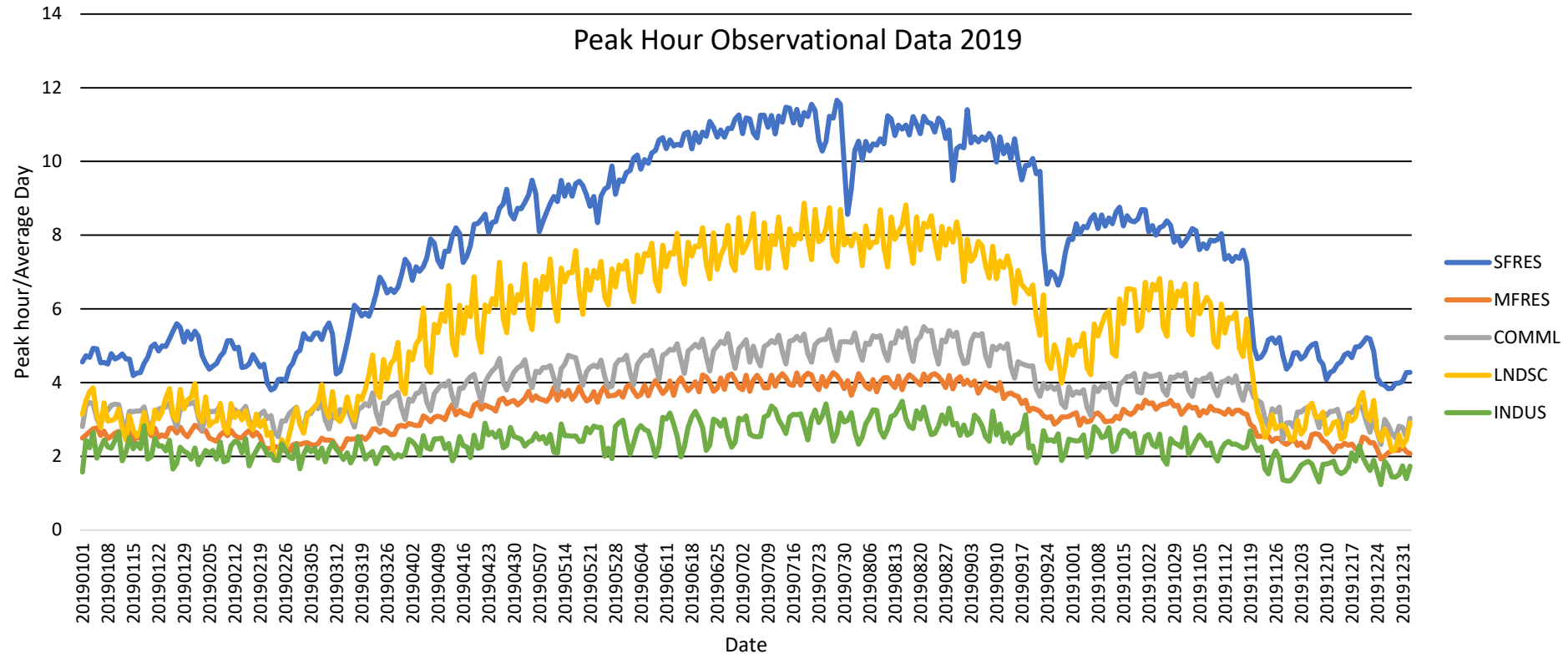


# Deep dive into customer data



11 million data points from the Advanced Metering Infrastructure Data were used for 2019 on a **daily** basis

# REALLY deep dive into customer data

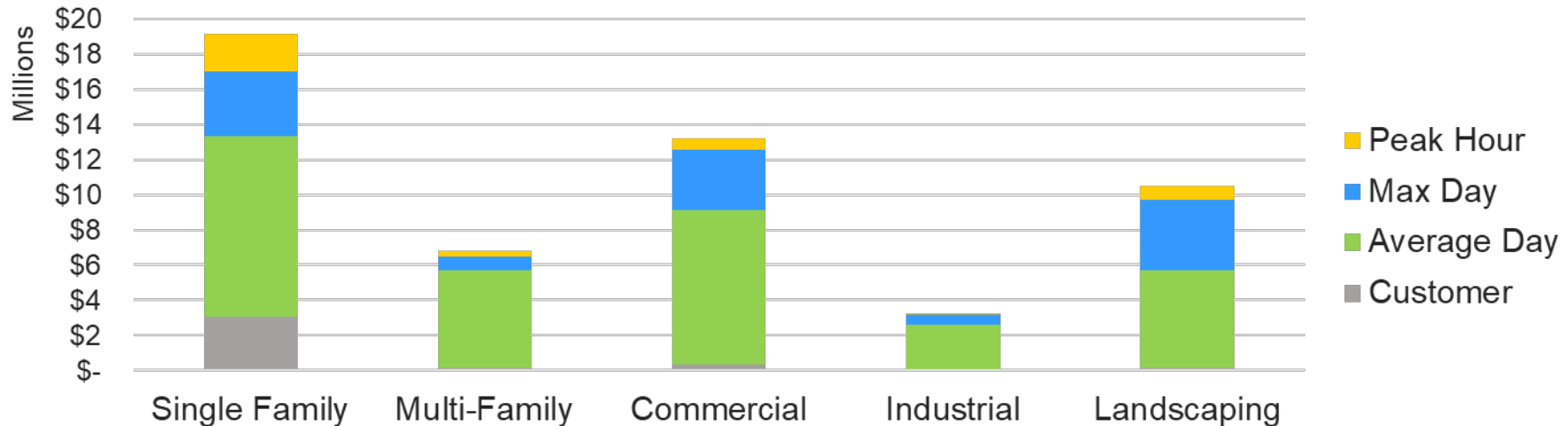


263 million data points from the Advanced Metering Infrastructure Data were used for 2019 on an **hourly** basis

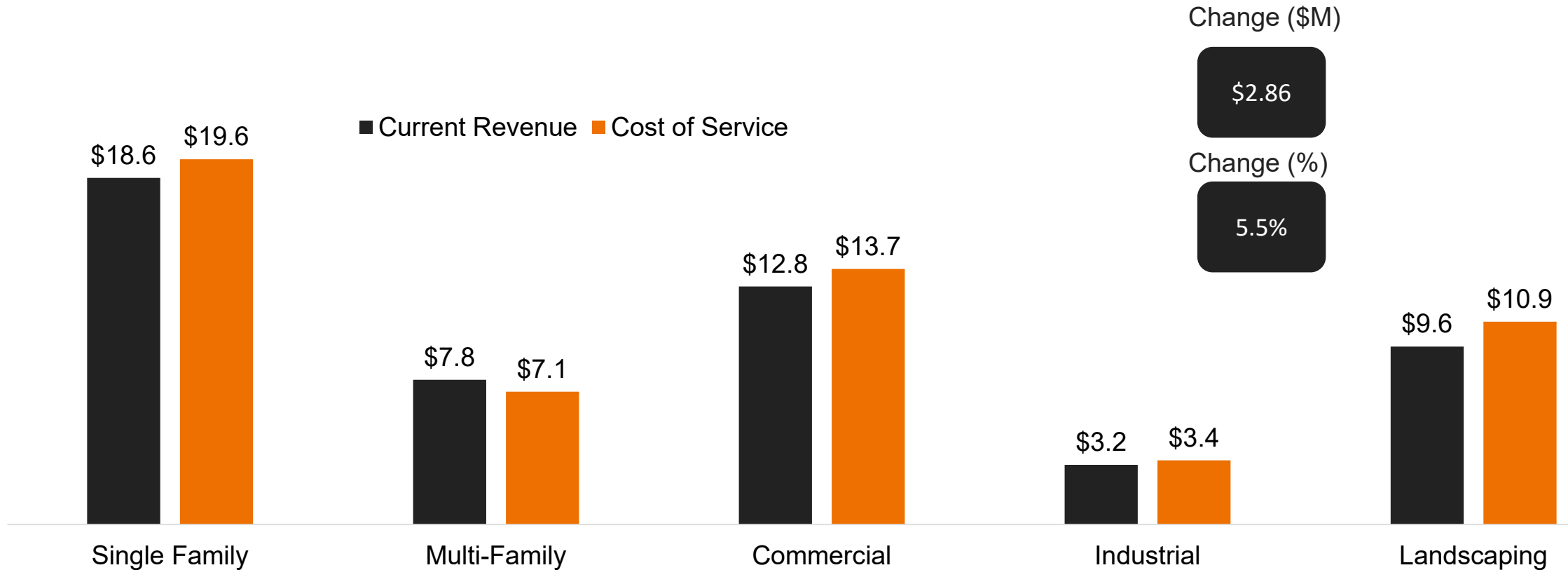
# Customer Class Units of Service

Customer Type	# of Accounts	Total Water Use (kgal/day)	Extra Max Day Use (kgal/day)	Extra Peak Hour Use (kgal/day)
Single Family	34,677	12,922	4,264	129,734
Multi-Family	1,714	7,019	983	17,476
Commercial	3,712	10,976	3,951	40,061
Industrial	70	3,189	670	6,665
Landscape	1,650	6,779	4,610	46,845

Cost of Service by Cost Component and Class



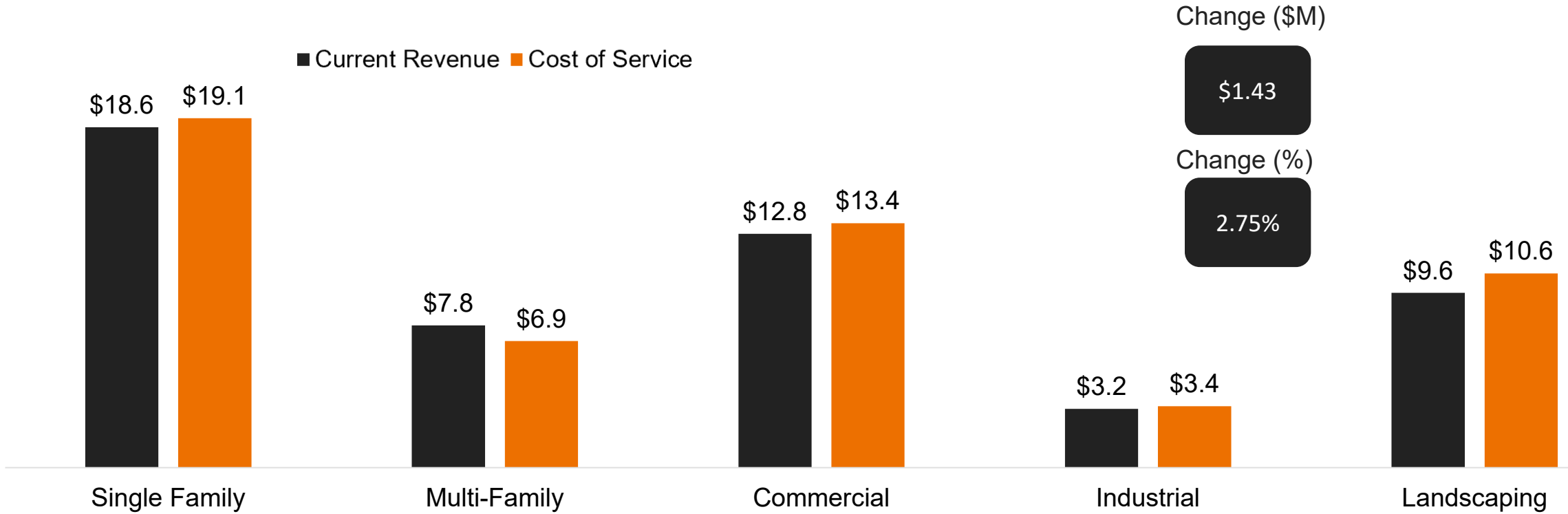
## Water Cost to Serve vs. Current Revenue (\$M)



Change (\$M):	\$1.00	\$(0.64)	\$0.94	\$0.23	\$1.33
Change (%):	5.4%	-8.3%	7.3%	7.3%	13.9%

Note: current revenues are based on projections of FY 2021 billing units and FY 2020 rates.

## Water Cost to Serve vs. Current Revenue (\$M)



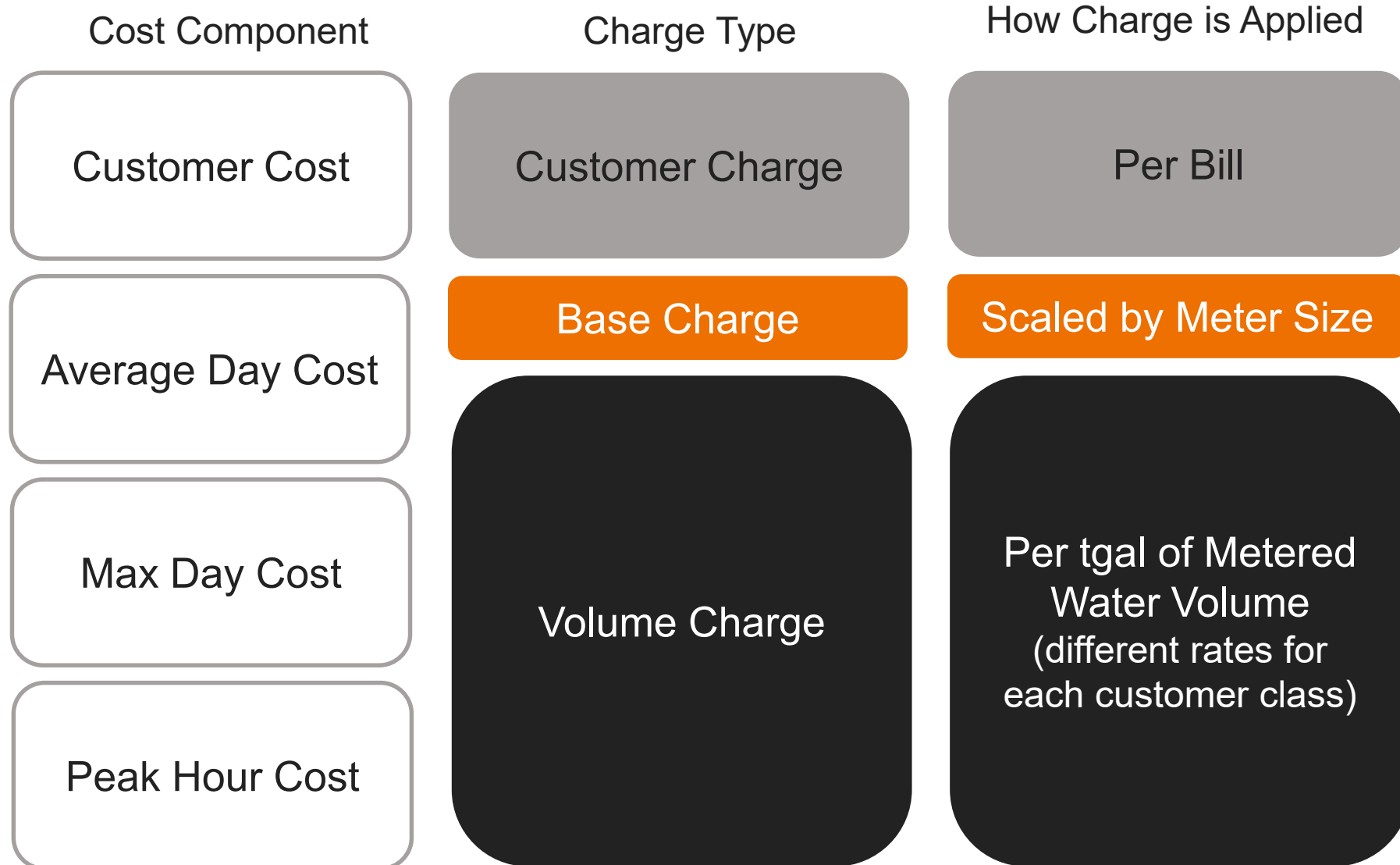
Change (\$M):	\$0.49	\$(0.86)	\$0.59	\$0.14	\$1.06
Change (%):	2.6%	-11.0%	4.6%	4.5%	11.1%

Note: current revenues are based on projections of FY 2021 billing units and FY 2020 rates.



# Water Rate Structure

# Basis of proposed water rate structure



## Water monthly fixed charge summary 5.5% revenue increase scenario

Meter Size	Current Fixed Charge	FY17-19 Average Usage (tgal/bill)	Customer Charge	Portion of Avg. Day Cost	Calculated Base Rate*
5/8"	\$11.50	10.7	\$7.44	\$5.71	\$13.15
3/4"	15.70	13.9	7.44	7.42	14.85
1"	23.50	27.5	7.44	14.72	22.15
1.5"	41.60	73.9	7.44	39.59	47.00
2"	67.90	157.1	7.44	84.17	91.60
3"	154.00	373.0	7.44	199.83	207.25
4"	302.00	543.6	7.44	291.24	298.70
6"	599.00	2,129.7	7.44	1,141.09	1,148.55
8"	1,400.00	2,447.1	7.44	1,996.91	2,004.35

Note: Fixed cost recovery under current rates is 19% of total water revenue. Fixed cost recovery under proposed rates is 22%.

\*Base charges rounded to nearest \$0.05.

## Water monthly fixed charge summary 2.75% revenue increase scenario

Meter Size	Current Fixed Charge	FY17-19 Average Usage (tgal/bill)	Customer Charge	Portion of Avg. Day Cost	Calculated Base Rate*
5/8"	\$11.50	10.7	\$7.24	\$5.56	\$12.80
3/4"	15.70	13.9	7.24	7.23	14.45
1"	23.50	27.5	7.24	14.33	21.55
1.5"	41.60	73.9	7.24	38.54	45.80
2"	67.90	157.1	7.24	81.95	89.20
3"	154.00	373.0	7.24	194.57	201.80
4"	302.00	543.6	7.24	283.58	290.80
6"	599.00	2,129.7	7.24	1,111.07	1,118.30
8"	1,400.00	2,447.1	7.24	1,944.37	1,951.60

Note: Fixed cost recovery under current rates is 19% of total water revenue. Fixed cost recovery under proposed rates is 22%.

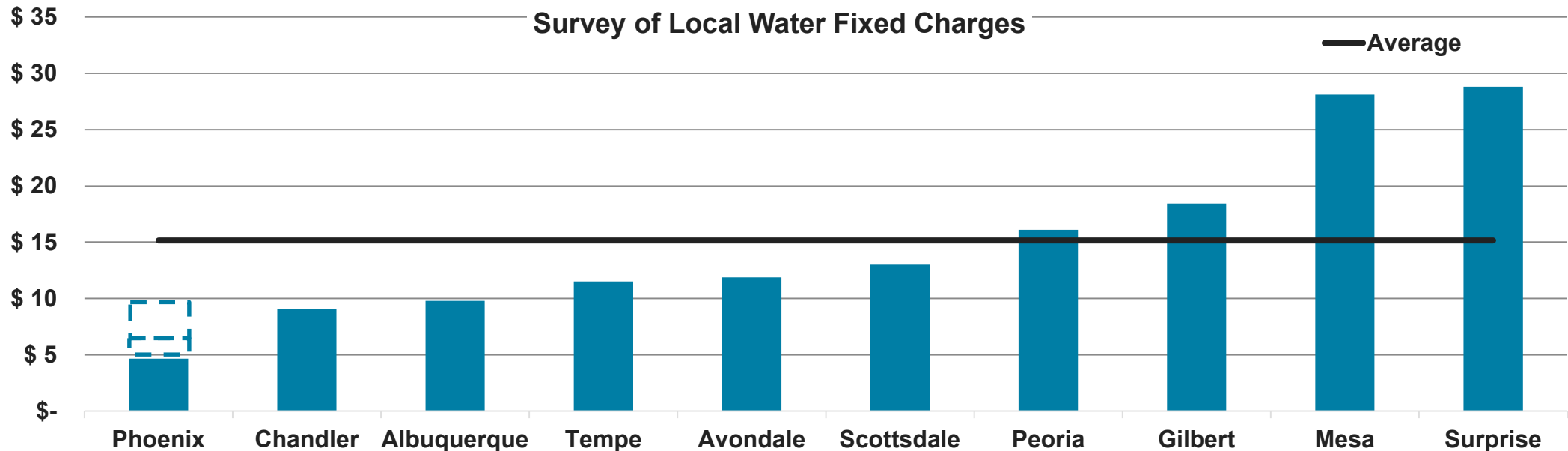
\*Base charges rounded to nearest \$0.05.

# Fixed charges lead to stable revenue recovery

Higher fixed charges provide a measure of revenue stability when changes in demand happen from year to year

- Fitch rating agency recommends fixed rate revenue > 20% of total rate revenue

*In light of the decreased predictability and increased volatility of the variable portion of water-rate revenues, many utilities are looking to increase the portion of fixed-charge revenues.*  
AWWA M1: Principles of Water Rates, Fees, and Charges



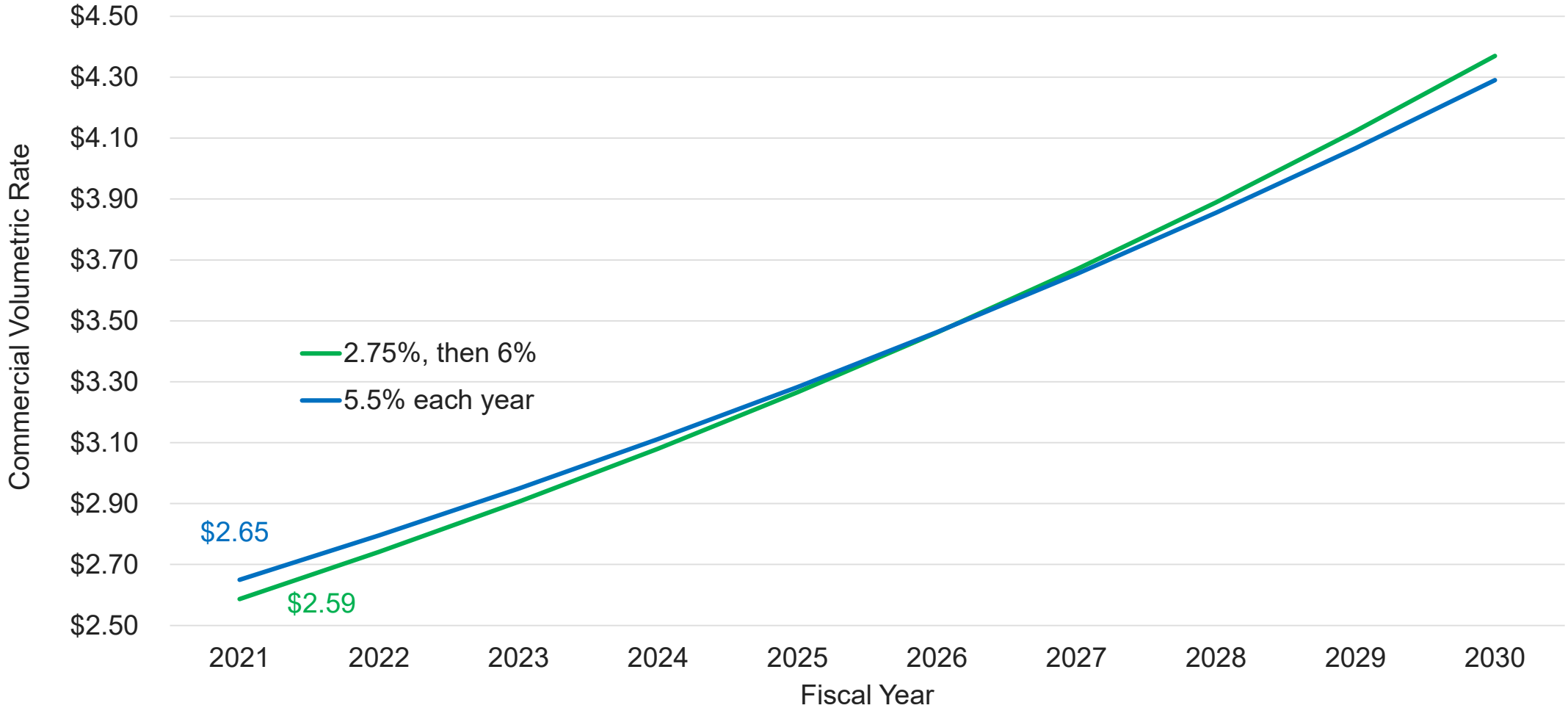
# Non-single family volumetric rates

Class	Current Rate (\$/tgal)	Calculated Rate* Scenario 1 (\$/tgal)	Calculated Rate* Scenario 2 (\$/tgal)
Multi-Family	\$2.51	\$2.05	\$1.98
Commercial	\$2.59	\$2.65	\$2.59
Industrial	\$2.63	\$2.77	\$2.70
Landscaping	\$3.51	\$3.96	\$3.87

\*Calculation for proposed volumetric rates of each class:

$$\frac{\text{Total Revenue Requirement} - \text{Revenue Recovered from Fixed Charges}}{\text{Billed Volume}}$$

# Comparison of rate plans over time Commercial volumetric rate



# Current single family volumetric rates

	<b>Tier Size (tgal)</b>	<b>Tier Price (\$/tgal)</b>
Tier 1	0-6	\$1.80
Tier 2	7-12	\$2.49
Tier 3	13-20	\$3.65
Tier 4	21-40	\$4.61
Tier 5	40+	\$5.10



# Monthly Single-Family Tier Sizing (Indoor)

Tier 1



Typical household:  
2.76 people



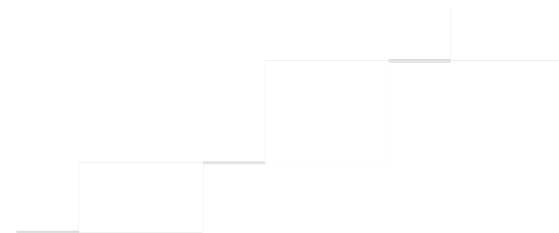
**Tgal per Month**

**Tier 1 = 6 tgal**

Tier 1



0-6

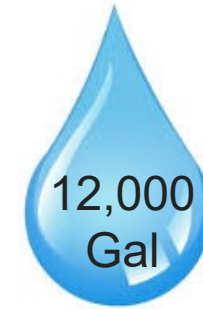


# Monthly Single-Family Tier Sizing (Indoor)

Tier 2

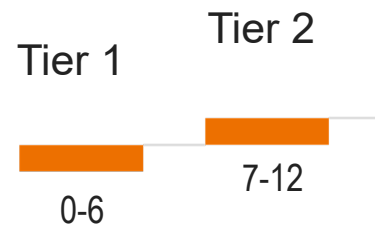


Large household:  
5.52 people

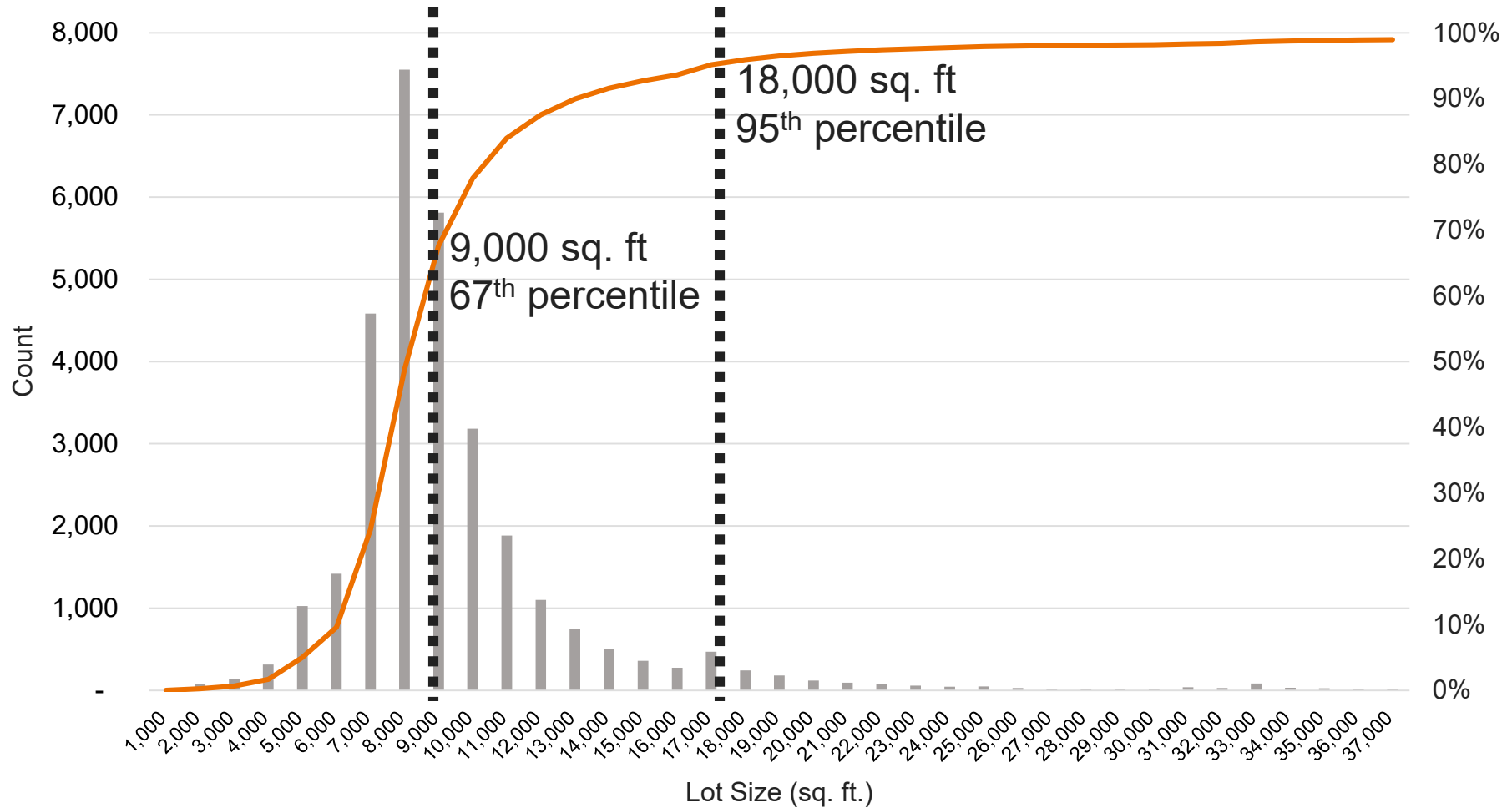


**Tgal per Month**

**Tier 2 = 12 tgal**



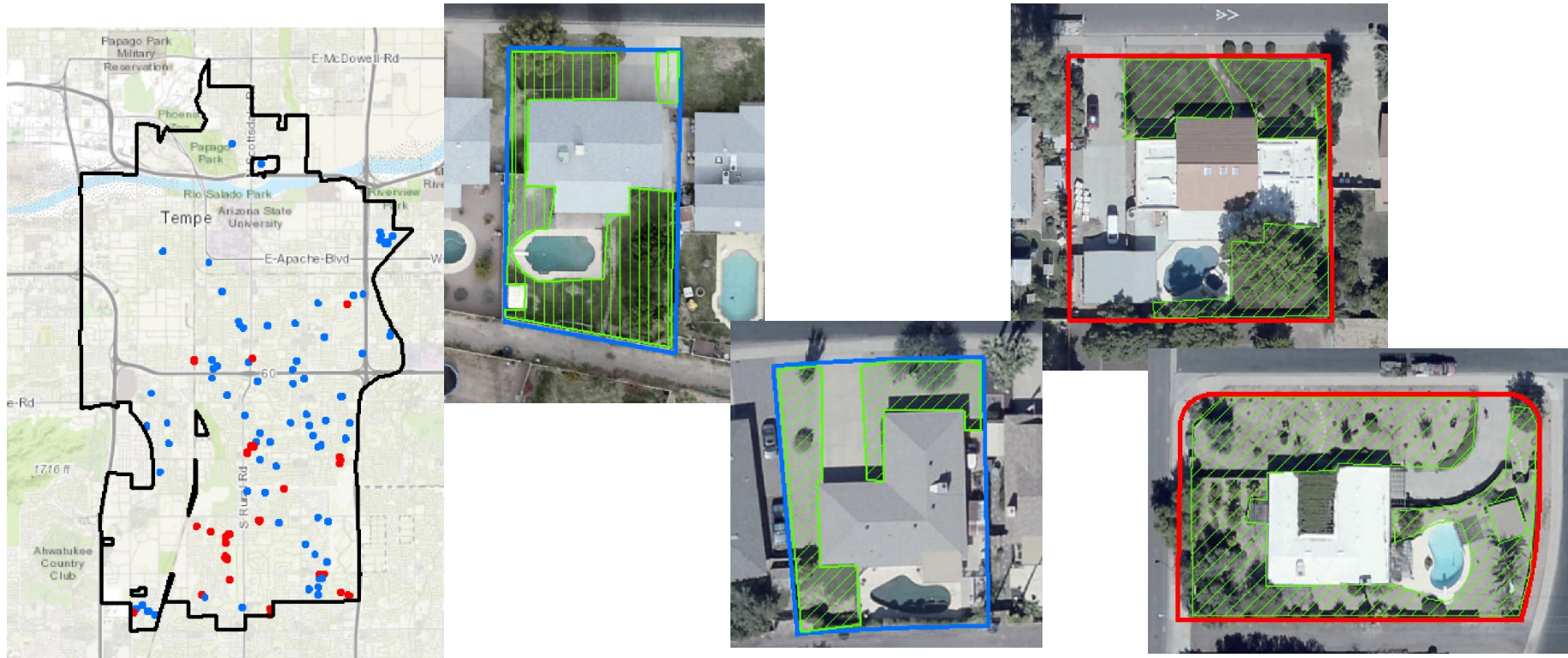
# Single Family Parcel Distribution



# Single Family Irrigation Area

Map on left: 9,000 sq. ft. lot sizes sampled shown in blue, 18,000 sq. ft. lot sizes sampled shown in red.

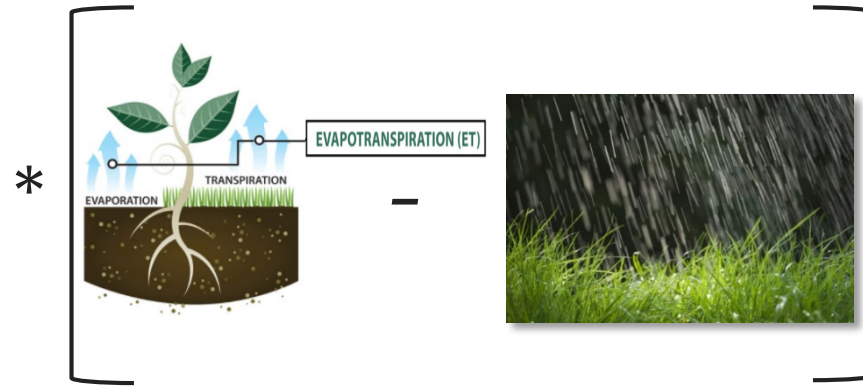
Example images of 9,000 sq. ft. and 18,000 sq. ft lots shown on right.



# Calculating irrigation requirements for the 67<sup>th</sup> percentile parcel (9,000 ft<sup>2</sup>)



Parcel Size: 9,000  
Landscape Area: 2,700



Evapotranspiration: 83 Inches

Annual Rainfall: 4 Inches



Irrigation System  
Efficiency: 90%

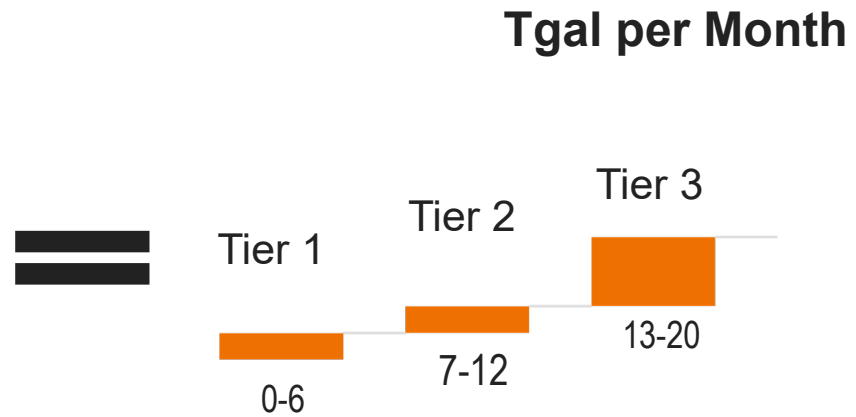
= 8,000 gal



# Monthly single family tier sizing: Tier 3



Parcel Size: 9,000  
Landscape Area: 2,700

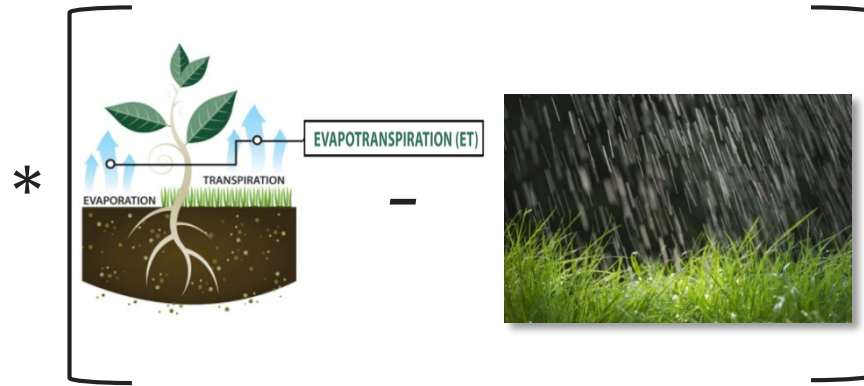


**Tier 3 = Additional 8 tgal**

# Calculating irrigation requirements for the 95<sup>th</sup> percentile parcel (18,000 ft<sup>2</sup>)



Parcel Size: 18,000  
Landscape Area: 8,100



Evapotranspiration: 83 Inches

Annual Rainfall: 4 Inches

Crop Type



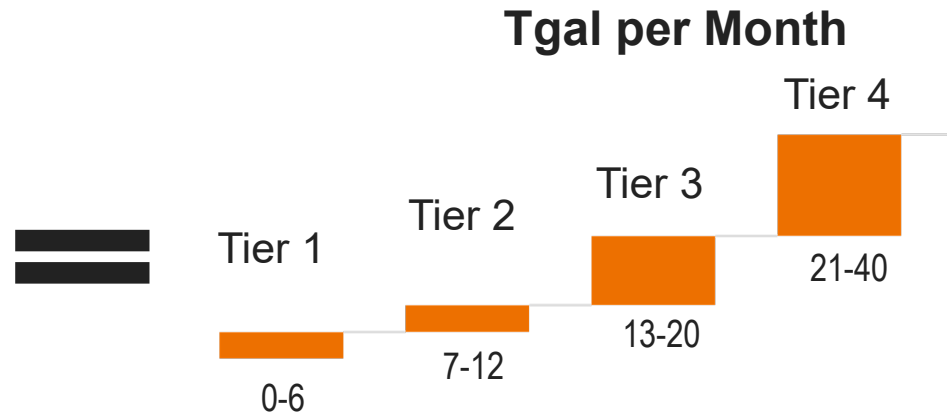
Irrigation System  
Efficiency: 85%

= 28,000 gal  
**Additional 20,000 gal**

# Monthly single family tier sizing: Tier 4



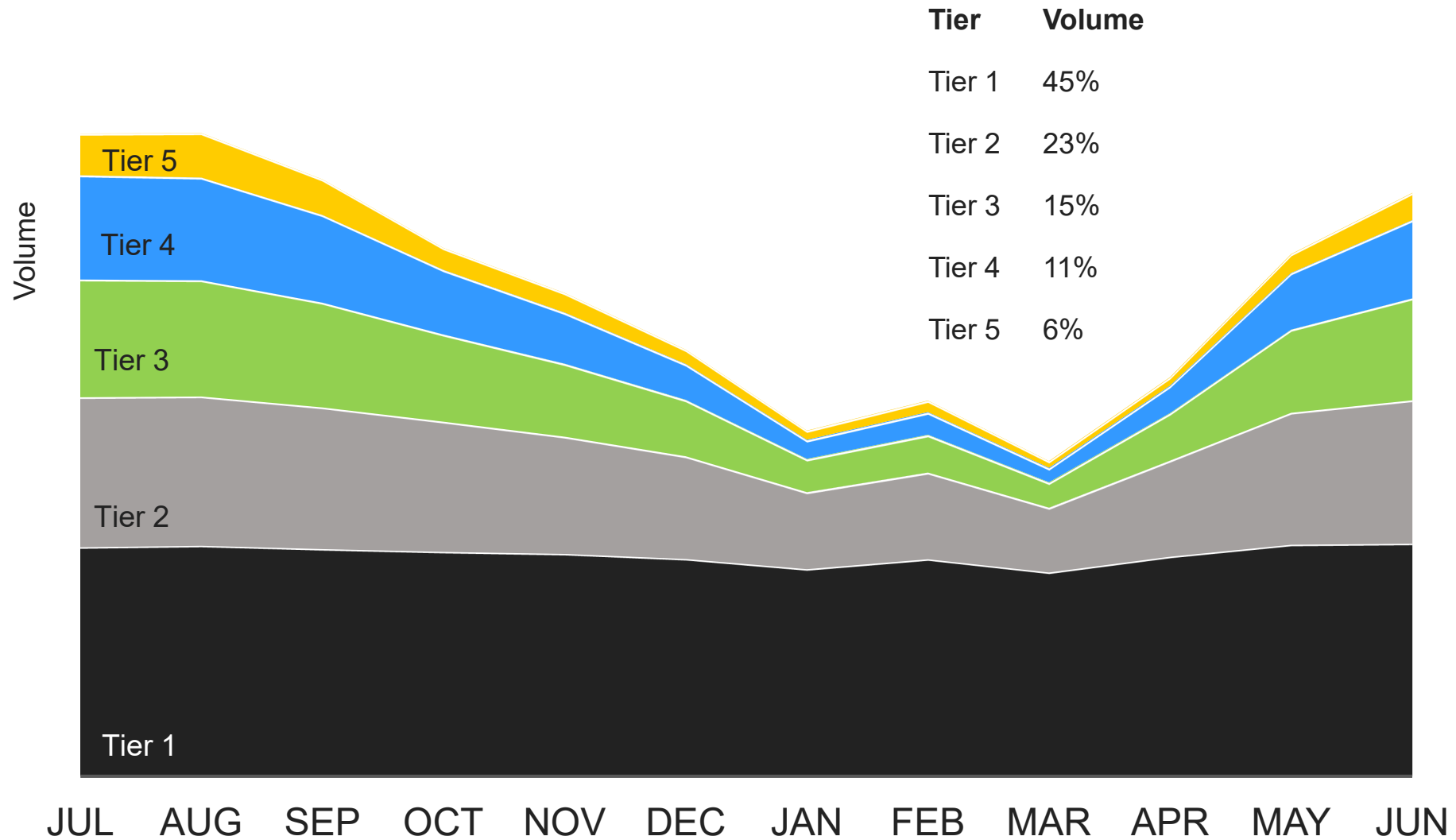
Parcel Size: 18,000  
Landscape Area: 8,100



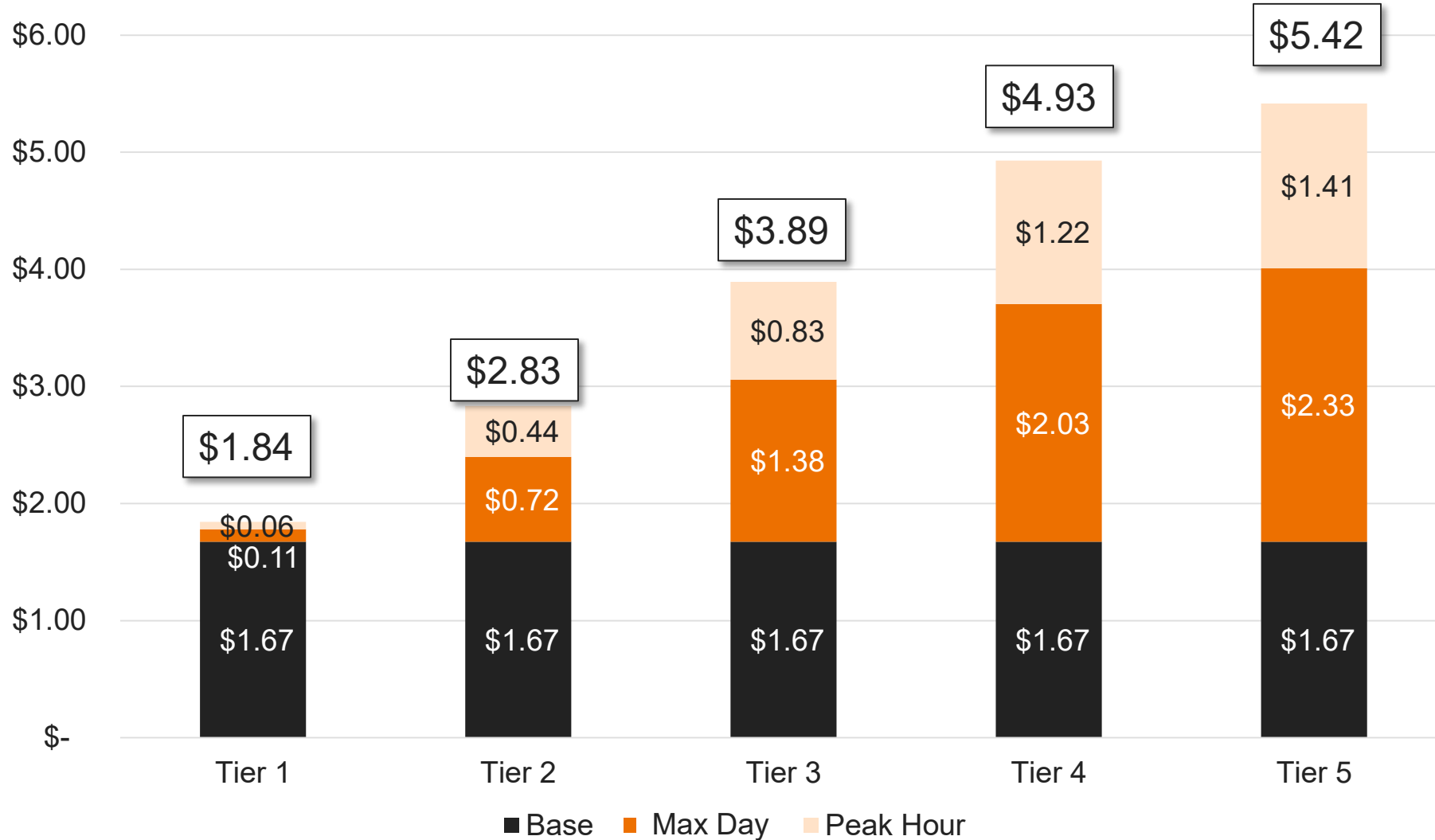
Tier 4 = Additional 21 tgal



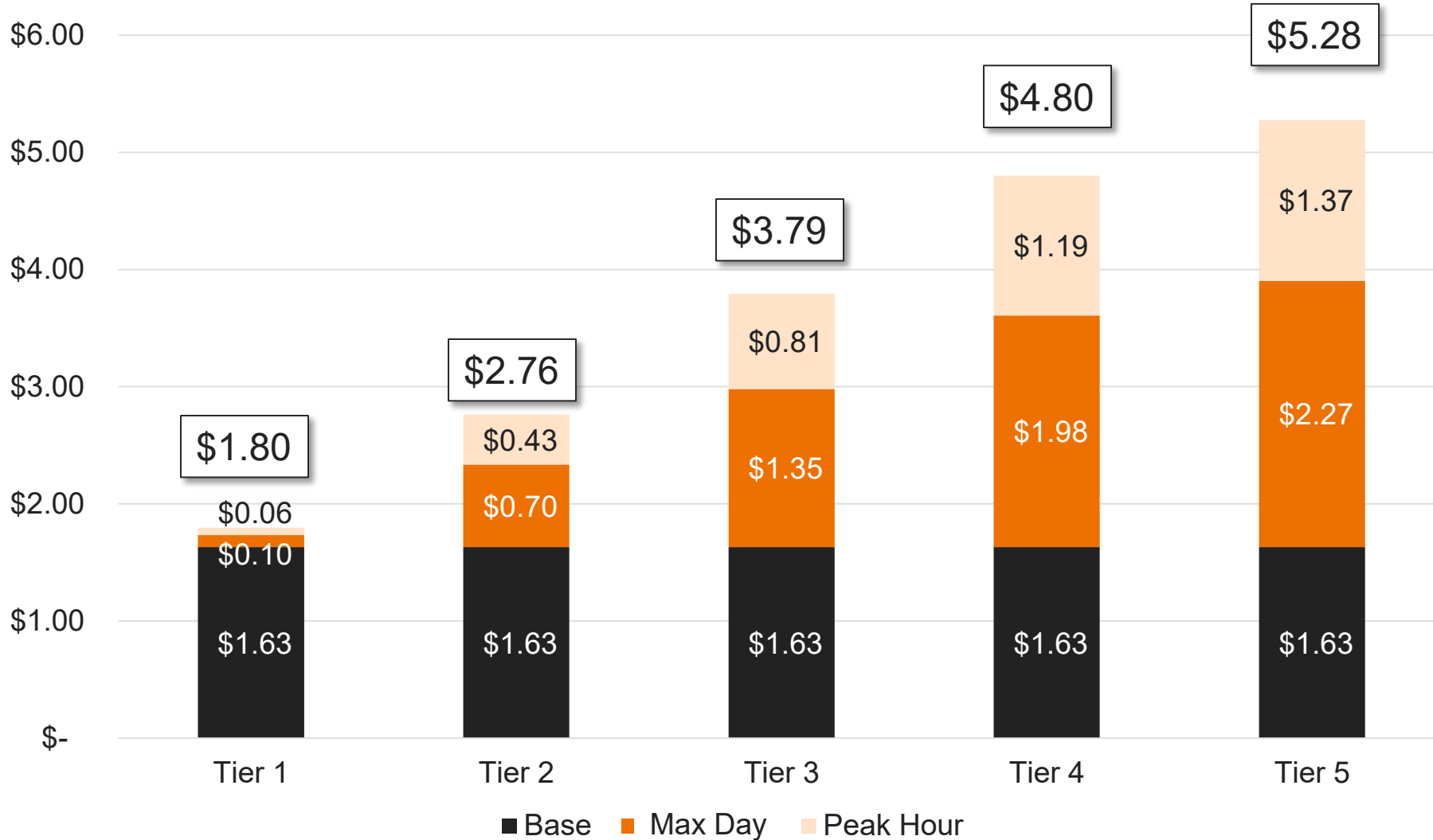
# Single family water use by tier



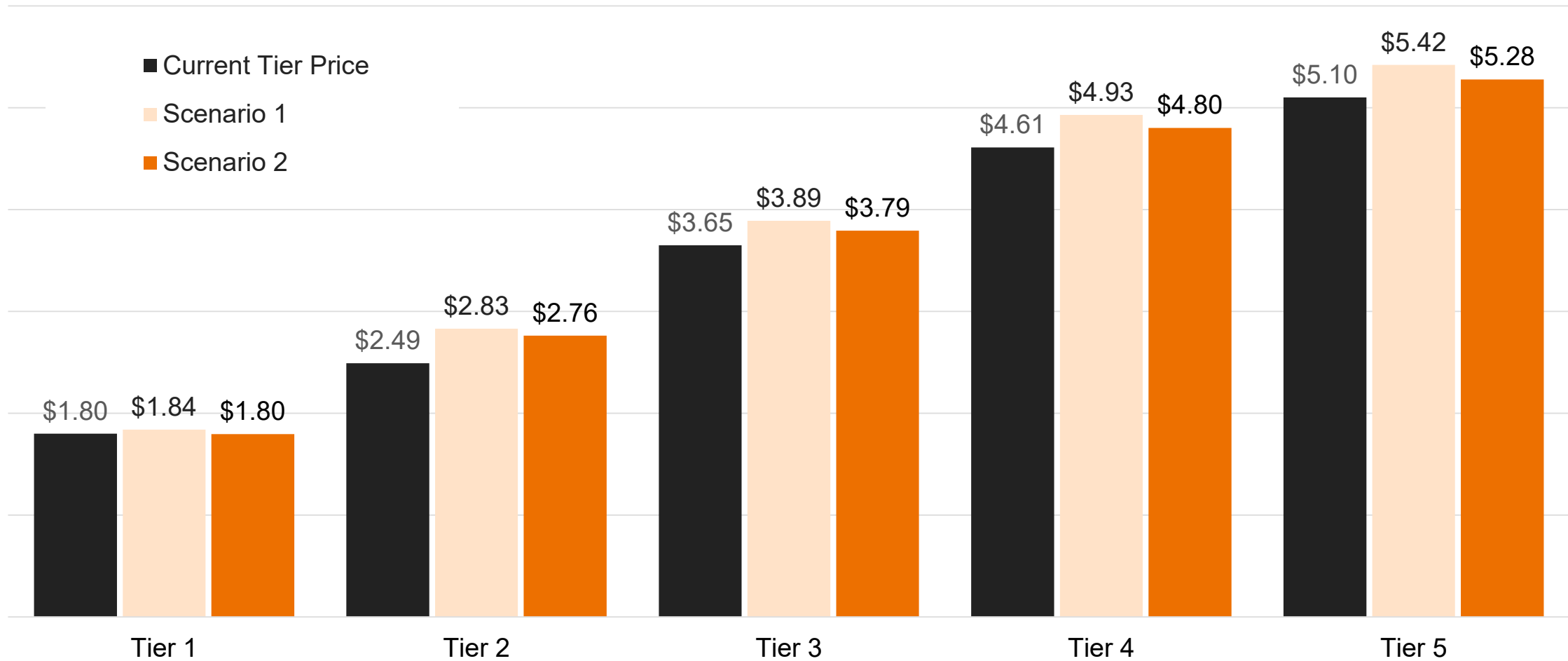
# Single family tiered rate calculations (\$/tgal) 5.5% revenue increase scenario



# Single family tiered rate calculations (\$/tgal) 2.75% revenue increase scenario



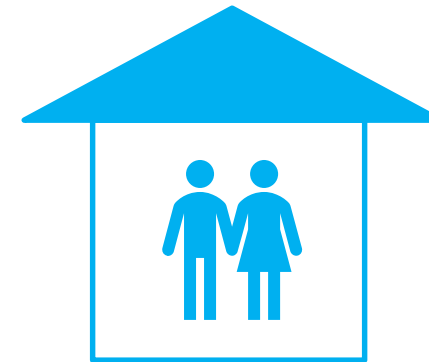
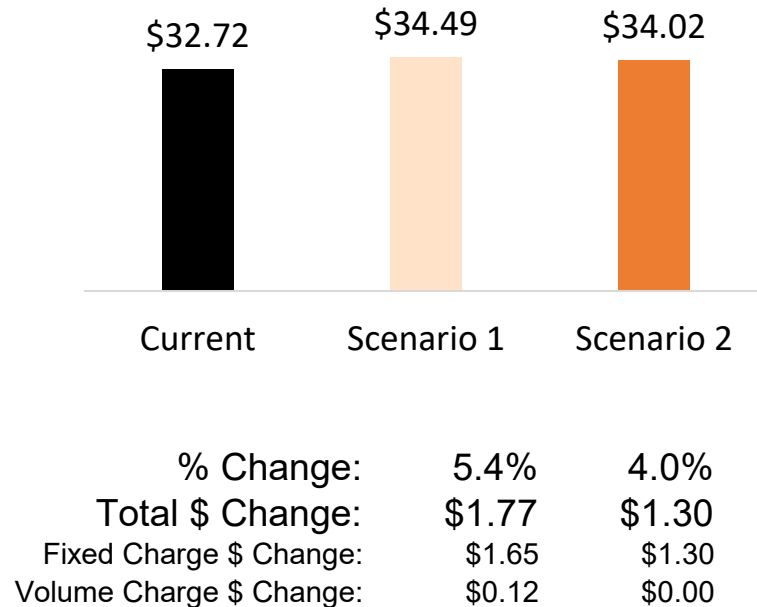
# Current vs. proposed single family tiers



Customer Bill Impacts

# Bill Impacts: Single Family Customers

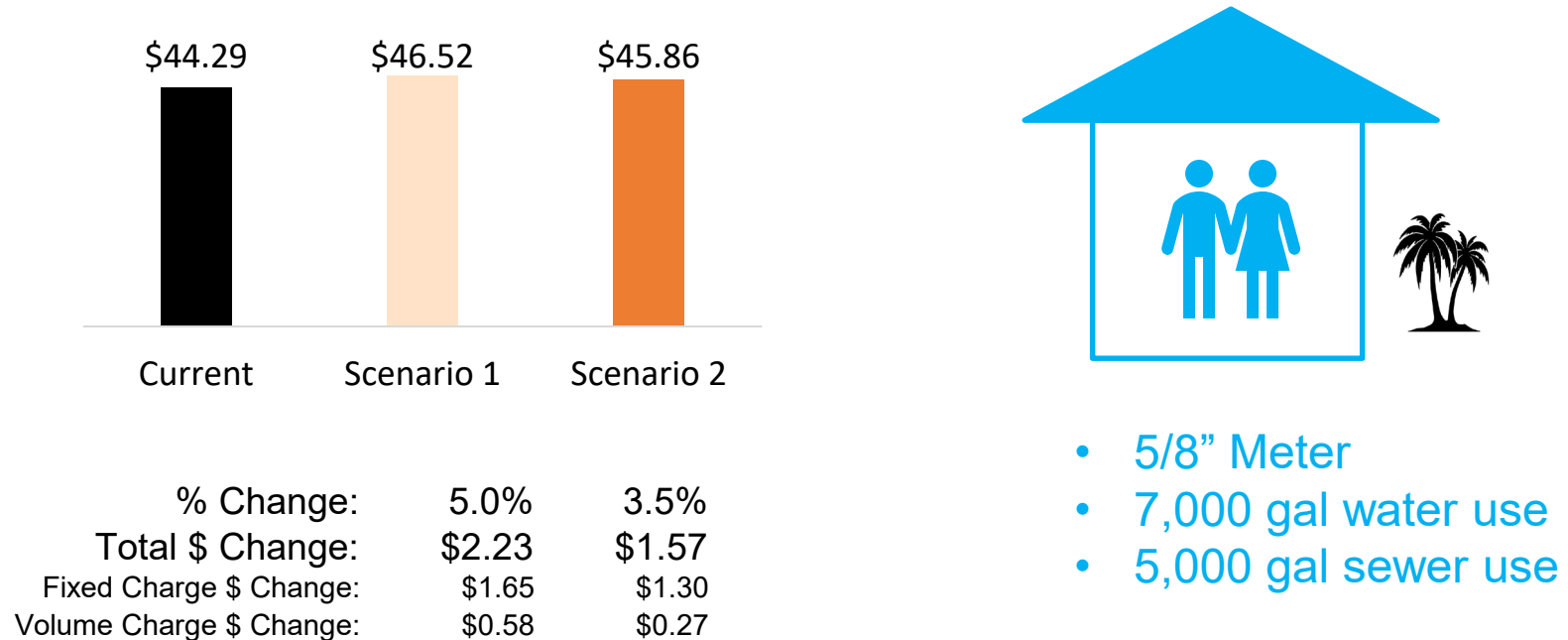
Customer with water and sewer service  
 Smaller household with indoor-only use  
 3,000 gal per month



- 5/8" Meter
- 3,000 gal water use
- 3,000 gal sewer use

# Bill Impacts: Single Family Customers

Customer with water and sewer service  
 Smaller household with some outdoor use  
 7,000 gal per month

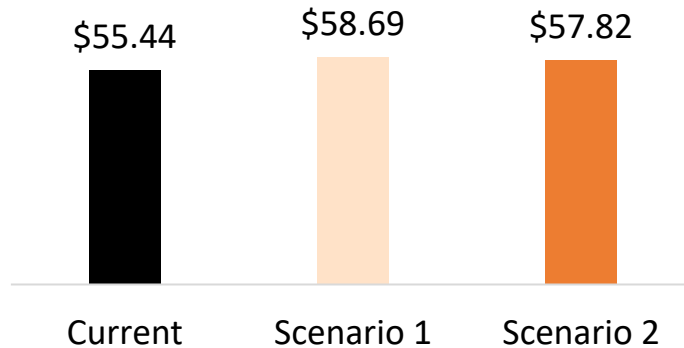


# Bill Impacts: Single Family Customers

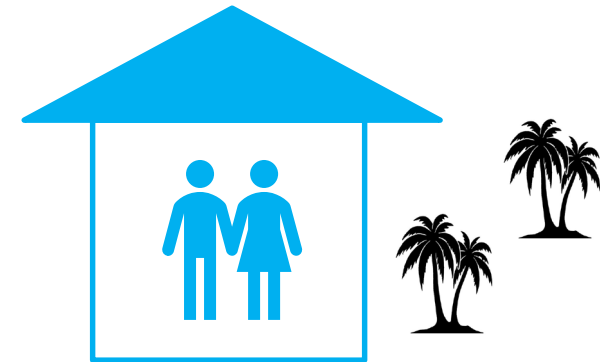
Customer with water and sewer service

Smaller household with outdoor use or larger family

10,000 gal per month



% Change:	5.9%	4.3%
Total \$ Change:	\$3.25	\$2.38
Fixed Charge \$ Change:	\$1.65	\$1.30
Volume Charge \$ Change:	\$1.60	\$1.08

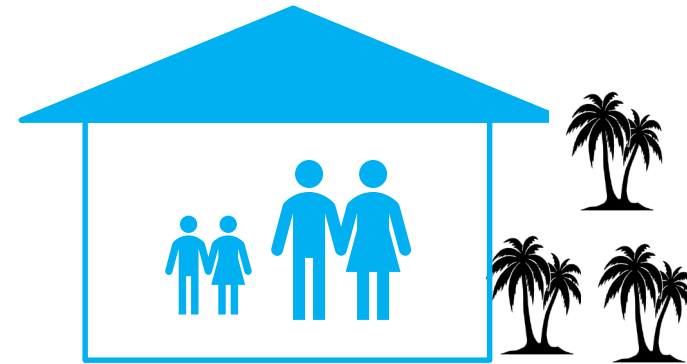
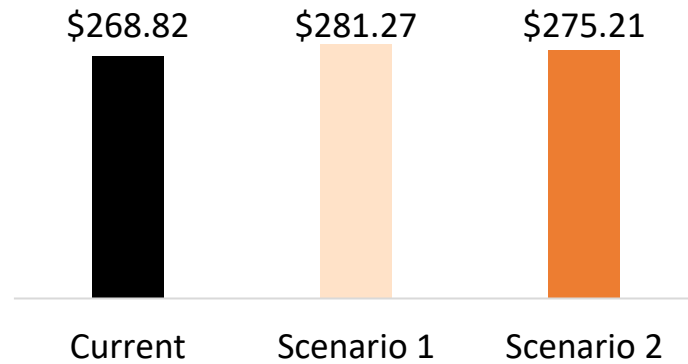


- 5/8" Meter
- 10,000 gal water use
- 7,000 gal sewer use



# Bill Impacts: Single Family Customers

Customer with water and sewer service  
 Larger household with significant outdoor use  
 50,000 gal per month

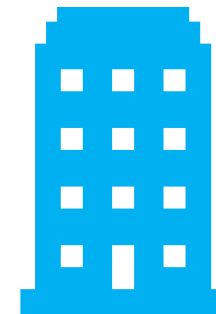
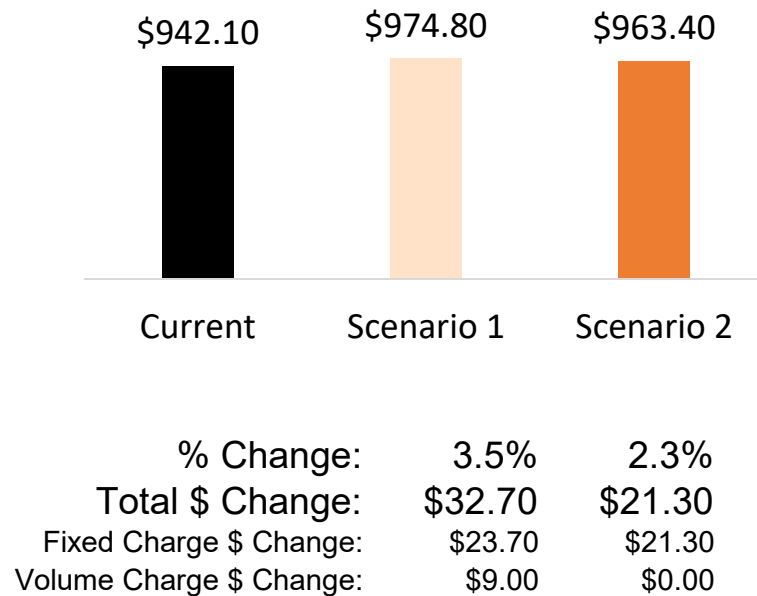


% Change:	4.6%	2.4%
Total \$ Change:	\$12.45	\$6.39
Fixed Charge \$ Change:	-\$1.35	-\$1.95
Volume Charge \$ Change:	\$13.80	\$8.34

- 1" Meter
- 50,000 gal water use
- 12,000 gal sewer use

# Bill Impacts: Commercial Customer

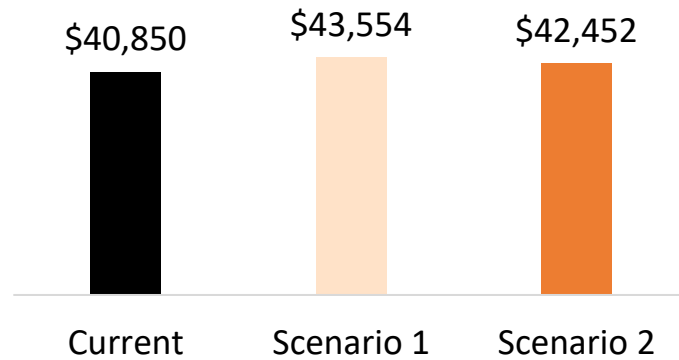
Customer with water and sewer service  
 150,000 gal per month  
 90% return flow estimate for sewer use



- 2" Meter
- 150,000 gal water use
- 135,000 gal sewer use

# Bill Impacts: Industrial Customer

Customer with water service  
 15 million gal per month  
 No sewer return flow



% Change:	6.6%	3.9%
\$ Change:	\$2,704	\$1,602
Fixed Charge \$ Change:	\$604	\$552
Volume Charge \$ Change:	\$2,100	\$1,050



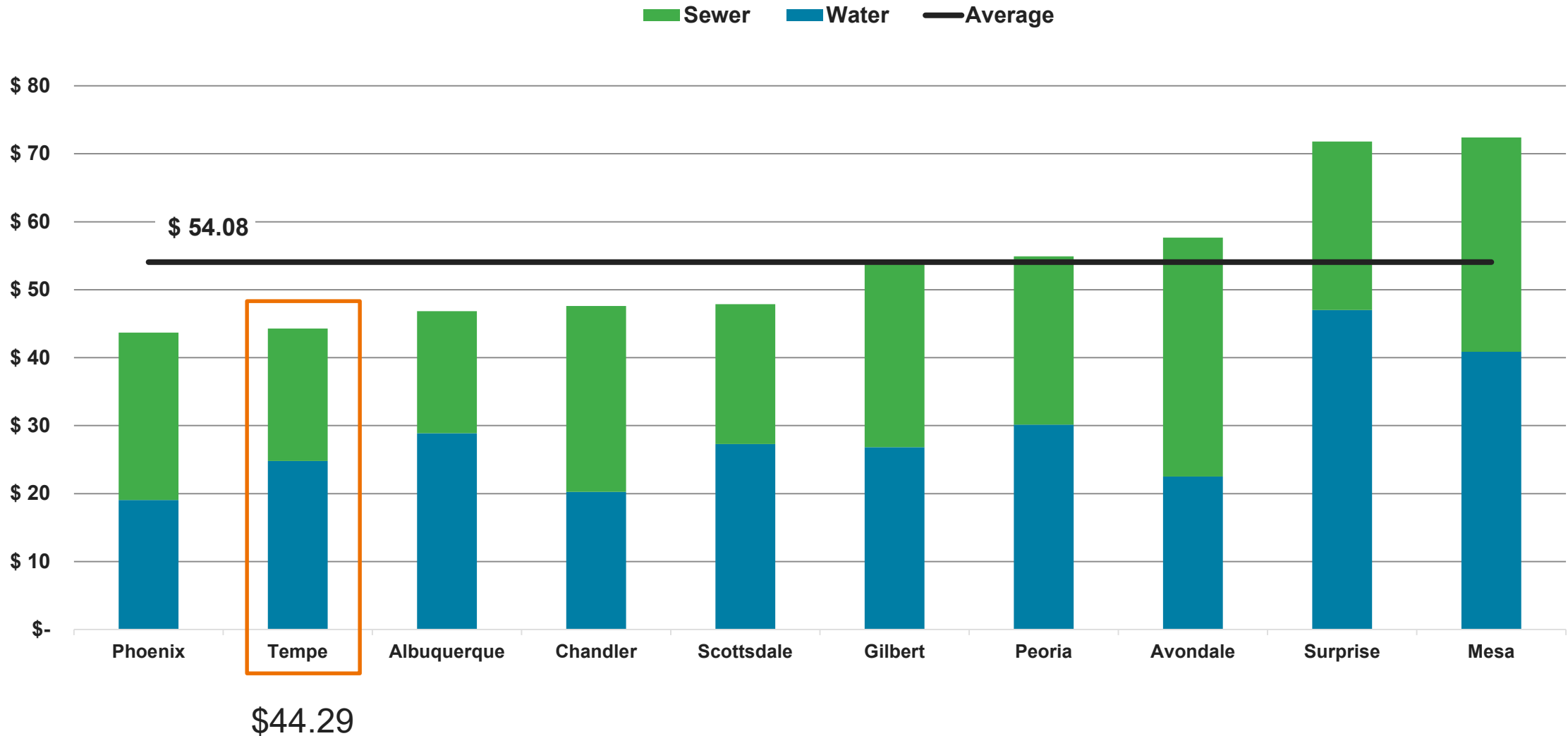
- 8" Meter
- 15,000,000 gal water use

## Affordability recommendations

- Implement cost of service-based rates to ensure that peak costs are allocated correctly, ensuring that rates reflect the true cost of service
- Continue to work with community to meet the needs of those with affordability challenges through:
  - Proactive communications through Customer Service
  - Partnership with Community Partners to avert crisis needs
  - Continue the opt-in conservation program that reduces the price of volume in Tier 5

# Water and sewer survey of local communities

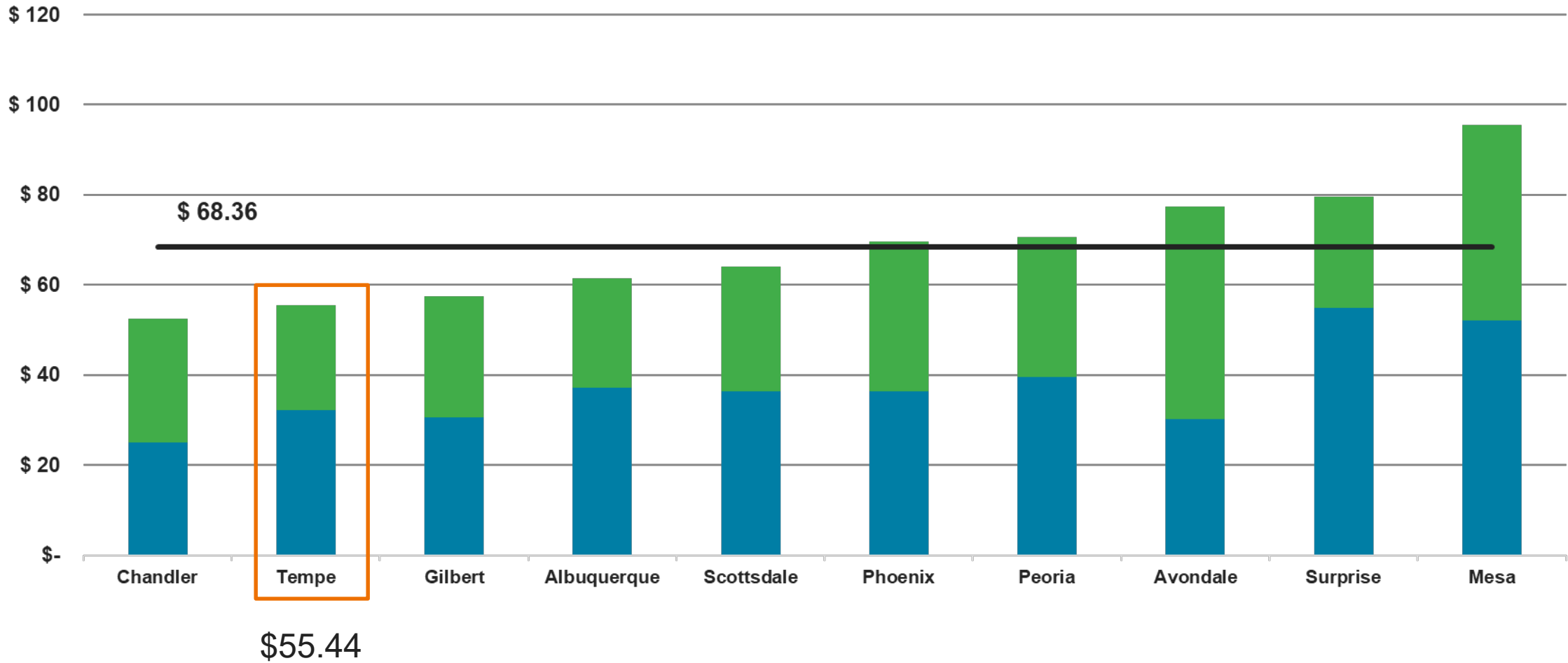
5/8" Meter, 7 tgal water, 5 tgal sewer



# Water and sewer survey of local communities

5/8" Meter, 10 tgal water, 7 tgal sewer

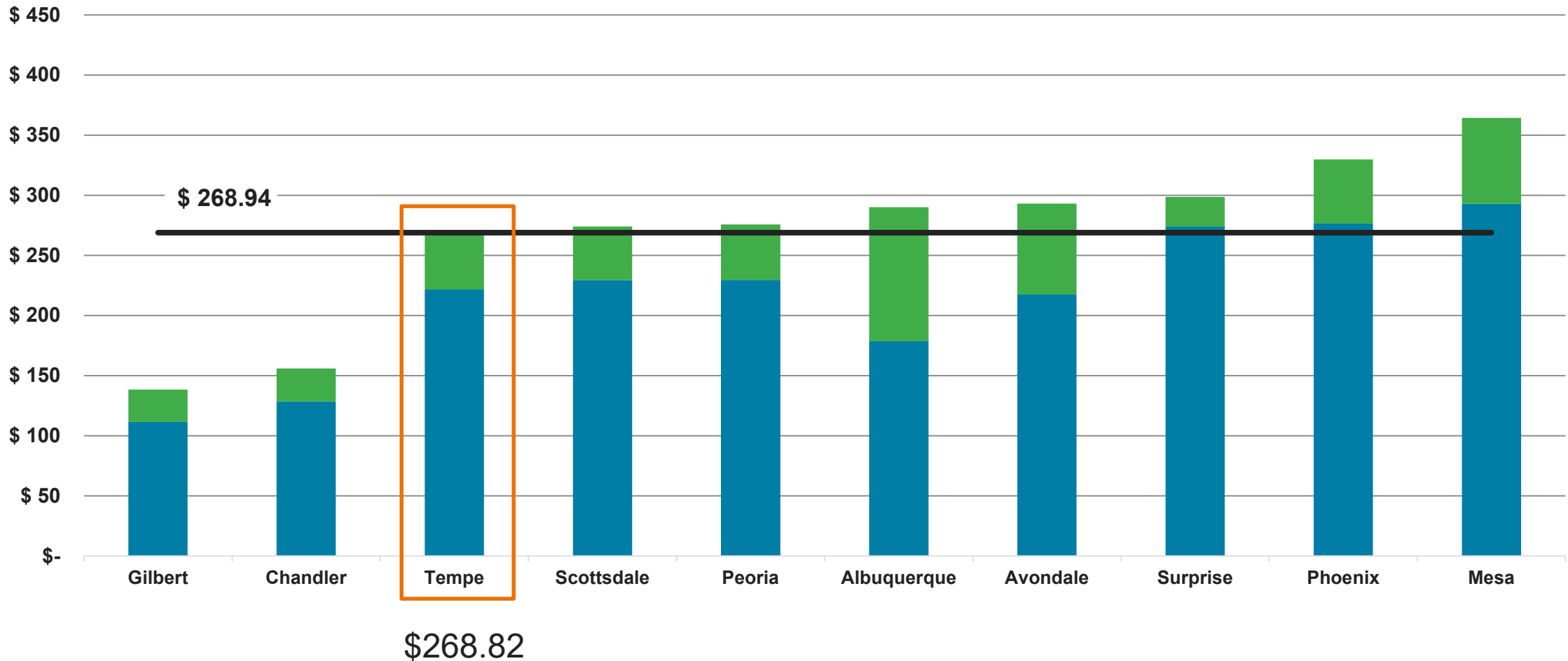
Sewer Water Average



# Water and sewer survey of local communities

1" Meter, 50 tgal water, 12 tgal sewer

Sewer Water Average



## Completed Activities

- ✓ “Rates 101” (6/2/2020)
  - Rate Study process, group role, desired outcomes
- ✓ Revenue Sufficiency Workshop (6/9/2020)
  - Annual O&M, debt service, and capital needs of water and sewer funds
- ✓ Cost of Service Workshop (7/7/2020)
  - Allocation of revenue requirements to customer classes
- ✓ Rate Structure Workshop (Today)
  - Customer class-specific rate structure enhancements



Questions & Discussion