



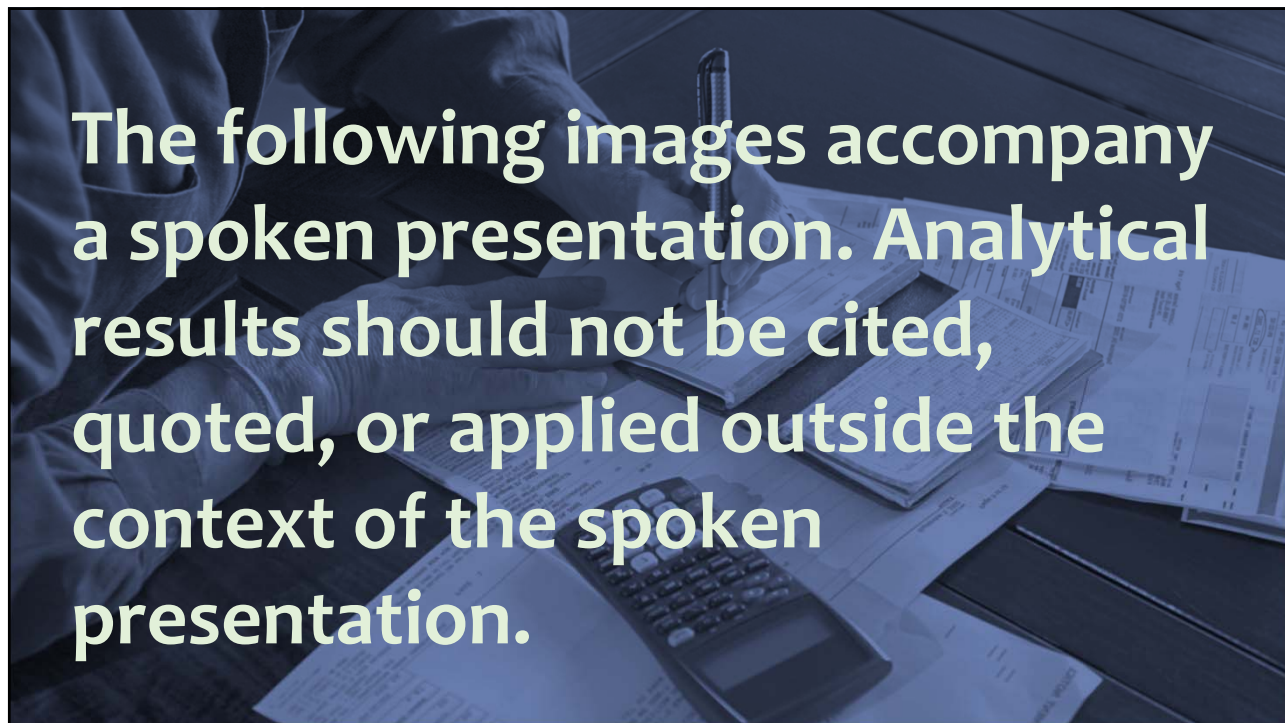
Affordability *meaning & measurement*

Affordability workshop
California Public Utilities Commission
January 2019



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Measuring Household Affordability for Water and Sewer Utilities

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Rising costs and recent high-profile crises have brought renewed and increasing attention to the affordability of water and sewer service. Meaningful, accurate assessment of affordability is critical as utility leaders seek to serve low-income customers while also raising the revenue necessary to maintain and advance public health and conservation. Unfortunately, the predominant conventional method of measuring household affordability is fundamentally flawed and often misleading. This article advances a more accurate and meaningful method for measuring the affordability of water and sewer service for low-income households. The proposed method accounts for essential household water needs, income disparities, and core nonwater/sewer costs. After detailing the method, the new approach is used to measure water and sewer service affordability in the 25 largest US cities. The article concludes with a discussion of the new method's limits and general guidelines for its use in policymaking and rate design.

Keywords: affordability, finance, measurement, rates

This article advances a new method for measuring the affordability of water and sewer service for low-income households. Rising costs and recent high-profile crises have brought renewed and increasing attention to the affordability of water and sewer service for utilities that rely upon rate revenue to meet operating and capital needs. Consequently, communities across the United States and elsewhere are under increasing pressure to ensure that the most economically vulnerable can afford to pay for these essential services in an era of rising costs. Meaningful, accurate assessment of affordability is more critical than ever as utility leaders seek to serve low-income customers while raising the revenue necessary to maintain and advance public health and conservation (L'Orange 2017). As with any organizational goal, getting affordability right requires measuring affordability accurately; unfortunately, the predominant method of measuring household water and sewer affordability is fundamentally flawed. The conventional approach measures affordability as a community's average cost of water and sewer service as a percentage of that community's median household income (MHI), with values of 2.0 or 2.5%–4.0 or 4.5% combined—deemed “affordable” (Mack & Wrase 2017). Originally intended as a means of gauging a community's overall financial capability for purposes of negotiating regulatory compliance, this standard has been widely misapplied to household affordability. As a result, evaluations of household water and sewer utility affordability are inaccurate at best and misleading at worst. This article offers a more meaningful and accurate method for measuring the affordability of water and sewer service at the household level. In contrast to the conventional approach, the proposed method accounts for essential household water and sewer costs, nonwater/sewer costs. Further, because affordability in the United States is a function of income, the proposed method assesses affordability at the 25th percentile (P₂₅), rather than at median household water and sewer cost as expressed by the MHI. The proposed method is based on a more defensible and practical approach to measuring utility affordability for planning, rate-setting, and policy. This article begins by summarizing the conventional approach to measuring the ways in which it fails. The proposed method is then presented, a discussion of its advantages over the conventional approach. As an illustration, the new method is used to measure water and sewer affordability in the 25 most populous US cities. The article concludes with a discussion of the new method's applicability, limitations, and general guidelines for use in budgeting and rate design. Significant portions of the current article draw on Davis and Teodoro (2014), which first introduced the AR method.

THE CONVENTIONAL APPROACH AND WHY IT IS WRONG

As noted previously, the most widely applied method of measuring water and sewer affordability in the United States is to calculate the average residential water and sewer bill for

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Principles of measurement

- Provide for basic volume
- Account for other essential living costs
- Focus on low-income customers



Affordability Ratio (AR)

Basic water & sewer cost as % **disposable** income

$$\frac{(\text{Cost of basic per capita water} + \text{sewer service}) \times \text{Household size}}{(\text{Household income} - \text{non-water essential expenses})}$$

Affordability Ratio (AR)

Basic water & sewer cost as % **disposable** income

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Affordability Ratio, 20th income pcntle
(AR20)

Hours at Minimum Wage (HM)

Basic water & sewer cost in *hours at minimum wage*

(Cost of basic per capita water + sewer service) x Household size

Hourly minimum wage

Principles of measurement

- ✓ Provide for basic volume
- ✓ Account for other essential living costs
- ✓ Focus on low-income customers

Example: Dallas, TX (2017)

Basic monthly water & sewer cost (6.2 kgal) \$59.82

Monthly income, 20th income percentile \$1,548.75

Estimated monthly essential expenses 864.11

Disposable monthly income \$684.64

AR₂₀ 8.74%

Example: Dallas, TX (2017)

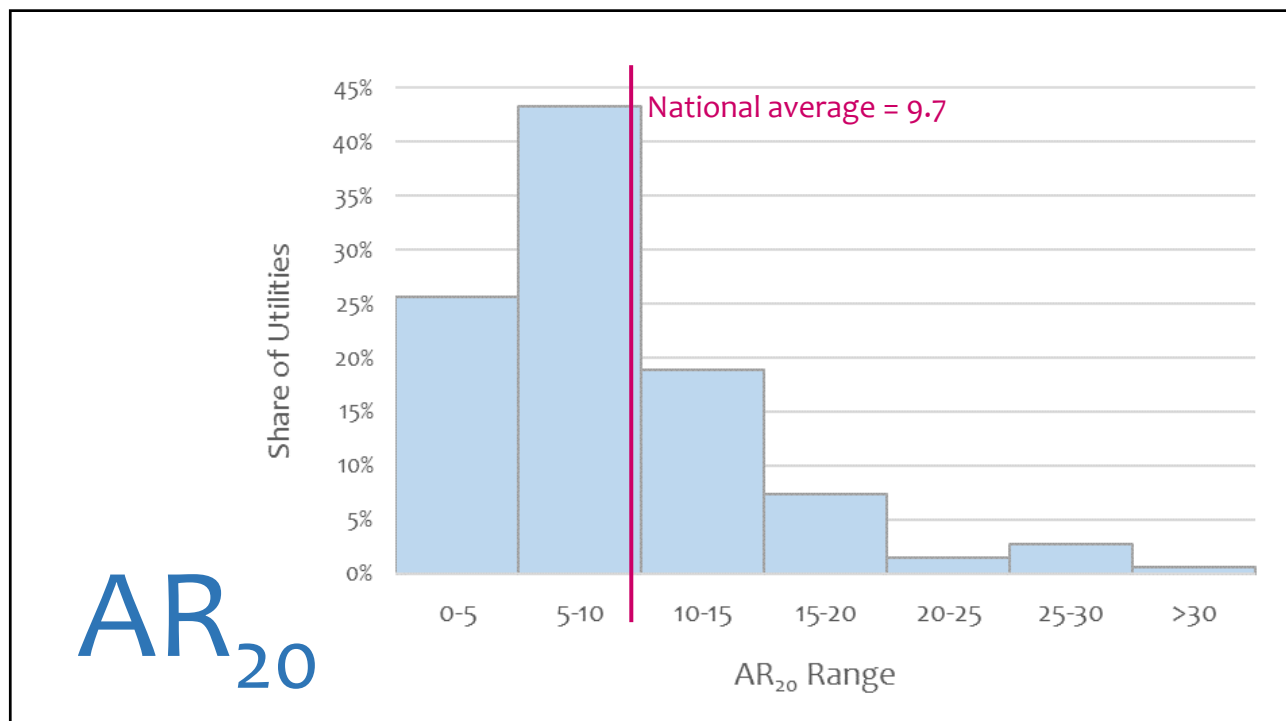
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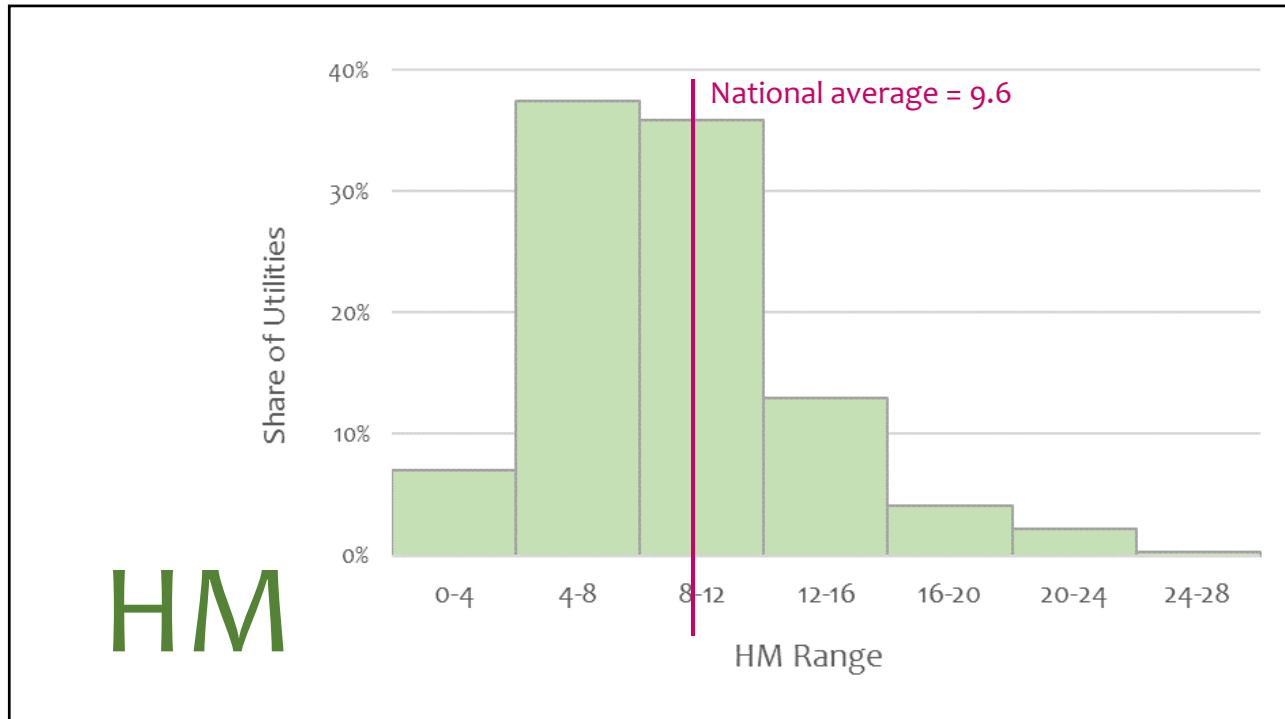
Minimum wage \$7.25

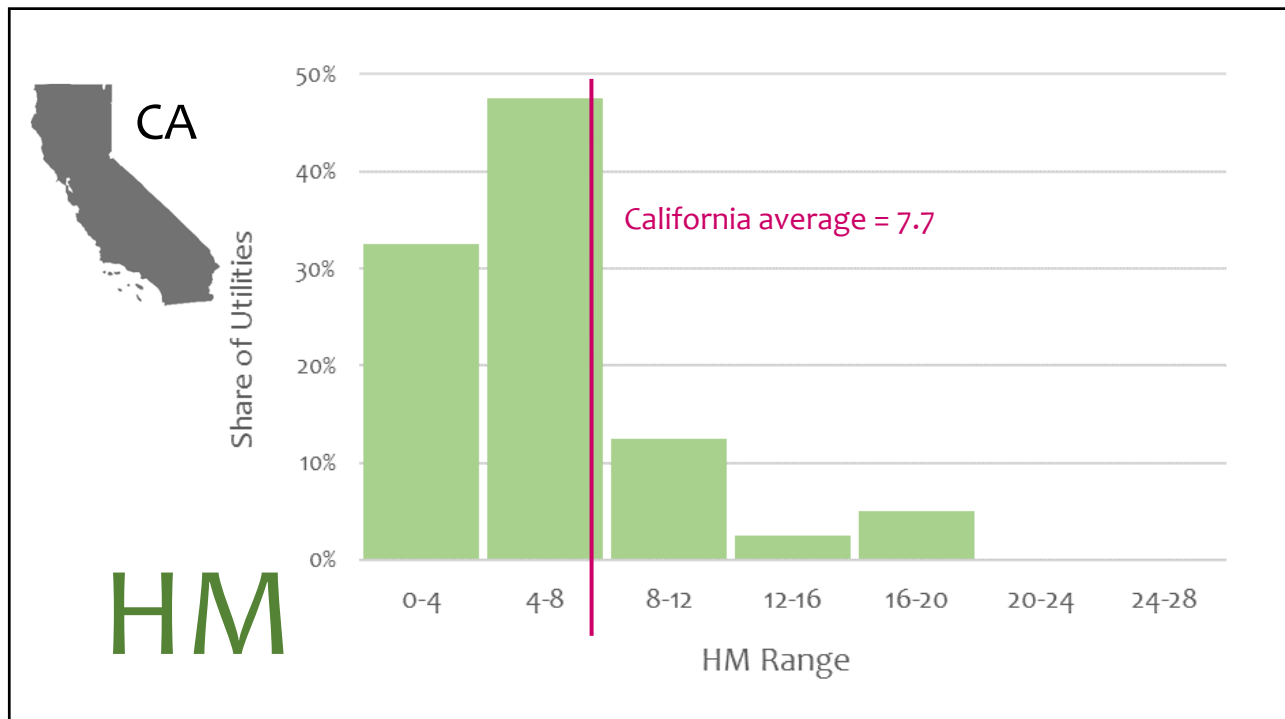
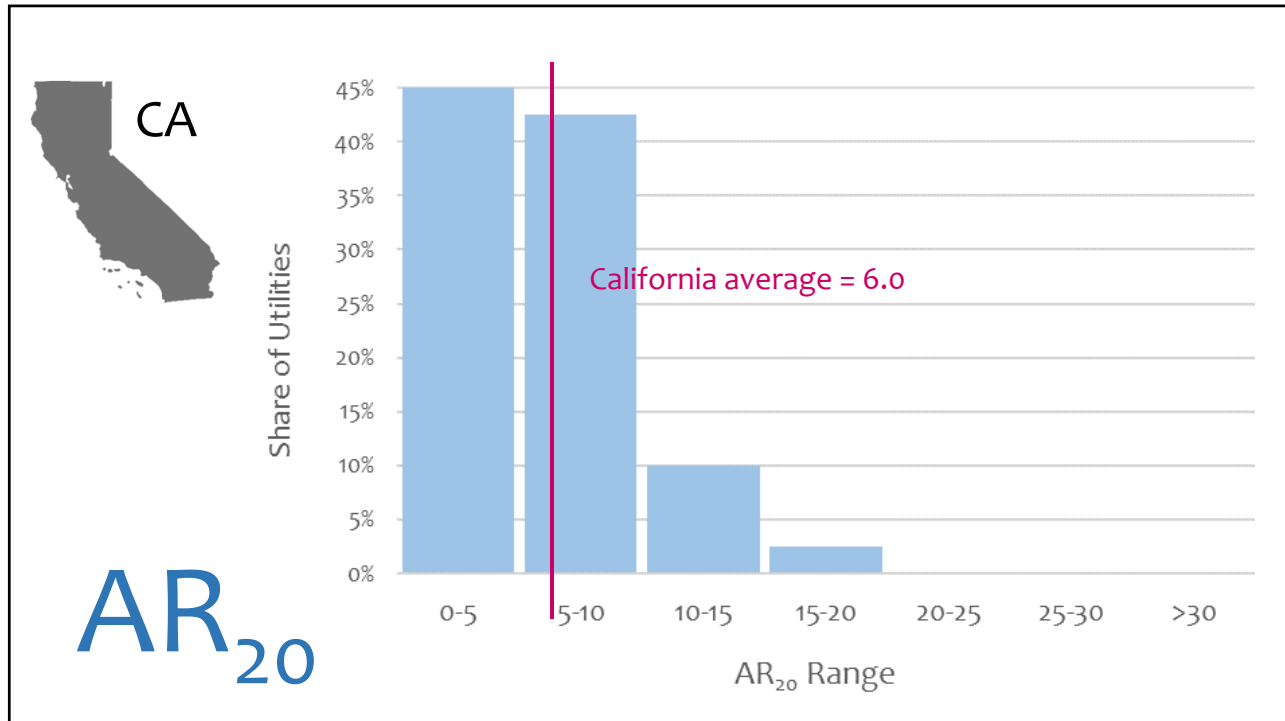
HM 8.25

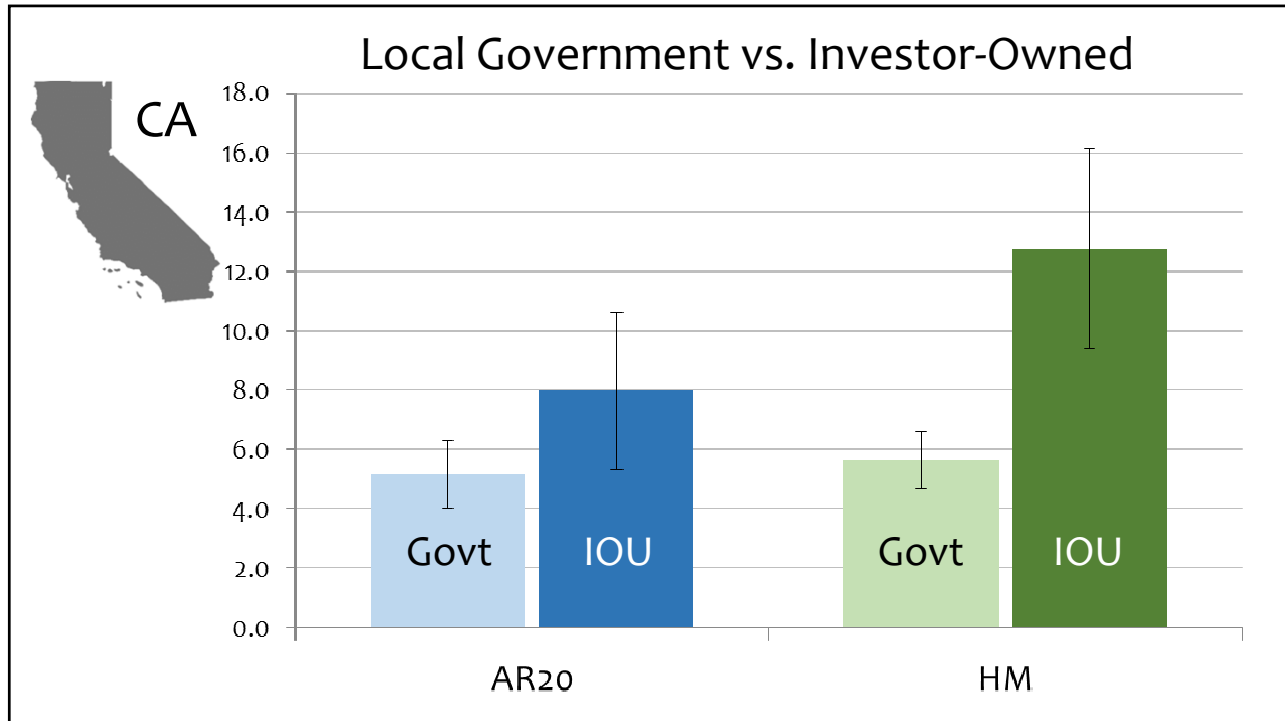
Affordability in United States | 2017

- Randomized, stratified sample
- Municipal, special district, investor-owned
- No territories
- N= 329

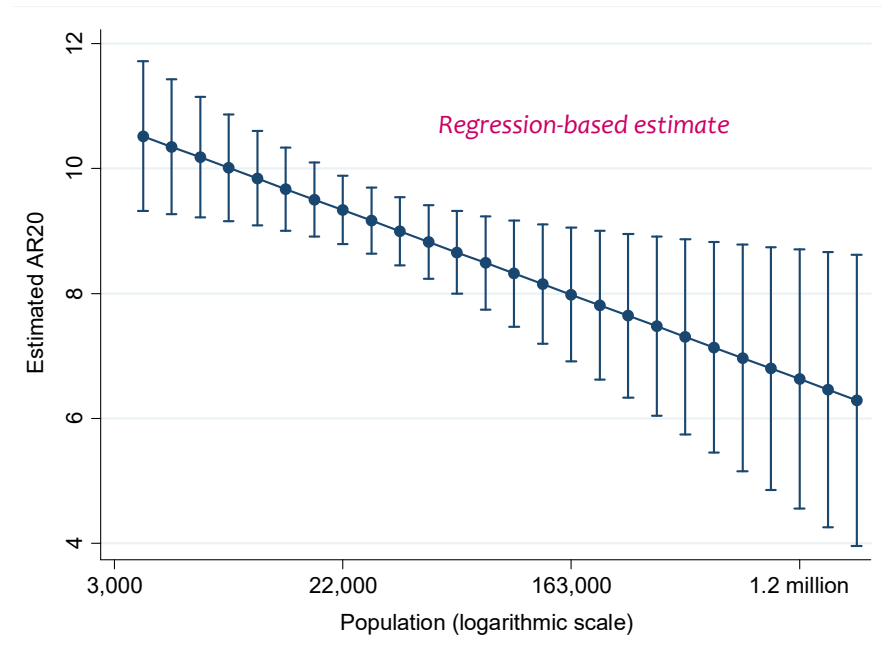






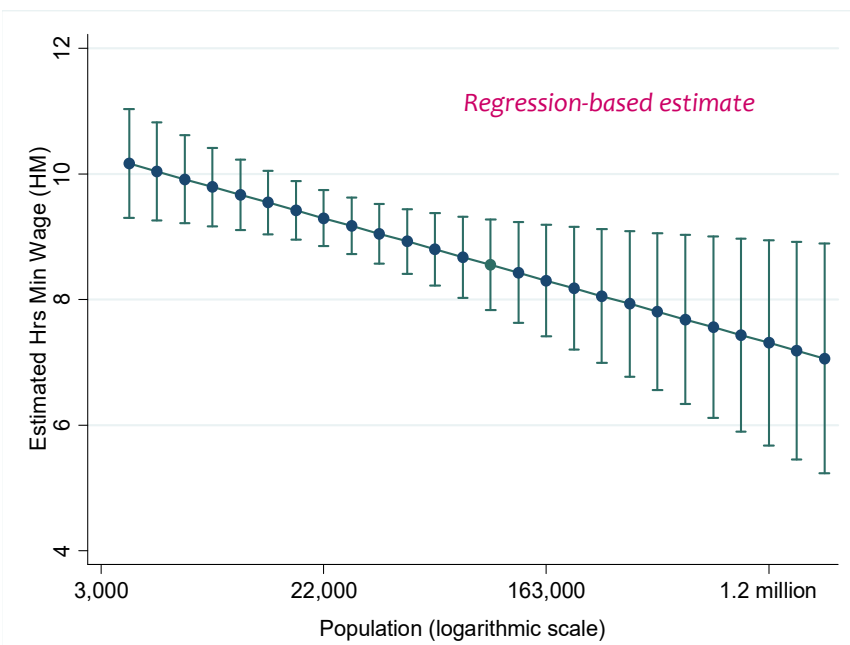


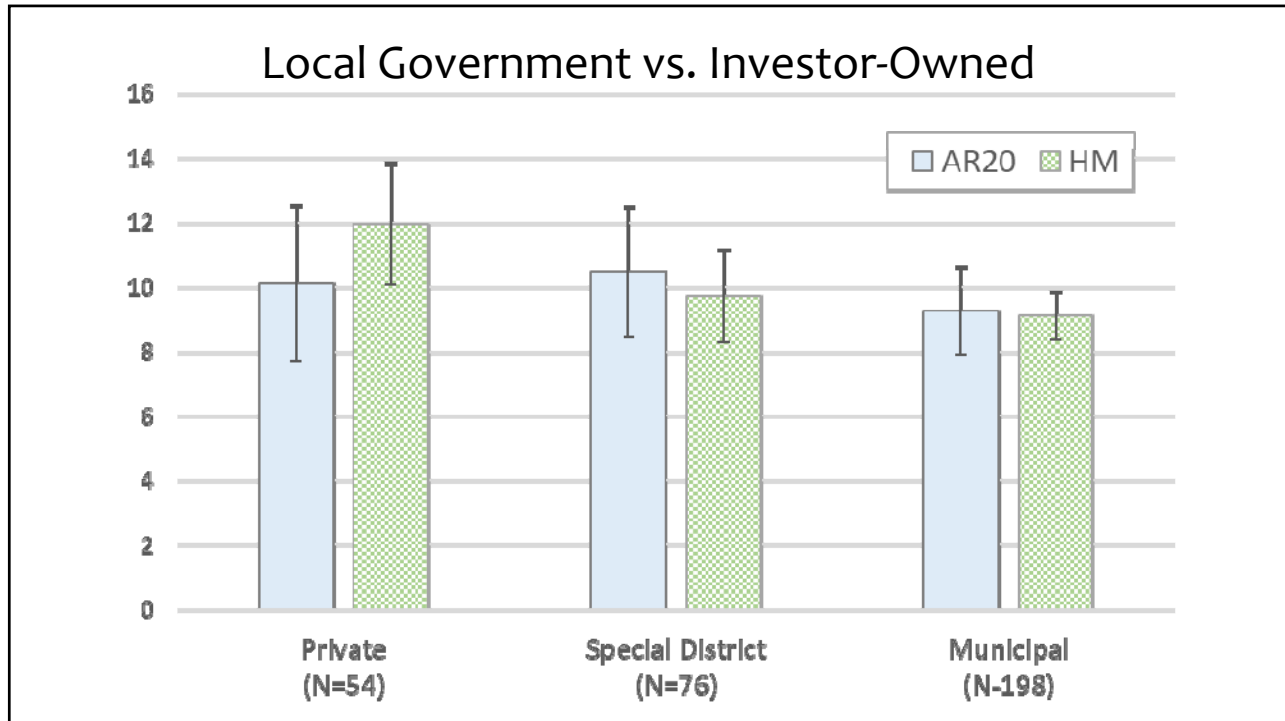
Utility size

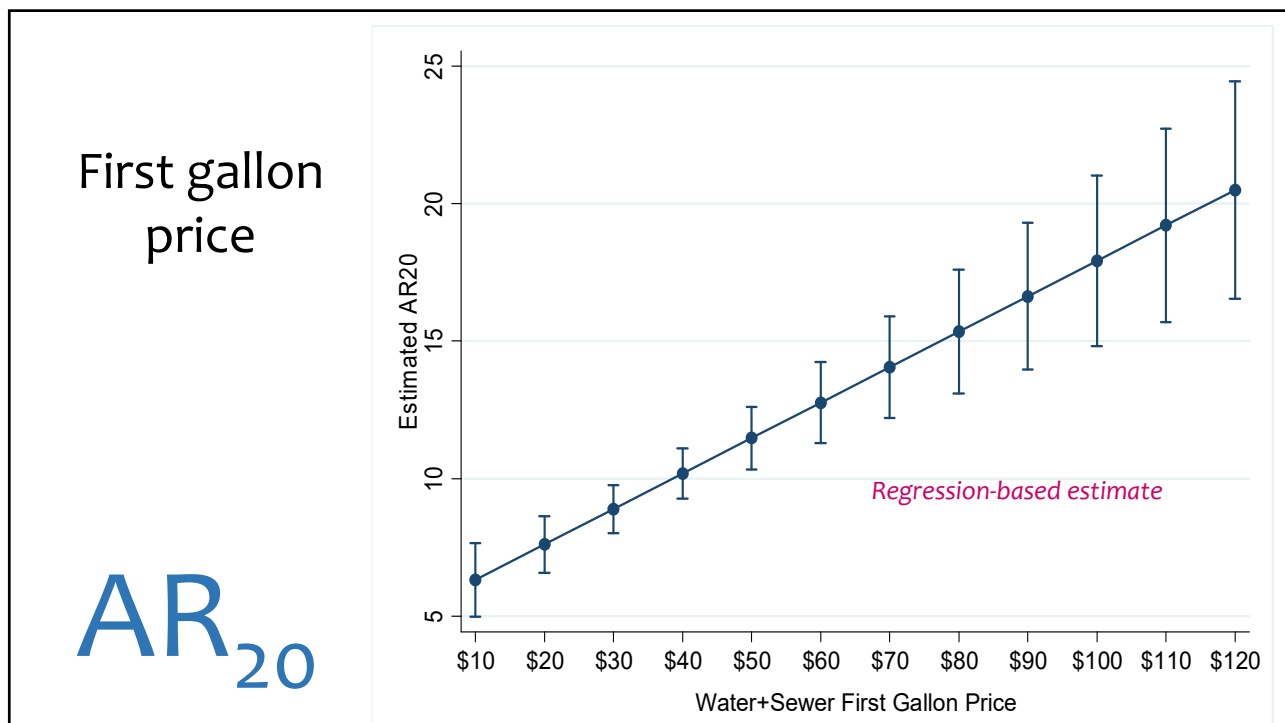
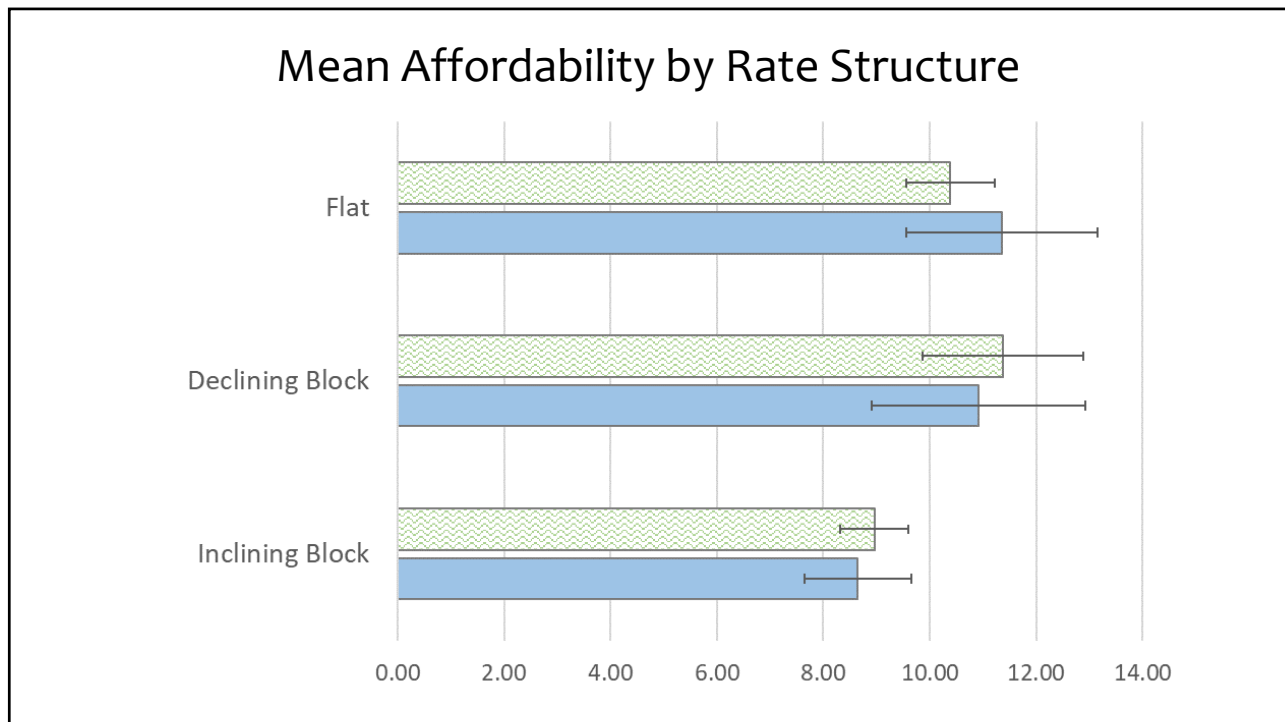
AR₂₀

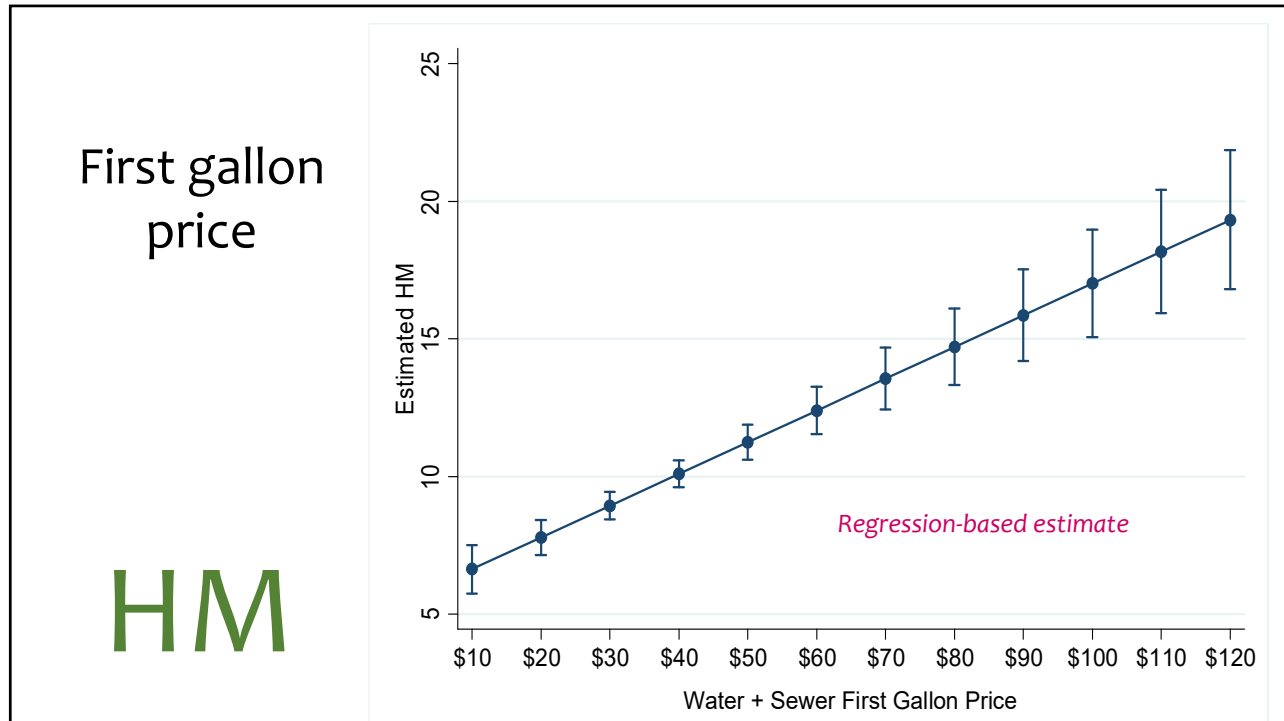
Utility size

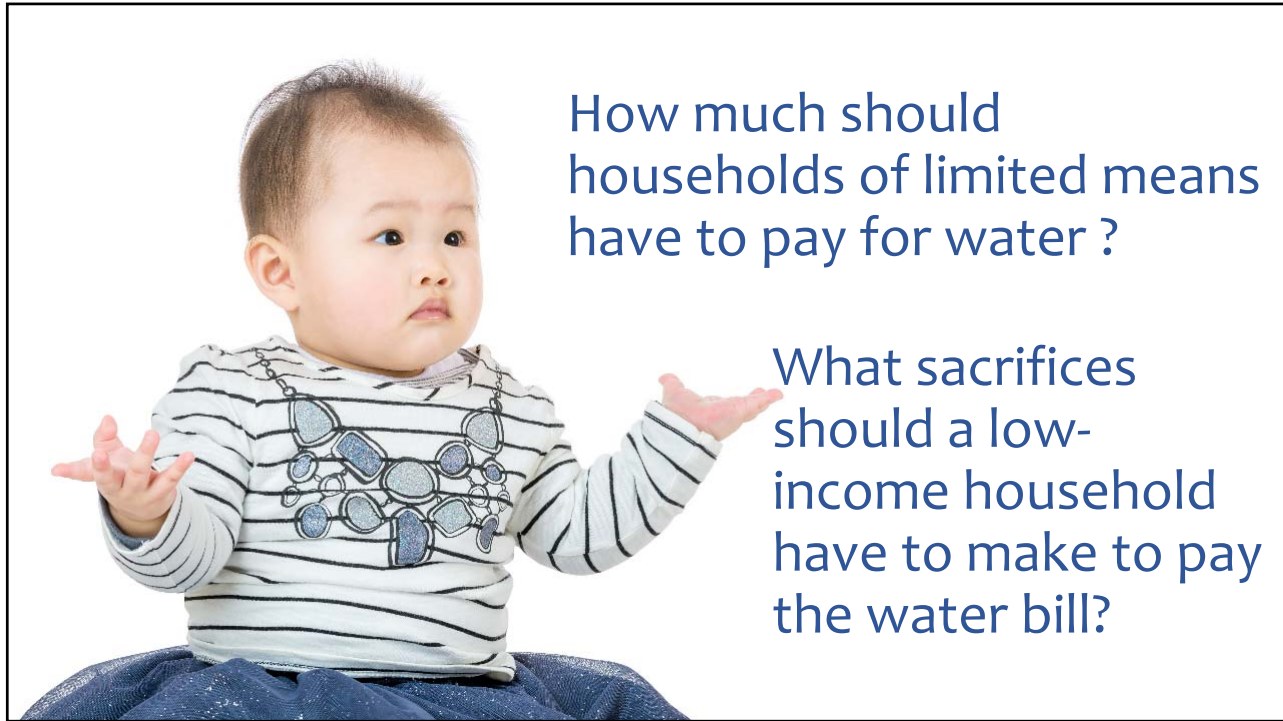
HM



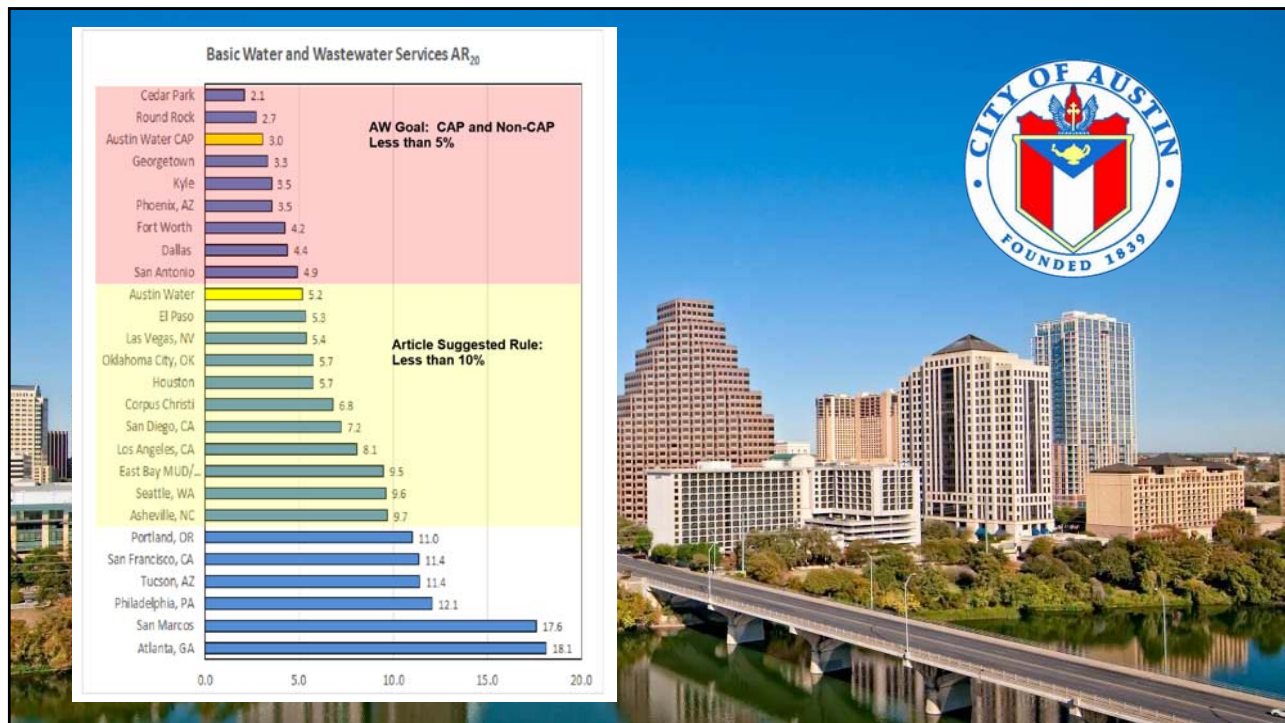








$AR_{20} \leq 10.0\%$ $HM \leq 8.0$





Principles for practice

- Measure meaningfully
- Set goals & standards
- Compare across time, not utilities



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