



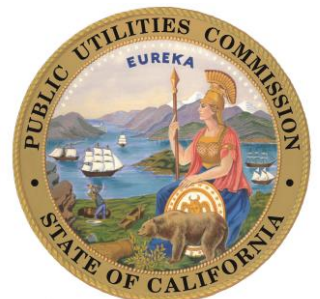
Water Rates Scenario Planning

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Executive Summary

In December 2016, the California Public Utilities Commission (CPUC) provided new guidance to the state's large (Class-A and Class-B) water utilities regarding changing the structure of retail rates along with many other related subjects, including forecasting future demand, when and how to react to divergences between actual water deliveries and the amounts forecasted, and future advanced metering options. The Commission provided both specific recommendations and goals and objectives. This paper is about the rate-design guidance. It provides a first look at how the water utilities could modify an existing water tariff – already approved by the Commission as just-and reasonable –in several different ways to meet the objectives of the Commission's guidance.

Of course, this report's simple analyses are only illustrative, and they are based on a very simplified framework. Any rate-design proposal presented by a California water utility in a general rate case would be far more rigorous. The hypothetical rate designs for water utilities are based on the "Decision Providing Guidance on Water Rate Structure and Tiered Rates," Decision D.16-12-026. It gave the water utilities several potential options, and this paper analyzes several different scenarios based on an actual tariff of the San Jose Water Company, approved and in use in California at this time. These five examples are only simple modifications; there are infinite possible variations on the ideas presented here.

Executive Summary Table 1 shows the characteristics of an existing just and reasonable tariff in effect for the residential customers of San Jose Water Company (used as a proxy for illustrative purposes) along with five variations. Executive Summary Table 2 presents the hypothetical bills that would be produced from the examples.

Executive Summary Table 2 demonstrates that the five hypothetical rate structures provide predictable changes in monthly bills for small and large users. Compared to the calculated bills for the existing standard water rates under San Jose Water Company's existing tariff, raising the percentage of the bill collected from fixed charges raises the bills for small users and lowers them for larger users. That flattening effect can be countered by changing the relative heights of the tiers, including a super-user charge or a super-user charge and a higher middle tier. Finally, a water-budget based rate design can provide different results depending on its characteristics.

These examples are meant to be illustrative and helpful to the Commission and to others in creating balanced rates for water in California. Two conclusions stand out: First, changing any one element of a rate or a rate design has the result that other things also will change. And, following from that, there is no one simple change that can be relied on to meet the many goals and objectives that the Commission has set out for just and reasonable rates.

Executive Summary Table 1

Hypothetical Water Utility Rate Designs Review Table							
Showing General Rate-Design Characteristics							
<u>Tariff Scenario</u>	<u>Fixed Charge Percentage of an Average Bill</u>	<u>Fixed Charge</u>	<u>1st-Tier Rate</u>	<u>1st- and 2nd-Tier Usage Allowances</u>	<u>2nd-Tier Percentage Increase From 1st Tier</u>	<u>3rd-Tier Percentage Increase From 2nd Tier</u>	
	<u>%</u>	<u>\$</u>	<u>\$</u>	<u>CCF</u>	<u>%</u>	<u>%</u>	
Existing SJWC Schedule 1 Tariff – This is what people are paying now	33	\$26.53	\$4.2210	3, 18	11.1	10.0	
1 Modification of SJWC Tariff to Collect 40-percent of an average bill through a fixed charge	40	\$32.39	\$3.6769	3, 18	11.1	10.0	
2 Modification of SJWC Tariff to Collect 50-percent of an average bill through a fixed charge	50	\$40.49	\$2.9255	3, 18	11.1	10.0	
3 Further Modification of the SJWC Tariff to include a Super-User Charge (double the rate of the first tier)	50	\$40.49	\$2.9255	3, 18	11.1	80.0	
4 Further Modification of the SJWC Tariff to include a a High 2nd tier ratio (67-percent higher than the 1st tier) along with a Super-User Charge (67-percent higher than the 2nd Tier)	50	\$49.49	\$2.1498	3, 15	66.7	66.7	
5 Water-Budget-based rate design (calculated for a household of four residents) based on 55/gal/day/person still to Collect 50-percent of an average bill through a fixed charge	50	\$40.49	\$2.9779	8.8235, 18.8235	50.0	50.0	

Executive Summary Table 2

Hypothetical Water Utility Rate Designs Review Table					
<u>Showing Calculated Bill Results -- at Monthly Usage Rates</u>					
Tariff Scenario		Low User <u>5 CCF</u>	Avg User <u>10 CCF</u>	High User <u>15 CCF</u>	Very High User 20 <u>CCF</u>
		<u>Dollars (\$) per Month</u>			
	Existing SJWC Schedule 1 Tariff – This is what people are paying now	\$53.05	\$80.99	\$108.92	\$137.79
1	Modification of SJWC Tariff to Collect 40-percent of an average bill through a fixed charge	\$56.08	\$80.98	\$105.89	\$131.62
2	Modification of SJWC Tariff to Collect 50-percent of an average bill through a fixed charge	\$60.25	\$80.98	\$101.72	\$123.10
3	Further Modification of the SJWC Tariff to include a Super-User Charge (double the rate of the first tier)	\$60.25	\$80.98	\$101.72	\$127.65
4	Further Modification of the SJWC Tariff to include a a High 2nd tier ratio (67-percent higher than the 1st tier) along with a Super-User Charge (67-percent higher than the 2nd Tier)	\$58.59	\$80.98	\$103.38	\$137.72
5	Water-Budget-based rate design (calculated for a household of four residents) based on 55/gal/day/person still to Collect 50-percent of an average bill through a fixed charge	\$59.86	\$80.99	\$107.80	\$137.24

Introduction and Background

In December of 2016, the California Public Utilities Commission (CPUC or the Commission) issued a “Decision Providing Guidance on Water Rate Structure and Tiered Rates,” which provides new guidance on water utility rate structure.¹ The decision changed a long-standing policy of requiring its jurisdictional large water utilities to use a specific rate design for residential customers. Entitled the “Decision Providing Guidance on Water Rate Structure and Tiered Rates,” it will be referred to in this paper as “the Guidance Decision.” In it the Commission adopted a set of goals and Objectives for Balanced Rate Design.²

The Guidance decision alters the direction of retail rate design of the Commission’s 2007 Rate Case Plan for water utilities.³ Among the many requirements of the 2007 Rate Case Plan, the utilities were required to report progress in meeting the 14 Best Management Practices (BMPs) of the California Urban Water Conservation Council (CUWCC or the Council), including a BMP for rate design. Originally adopted in 1991 and updated multiple times in the succeeding years, the BMPs are contained in a Memorandum of Understanding among the members.⁴ BMP 1.4, regarding retail conservation pricing, requires that revenues from volumetric charges should be at least 70-percent of annual revenue, with a maximum of only 30-percent of revenue derived from fixed charges.⁵ In the CPUC’s new Guidance decision, the utilities are directed to consider proposing rate structures that would collect a minimum of 40-percent (and up to 50-percent) of revenues from fixed charges.

The CPUC is a member of the CUWCC. The Class-A and Class-B water utilities also are members, as is the trade association many of them belong to, the California Water Association. The CUWCC itself is undergoing organizational changes, and the new organization that it becomes may adopt changes to its policies regarding conservation rate design standards.⁶

In light of the Commission’s Guidance decision and the Council’s organizational changes, the California water utilities and the Commission will be considering changes to long-standing tariff-design assumptions. This paper presents options that may be considered for water utility rate design. It presents a brief history of the Commission’s view of water rate design from 2005 to the present and the

¹ California Public Utilities Commission Decision D.16-12-026, Decision Providing Guidance on Water Rate Structure and Tiered Rates. The decision was modified by Decision D.17-04-002, Decision Correction Errors in Decision D.16-12-026. The decision is referred to hereafter as “the Guidance decision.”

² Attachment A to Decision D.16-12-026. The goals are presented as Appendix 1 of this paper.

³ California Public Utilities Commission Decision D.07-05-062, Opinion Adopting Revised Rate Case Plan for Class A Water Utilities.

⁴ California Urban Water Conservation Council, *Memorandum of Understanding Regarding Urban Water Conservation in California*, <http://www.cuwcc.org/About-Us/Memorandum-of-Understanding>.

⁵ The 70-percent rule relates to annual revenues from monthly or bi-monthly meter/service charges. It does not include revenues from new service connection charges; revenue from special rates and temporary service, fire protection or other irregular services; revenues from grants or contributions from external sources in aid of construction or program implementation; or revenue from property or other utility taxes.

⁶ At its November 16, 2016 meeting, the Council Board approved a package of agreements that would allow the Council to substantially restructure and refocus itself. On January 6, 2017, the Council announced that the recommendation to restructure and refocus was passed by written vote of the members. More information about the proposed changes and the vote results are available at the Council’s web site: <http://www.cuwcc.org/News>.

difficulties that the Commission faced with revenue and rate stability over the last several years. It provides a short summary of the rate-design aspects of the Guidance decision. And it discusses some rate design options that have been discussed in the professional literature.

Recent History of CPUC Direction on Water Rate Design

The recent history of the Commission's water policies regarding water conservation and rate design issues begins with its first Water Action Plan, adopted in 2005.⁷ The Commission conducted a set of water conservation-related proceedings in the latter half of that decade, and there followed an updated Water Action Plan in 2010.⁸ Water Revenue Adjustment Mechanisms (WRAMs) were established in various forms for most of the water utilities over the next several years. In 2011, the Commission revisited water conservation and rate matters in the Water Balanced Rates proceeding.⁹

The Water Action Plan of 2005

The Water Action Plan of 2005 called efficient use of water one of four basic principles upon which regulation should stand. It expressed as an objective the strengthening the Commission's water conservation programs to a level comparable to the conservation programs of the energy utilities. While energy conservation has been a goal of the state of California at least since the 1970s, before the Water Action Plan, the State's and the Commission's water policies were not all directed towards conservation of water.

For example, it was not required that all retail water connections be metered. To the contrary, the Public Utilities Code required that before the Commission could require the installation of water meters, it must show that metering would be cost-effective; that it would result in significant water use reduction; and that it would not impose unreasonable costs. The 2005 Water Action Plan indicated that the Commission would work to ensure that such a showing would be made as often as possible in future water cases, and would then require metered water service.

The Commission said in the 2005 Water Action Plan that it should promote conservation-based retail water rates. The Commission also promised that it would work to educate water users and providers regarding efficiency in water use. In addition, the Commission indicated that it would direct all Class-A and Class-B water utilities to participate in the CUWCC, and that it would promote increasing-block rates to provide customers a financial incentive to save. Finally, in addition to other actions, the Commission recognized that, "because water utilities recover their costs through sales, there is a disincentive associated with demand side management: a successful campaign to reduce water use leads to less

⁷ California Public Utilities Commission, Water Action Plan, December 2005.

<http://www.cpuc.ca.gov/General.aspx?id=6751>.

⁸ California Public Utilities Commission, Water Action Plan, October 2010.

<http://www.cpuc.ca.gov/General.aspx?id=6751>.

⁹ Rulemaking R.11-11-008, "Order Instituting Rulemaking on the Commission's Own Motion into Addressing the Commission's Water Action Plan Objective of Setting Rates that Balance Investment, Conservation, and Affordability for Class A and Class B Water Utilities."

revenue and less profit. The Commission will consider de-coupling water utility sales from earnings in order to eliminate current disincentives associated with conservation.”¹⁰

Water Conservation Proceedings and the Water Action Plan Update of 2010

After adopting the 2005 Water Action Plan, the Commission was able to achieve most of its objectives. Over the next several years, there was a succession of proceedings involving water conservation. In particular, the Commission adopted the policy of decoupling revenue from sales, just as it had for the energy utilities a generation earlier. For the energy utilities, this policy was adopted in the 1970s as a deliberate regulatory mechanism to remove any incentive on the part of the utility companies to encourage customers to use more. In 2008, the Commission adopted a policy of Water Revenue Adjustment Mechanisms (WRAMs) and other special accounts, such as Modified Cost Balancing Accounts (MCBAs), designed to remove any incentive to sell more water.¹¹ The Commission also adopted another conservation-oriented policy from its regulation of the energy utilities; it imposed increasing-block rates as a further incentive to customers to conserve.

The Water Action Plan Update of 2010 noted that the California legislature had adopted several statutes to promote water conservation, including a change to the water code to require full metering by the year 2025.¹²

The 2010 Update once again discussed the CUWCC BMPs, and it noted that there was at least some controversy about them: “Subsequent Commission commentary on BMPs has been critical of their effectiveness and indicated an intention to make improvements in this area.”¹³ Still, the 2010 Update did not release the water utilities from reporting their progress on meeting the terms of the BMPs.

By 2010, most of the Class-A and Class-B water utilities were set up with WRAMs and with rate structures closely aligned with the CUWCC 30/70 conservation-rate BMP. Soon, the utilities were finding that through the application of both of those policies in combination, they were beginning to see that sales of water below forecasted rates were resulting in increasing WRAM balances, and that the balances were not declining over time.

The Water Balanced Rates Rulemaking and the Guidance Decision

In December 2013, Governor Brown convened a Drought Task Force. From the point of view of the California Water Utilities, that year might be considered the last pre-drought year, for there were not widespread water shortages or executive actions to restrict water deliveries. In January 2014, the Governor declared a Drought State of Emergency. Strong efforts to conserve water were begun in earnest in 2014, and the result was a substantial decrease in water deliveries, about six-percent less than the previous year for the Class-A water utilities as a whole. For the water utilities, the result was sales far below forecast, and consequently, increasing WRAM balances. The decoupling of sales from revenues, the very program that insulated the water utilities from the incentive to deliver more water,

¹⁰ Water Action Plan, 2005, page 9.

¹¹ CPUC Decision D.08-02-036, “Opinion Resolving Phase 1A Settlement Agreements and Contested Issues,” and Decision D.08-08-030, “Decision Resolving Phase 1B Settlement Agreements and Return on Equity Adjustment.”

¹² California Water Code Section 527.

¹³ California Public Utilities Commission, “Water Action Plan Update,” October 2010.

was accomplishing its purpose, but was building balances that customers would need to pay in the future. Under the Commission's rate case plan, the utilities could not adjust their forecasts fast enough to keep up with the rapid declines in customer usage. The Commission's regular process of scheduling general rate case applications every three years was not able to keep up with the pace of declining sales.

In 2015, Commissioner Catherine Sandoval, the Assigned Commissioner in the Water Balanced Rates Rulemaking, issued a new scoping memorandum to review the Commission's "water conservation rate structure, tiered rates, forecasting methods, accounting mechanisms and other standards and programs that guide water investor-owned utility (IOU) rates, charges, and cost recovery."¹⁴ The new scoping memorandum made note of Governor Brown's Executive Order,¹⁵ issued April 1, 2015, that instituted a 25-percent reduction in potable water usage through February 28, 2016. The executive order also instituted a number of water-saving programs, including replacement of lawns with drought-tolerant landscapes, an appliance rebate program, and additional restrictions. The new Phase II of the proceeding would "evaluate current policies and potential improvements in policies related to: (1) rate structures, including conservation rate design, tiered rates, and other rate-design issues including forecast mechanisms especially in light of the recently issued Executive Order; (2) accounting mechanisms such as the Water Revenue Adjustment Mechanisms (WRAMs) and Modified Cost Balancing Account (MCBAs); and (3) in collaboration with the State Water Resources Control Board and the Department of Water Resources the role and use of data and technology to assist in smart conservation among different sectors in the State of California." The scoping memorandum specifically referred to the CUWCC 70-percent rule and the balances in the WRAM and MCBA accounts. It called for "bold, creative ideas, including radical departures from our current way of doing business"

The result of the new phase was the Guidance Decision. It contains many policy directions for the water utilities, including direction to improve their forecasting methodology, to file Sales Reconciliation mechanisms when sales depart from forecast levels, to consider Advanced Metering Infrastructure programs, and to provide revisions in low-income programs where necessary and appropriate. Of particular relevance when considering rate design are the following:

- **Ordering Paragraph 5:** Class A and B water utilities shall consider proposing pilot programs in their next General Rate Case application to implement very high tiered rates, a superuser charge, or other mechanisms to enable the utility to provide clear conservation signals to outlier users.
- **Ordering Paragraph 6:** Class A and B water utilities shall propose pilot programs in their next General Rate Case application, or in a separate, standalone application, to adjust tiers, impose a superuser charge, or deploy other mechanisms taking into account other rate design changes and deployment of Advanced Metering Infrastructure to promote conservation, rate recovery, cost-based rates, and equity, providing analysis and a showing to allow the Commission to evaluate the likely effectiveness of those proposals.

¹⁴ California Public Utilities Commission, Rulemaking R.11-11-008, "Assigned Commissioner's Third Amended Scoping Memo and Ruling Establishing Phase II," April 30, 2015

¹⁵ Executive Order of California Governor Brown, B-29-15, April 1, 2015.

- **Ordering Paragraph 11:** Class A and Class B water utilities shall propose and provide in their General Rate Case application information and analysis that provides estimates of long run marginal costs based on information about water supplies reasonably likely to be available to that utility and other factors as described in this Decision, and how such costs should be applied in proposed rate designs. We give flexibility to Class A and Class B water utilities to propose rate design that reflects long run marginal cost in all but the bottom tier, only in upper tiers, to target outlier users with extremely high consumption, or alternative mechanisms to address high water consumption, particularly by outlier users.
- **Ordering Paragraph 13:** Class A and Class B water utilities shall consider proposing in their General Rate Case application adjustments to the percentage of revenue recovery collected from fixed charges with a floor of at least 40 percent of revenues collected from fixed charges and up to 50 percent fixed charges, or submit alternative proposals to reduce reliance on Water Revenue Adjustment Mechanism (WRAM)/Modified Cost Balancing Account balances, maintain an incentive for conservation of water, and address utility circumstances. Such proposals shall consider the impact of shifting revenue recovery to fixed costs on low-income customers and propose appropriate adjustments to low-income programs to maintain affordability and equity, while signaling conservation and reducing reliance on WRAM balances and surcharges.

Elements of Rates for Regulated Services including Water

Rate design is the practice of assembling a set of rate elements together to set just and reasonable rates for a regulated service, rates that will meet the criteria established by the regulatory authority. The CPUC's water rates for the most part have included two elements: a fixed charge, sometimes called a customer charge or a meter charge; and a usage charge, sometimes called a variable usage charge. They are discussed below along with additional elements.

Fixed Charges

A fixed charge is the simplest and most straight-forward way for charging utility customers for regulated services. Newspaper and magazine subscriptions, membership-based and dues-based groups, and, for the most part, internet service subscriptions, follow this model. Until recently, many water utilities in California relied exclusively on fixed charges – payable monthly, or even annually – for their entire revenue stream. These days, only a very few California water users pay for all of their service through fixed charges. Almost all have water meters, allowing variable usage charges to supplement a fixed charge.

Fixed charges provide a steady revenue stream. They do not vary with changes in customer usage. Customers can avoid paying fixed charges only by disconnecting from the system, much like cancelling a subscription. From a conservation-incentive point of view, fixed charges offer no reason for customers to conserve or even to repair their faucets or toilets, for there is no difference in the fixed charge based on consumption.

Consumer advocates argue that fixed charges disadvantage customers who limit their usage (by not rewarding their frugality). Consumer advocates also contend that a fixed charge disproportionately

impacts poorer customers because the same fixed charge would be a higher portion of total income when compared to that of wealthier customers.

Fixed charges can vary with service terms and conditions, such as the size of the connection. Most CPUC-jurisdictional water utilities' fixed charges are related to the size of the connection, which regulates the maximum flow, as discussed below.

Minimum Bills Provisions

A minimum bill provision would be paired with a usage charge to assure that the customer will pay some minimum amount even if usage falls to zero or near zero. Minimum bill provisions have some of the characteristics of a fixed charge, but they are not the same as a fixed charge. They can be thought of as a combination of a fixed charge along with an allocation of a certain quantity of free service.¹⁶ The CPUC adopted a minimum bill provision for electric service after considering and not adopting a fixed charge.¹⁷ If the amount of the minimum bill is equivalent to a very small quantity of service, smaller than most customers would consume during a billing period, the distinction may not matter very much. But if the minimum bill is large enough that it is possible for consumers to find themselves in the "free zone," i.e., where the minimum is above the total of calculated charges, then such customers would face no cost for increased consumption up to the amount of the minimum bill. They would derive no benefit from turning off a faucet or repairing a leaky toilet. Under the current Pacific Gas and Electric Company tariff for Residential Service, there is a minimum charge of \$0.32854/day, a rate that would sum to about \$10 per month.¹⁸

Demand Charges, or Charges Related to Maximum Flow

A Demand Charge is the term used for the maximum amount of service taken at one time. In electric service, demand charges are common for commercial and industrial customers, and there is some use of them for residential customers as well. Electric demand charges sometimes are measured at the moment of a customer's own maximum usage, and sometimes they are measured at the time of the overall system's peak demand (known as coincident peak demand). For water consumption, instead of the maximum actual flow at any particular measured time, usually there is a charge according to the capacity of the connection, representing the maximum of potential demand a customer could place on the system. A larger connection implies greater potential flow, and therefore implies more robust infrastructure capable of delivering that flow and a greater overall cost to the system. For example, a typical residential connection is a 3/4-inch connection. If a customer's needs require a larger connector because of the need for greater flow, there would be higher system costs, and a larger fixed charge would be appropriate.

¹⁶ "The mathematics of a minimum bill is simple, but frequently ignored: A minimum bill is a combination of a fixed charge and a certain quantity of free electricity." Severin Borenstein, "The Economics of Fixed Cost Recovery by Utilities," *The Electricity Journal*, 29 [2016], 5 -12.

¹⁷ CPUC Decision D.15-07-001, Decision on Residential Rate Reform for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company and Transition to Time-of-Use Rates, July 13, 2015.

¹⁸ Pacific Gas and Electric Company, Electric Schedule E-1, CPUC Sheet Number 40030-E, Effective March 1, 2017.

Variable Use Charges (Volumetric Rates)

Variable Use charges are the opposite of fixed charges. The amount that the customer is charged on the bill varies with the customer's usage. A meter measures the quantity of water delivered as it flows. In theory, a customer who takes no water (or electric kilowatt-hours or gas therms) pays nothing in variable use charges. Variable use charges provide a stream of revenue based on customer usage; hence increased consumption results in higher revenue, and decreased consumption results in lower revenue.

Variable use charges traditionally have been preferred by consumer advocates under the principle that customers who use less should pay less. Variable use charges send a signal to customers that they can reduce their bills by using less. Since a variable use charge can send a signal to customers to conserve, they are generally favored by environmentalists and conservationists. Variable use charges also send a signal to producers that increased sales will result in higher revenues. For this reason, conservationists and environmentalists have often argued that regulators should find a way to remove such incentive.

Tiers for Variable Use Charges

Variable use charges can be set at a continuous (flat) rate, or they can be divided into blocks of usage, known as "tiers." Under the Best Practices of the CUWCC MOU, the California water utilities are encouraged to adopt rising tiers. The Guidance decision orders the utilities:

"to consider adjustments to tiered rates to promote conservation, rate recovery, cost-based rates, and equity, providing analysis and a showing to allow the Commission to evaluate the likely effectiveness of those proposals. Such rate design proposals shall propose mechanisms to provide reasonable customer rates and equity for low-income customers, particularly since low-income customers suffer from significant increasing water bills, while providing conservation incentives"¹⁹

Rising-tier rates provide higher prices for additional consumption beyond a certain set limit, or multiple limits. There are two variables associated with setting each tier:

- First, what is the break point, the amount of volume of consumption that is the set point for moving from one tier to the next? On what is it based?
- Second, what is the increase in the rate from one tier to the next? On what is it based?

Each of those variables deserves consideration. Most of the Class-A and Class-B water utilities have residential rates consisting of two tiers, with the break point based on either a calculation of the consumption level of a small family using indoor water only, or based on a percentile (such as the median) of domestic consumption. In many cases among the California water utilities, the second tier is set about 10- to 30-percent higher than the first tier, that is, high enough to send a signal that additional usage, more likely outdoor usage, should come at a higher cost. Some California water utilities have several tiers, and the tiers extend to multiples of the rates of the first tier.

¹⁹ Guidance Decision, p. 51.

California electric utilities have reduced the number of tiers for residential service to two standard tiers plus a super-user tier, as instructed in the Residential Rate Reform proceeding.²⁰ The tiers are based on a basic usage level known as the “baseline” or the “Tier-1 Allowance” that varies by climate zone across the state. Under the system, residential consumers may purchase a small amount of electric energy (up to 100-percent of the baseline amount) at the Tier-1 (lowest) rate. In the service area of Pacific Gas and Electric Company, the winter baseline amounts range from 8.5 to 12.6 kWh/day, with higher quantities for “all-electric,” meaning service to customers with permanently installed electric heating as the primary heat source. Summer baseline quantities range from 6.2 to 16.8 kWh/day based on the same climate zones. Any additional consumption of electric energy beyond 100-percent of baseline is charged at a higher Tier-2 rate, up to 400-percent of baseline. Finally, there is a “High-Usage” rate for consumption beyond 400-percent of baseline. California’s other large electric utilities use this same percentage-of-baseline method with two main tiers followed by a high-usage rate for consumption above 400-percent of baseline.

Time-of-use and Seasonal Variation

In electric service, there is a great variation in the marginal cost of kilowatt-hours by time of day, and the CPUC has determined that default residential service should be time-of-use service.²¹ Generally, water utility service costs do not vary greatly during the hours of a day, and the CPUC has not authorized daily time-of-use water rates.

Some water utilities have seasonal rates, reflecting different levels of costs during different times of the year. But the Class-A and Class-B utilities jurisdictional to the CPUC do not have such rates. Seasonal rates are not discussed in the Guidance Decision.

Low Income Rate Elements

California’s Class-A and Class B Water utilities offer low income bill assistance programs. The Guidance Decision does not propose changes in low-income programs, noting that the California State Water Board is currently investigating low-income programs, and the water utilities will participate in that forum.²² Consequently, this paper does not discuss implication of the Guidance decision on the existing low-income bill assistance programs or how the Guidance decision goals would be implemented on them.

Budget-Based Water Rates: A Form of Increasing-Tier Rates

Some water agencies in California have adopted a program called “Budget-Based Rates,” a mechanism for setting rates based on customized quantities of water for residential indoor use, residential outdoor use, and specific plans for commercial, industrial, and institutional users. Under budget-based rates,

²⁰ Rulemaking R.12-06-013, Decision D.15-07-001, “Decision on Residential Rate Reform for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company and Transition to Time-of-Use Rates, July 13, 2015.

²¹ CPUC Decision D.15-07-001, Decision on Residential Rate Reform for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company and Transition to Time-of-Use Rates, July 13, 2015. See Ordering Paragraphs 9, 10, and 11.

²² Guidance Decision, pp. 69-70.

each residential household customer would be assigned a specific indoor water budget based plus a specific outdoor water budget. Finally, there would be a higher rate for “excess usage,” amounts greater than the budgeted amounts. Essentially, this would be a three-tier volumetric rate. Rates would be set so that if the customers consume at the budget levels, then the water agency would achieve revenues sufficient for continued operations on a sustainable basis. Revenues collected from the “excess usage” tier could be directed to special projects or used as rebates to the customers.

The indoor water budget would be calculated based on a standard usage per person per day multiplied by the number of residents in the household and the number of days in the billing period. For example, 55 gallons per day x 30 days x 3 residents = 4,950 gallons or approximately 6.6 hundred cubic feet (CCF).²³ For a customer with four residents, the water budget would be higher: 55 gallons per day x 30 days x 4 residents = 6,600 gallons, approximately 8.8 CCF.

The outdoor water budget would be calculated based on yard size and other topographical and climate- and-weather-related factors. The budget would be different for different households.

Rate design for budget-based rates would favor indoor usage at the lowest rate, followed by a higher rate for outdoor usage, followed by a higher excess usage, perhaps similar to the super-user charge recommended in the Guidance Decision.

This type of mechanism for setting rising-tier rates has been recommended by the Inland Empire Utilities District²⁴ among others, and it appears to be favored by some water agencies in Southern California.

Proportion-Based Rates: An Alternative to Physical Units-Based Rates

Volumetric charges could be based on proportional volumetric consumption rather than on fixed physical-unit volumetric quantities, such as hundreds of cubic feet (CCF).²⁵ Under this type of billing, a portion of the usage charge would be based not directly on CCF or some other physical measurement of the quantity consumed, but on the quantity as a portion of the total quantity consumed by all customers in the relevant group. The idea was developed in response to the fact that when there are changes in the amount of water taken in total by all customers, the amount of revenue will also change and could result in revenue instability. That is, under a traditional billing system, revenue is a function of the quantity sold, and changes in the quantity sold results in changes in the total of what customers pay. A proportional rates system bases a customer’s charge on that customer’s portion of the total amount sold, so that revenue will remain stable even if total deliveries decline or rise.

²³ One hundred cubic feet (one CCF) of water contains 748 gallons.

²⁴ See, for example, Comments of Tom Ash, Horticulturist for the Inland Empire Utilities Agency (IEUA) Comments to the California Department of Water Resources Independent Technical Panel (ITP) regarding approaches to Water Use Efficiency. http://www.water.ca.gov/calendar/materials/comments_from_tom_ash_to_itp_01-04-16_20427.pdf. January 4, 2016.

²⁵ Spang, Edward S, Sara Miller, Matt Williams, and Frank J Loge, “Consumption-Based Fixed Rates: Harmonizing Water conservation and Revenue Stability,” AWWA Journal, American Water Works Association, <http://dx.doi.org/10.5942/jawwa.2015.107.0001>, March 2015.

The idea of proportional billing – as opposed to billing in physical units – has not been proposed for the water utilities of the CPUC. There is no CPUC decision as to its relevance or appropriateness for the water utilities.

There was a proposal for wholesale electric markets in California that may be considered analogous. The “slice-of-load” proposal is that the Commission’s long-term procurement process would be more competitive and more supportive of competitive infrastructure development if participants in the market were sold in “slices” or “tranches,” as opposed to the current method.²⁶ Though the proposal was ruled out of scope for the proceeding in which it was introduced,²⁷ the CPUC has not ruled on the merits of the slice-of-load proposal. To the knowledge of this author, no California water utility or agency has adopted a proportional-type billing system.

Rate Design – Assembling Rate Elements to Form Just & Reasonable Rates

The Guidance decision provides much direction for future rate design for the California water utilities. In particular, three rate-design instructions are included in the Ordering Paragraphs:

- The standard that revenue from fixed charges should constitute no more than 30-percent of total revenue should be revised such that the utilities should propose rates that gradually move to a proportion between 40-percent and 50-percent. (Ordering Paragraph 13)
- The utilities should consider tiers, perhaps steep tiers. Or, the utilities should consider proposing a super-user charge for high usage levels. (Ordering Paragraphs 5 and 6)
- The utilities should use an estimate of long-run marginal cost in developing the rate structure (Ordering Paragraph 11)

But before considering the elements of rate design, there is the first principle that rates overall should match the revenue requirement. That principle can be seen in the Guidance Decision’s Goals and Objectives for Balanced Rate Design, presented as the Appendix to this paper. Four of the goals and objectives refer to the basic principle that rates should be set so that the payments customers make, in total, will provide for the just and reasonable revenue requirement of the utility. Goals 1, 5, 9, and 10 refer to the legal requirement that the utilities provide safe and reliable water supply and delivery at just and reasonable rates, that the recovery match the revenue requirement, that the rates provide opportunity for timely recovery, and that they align risk and return in such a way as to provide an opportunity to attract capital for investment on reasonable terms. Together these requirements may be referred to as the Revenue Constraint, that is, that rates are constrained to provide as much revenue as necessary, but no more revenue than is appropriate for the water utilities.

²⁶ Prepared Direct Testimony of Mary Lynch on behalf of Constellation Energy Commodities Group, Inc., Constellation NewEnergy Inc., Constellation Generation Group, Inc., in R.06-02-013, March 2, 2007.

²⁷ Administrative Law Judge’s Ruling on Pacific Gas and Electric Company’s Motion to Strike Market Structure Issues, R.06-02-013, April 3, 2007.

The next criterion for rate design is that rates be, in the words of the Guidance Decision, “consistent with the objectives of the Bonbright principles: economic efficiency, revenue recovery and stability, rate and bill stability, and customer acceptance and satisfaction.”²⁸ And, of course, the rate design must be just and reasonable, reflecting the requirements of state law and priorities of the regulatory body. The Commission has stated its priorities for California’s water utilities in Attachment A to the Guidance decision, provided here as the Appendix to this paper.

Example Tariff San Jose Water Company’s Existing Schedule No. 1

The San Jose Water Company (SJWC or the Company) is one of California’s largest Class-A water utilities, and it is the largest of the single-district water utilities. SJWC has an existing three-tier residential tariff²⁹ that meets current standards for fixed and variable charges. The tariff was approved by the Commission in June 2016.³⁰ This tariff will be used as an example for calculating what a current tariff looks like, and how various potential changes in rate structure could affect residential customers.

The Company served nearly 24 million CCF of water to residential customers in 2015. There were 198,953 residential connections, all metered. That means that the average residential customer received approximately 10 CCF in an average month.³¹ Under SJWC’s current residential tariff, the 10-units-per-month average customer pays a monthly bill of approximately \$81, consisting of approximately 33-percent fixed charges and 67-percent usage charges. Residential customers who consume higher amounts of water pay the same fixed charges plus a higher usage charge, resulting in a higher usage charge percentage, above 80-percent for those whose use is above 20 CCF per month. The total bill for monthly consumption of 20 CCF is about \$138 under the current SJWC tariff. Those residential customers who consume less than 10 CCF still pay the same fixed charges, but because they use less, they pay a lower usage charge, resulting in a lower percentage of the bill being associated with usage charges. For example, a customer who consumes only six CCF per month would receive a bill of approximately \$59, of which only 55-percent is usage charges.

Table 1, shows the main characteristics of the SJWC’s Schedule No. 21 General Metered Service tariff, which is used for residential service. The chart below shows the bills for customers at usage levels from 0 CCF to 24 CCF per month. Appendix 2 provides the underlying calculations, including the billing total for each level of usage.

²⁸ Guidance Decision, page 32.

²⁹ San Jose Water Company, Schedule No. 1, General Meter Service, available on the Company’s web site here: https://www.sjwater.com/for_your_home/home_customer_care/rates_regulations/general_rate_schedules_for_billing

³⁰ CPUC Commission Decision D.16-06-004.

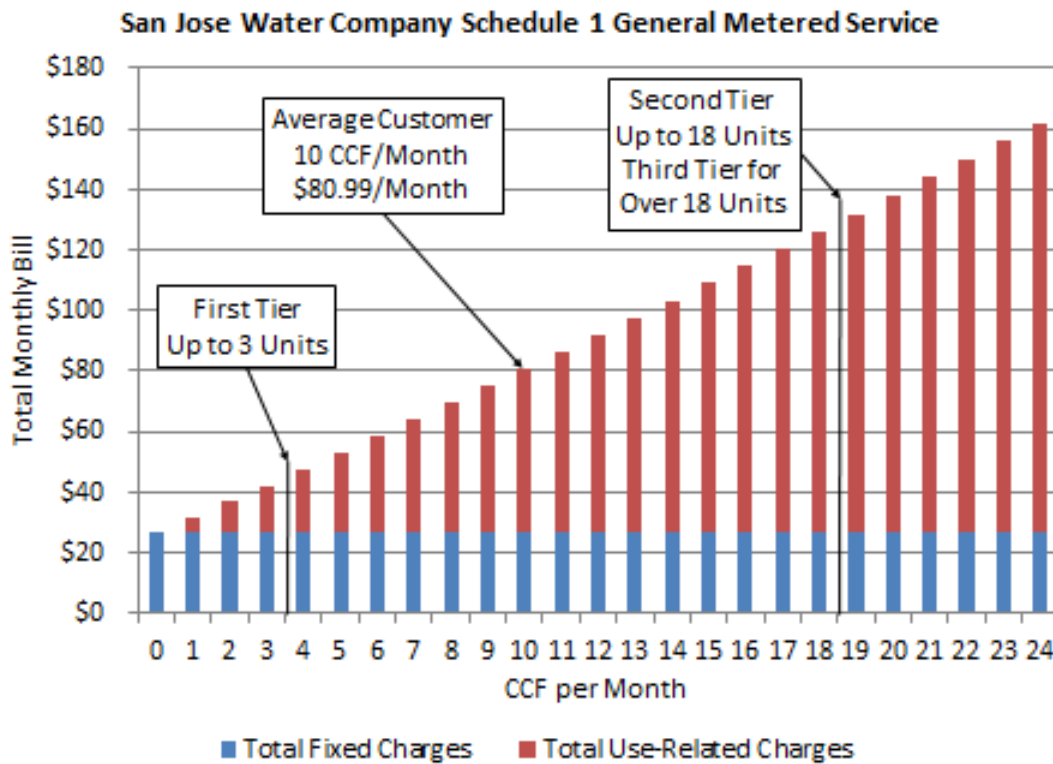
³¹ Note that averages may be misleading, and a thorough billing analysis suitable for building a rate design for the purpose of a General Rate Case application to the Commission would require information about the full distribution of customers and about the usage pattern throughout the seasons, not just the consumption level of an average customer in an the average month. The Commission is in the process of evaluating customer data from a sample of large energy and water utilities, including San Jose Water Company. It may be possible for a future analyst to develop a more detailed and thorough characterization of rate-structure proposals.

Table 1

San Jose Water Company Schedule No. 1		
Effective January 1, 2017		
Fixed Charges		
	For 5/8x3/4" Meter or 3/4" Meter Service	\$25.02
	Special Conditions Charges, Total	\$1.51
Total Fixed Charges		\$26.53
Use-Related Charges (Per Ccf)		
Tiered-Rate Charges		
	For Total Monthly Usage from 0 to 3 Ccf	\$4.2210
	For Total Monthly Usage from 3 to 18 Ccf	\$4.6900
	For Total Monthly Usage over 18 Ccf	\$5.1590
	Use-Related Special Conditions Charges, Total	\$0.8962
	Percentage Increase 1st Tier to 2nd Tier	11.1%
	Percentage Increase 2nd Tier to 3rd Tier	10.0%
	Percentage Increase 1st Tier to 3rd Tier	22.2%
<i>Source: San Jose Water Company</i>		

Total Bills Calculated at Selected Usage Levels	
5 CCF (Light User -- Half the Average)	\$53.05
10 CCF (Average User)	\$80.99
15 CCF (Heavy User)	\$108.92
20 CCF (Heavy -- Double the Average)	\$137.79

Chart 1



The chart shows bill totals and the main elements of the current residential tariff for the Company. A customer who takes no water – an unoccupied vacation home, perhaps – pays only the fixed charge, \$26.53 per month. The first three units of water consumed are delivered at a low rate of \$4.22 per CCF. Consumption of additional units is charged at a rate approximately 11-percent higher: \$4.69 per CCF. Finally, customers whose consumption rises above 18 CCF (an amount 80-percent higher than the consumption of the average customer) are charged an even higher rate, \$5.16 per CCF for the additional units, an additional 10-percent above the rate for the second-tier customers.

The average customer, taking 10 CCF per month, pays about \$81 under SJWC’s current tariff. For comparison, consider two other consumption levels: Half as much consumption, 5 CCF, costs \$53.05 per month. Consuming double that amount, 20 CCF, costs \$137.79 per month. The fixed charge does not change between these three bills; only the metered variable portion impacts the total bill calculation. All of the bill calculations, from 0 CCF to 24 CCF, are presented in Appendix 2.

Hypothetical Rate Design Options Based on the SJWC Tariff

Consider how the rate-design elements would change, and how the total bills would change, if the tariff were changed based on the principles contained in the Guidance Decision. In this paper, the following options are calculated and discussed:

1. Leaving in place the same tier structure as in the current SJWC tariff, but with a change from the 30/70 fixed-charges rule to a new 40/60 structure with 40-percent of the revenue for the average customer collected through Fixed Charges;
2. Leaving the same tier structure as in the current SJWC tariff, but with a change from the 30/70 fixed-charges rule to a new 50/50 structure with a 50-percent of the revenue for the average customer collected through Fixed Charges;
3. Changing out the existing third-tier rate of the current SJWC tariff with a steeper Super-User Charge (double the first-tier rate), beginning at 18 CCF, combined with 50-percent Fixed Charges outlined in Scenario 2;
4. Introducing a much higher Second-Tier rate that is 67-percent above the first tier (replacing the 11-percent rise for the second tier in the current tariff) – combined with a Super-User Charge, and introducing the super-user charge earlier (at 15 CCF rather than 18 CCF under the current SJWC tariff), along with Fixed Charges that are 50-percent of the average customer’s bill; and
5. A Budget-based Rate for a Family of four persons, using 55 gallons-per-day standard, plus a limited out-door water allocation for consumption 10 CCF, and an “excess water usage” rate for additional consumption beyond the sum of the budgets for indoor and outdoor water.

For each of these options, the bill for 10 CCF, the usage of SJWC’s average residential customer, will remain the same as under the current tariff: approximately \$81. We do this in an attempt to maintain revenue neutrality, since the Guidance decision did not direct any change in overall revenue requirement, but just how rates should be altered to optimally collect money from customers in light of the Commission’s updated goals and guidance. All other bills will change according to the changed parameters of the rate design. Of course, as noted previously, keeping the bill unchanged for the average user does not guarantee that the total revenue derived from a revised tariff will remain unchanged. For that, it would be necessary to be aware of the total distribution of consumption levels under the current rate design and, equally important, to have an estimate of the effect of the rate new design on customers’ water use choices. There is one additional difficulty in recalculating the tiers for these scenarios. Currently, the Company is required to collect not only the standard tier charges, but an additional usage charge of about \$0.90 per CCF on all water delivered under the tariff. For the scenarios calculated below, that same charge will remain in place.

Scenario 1: Same structure as Current SJWC tariff, but with Fixed Charges Raised to 40-percent of Total for the Average Customer

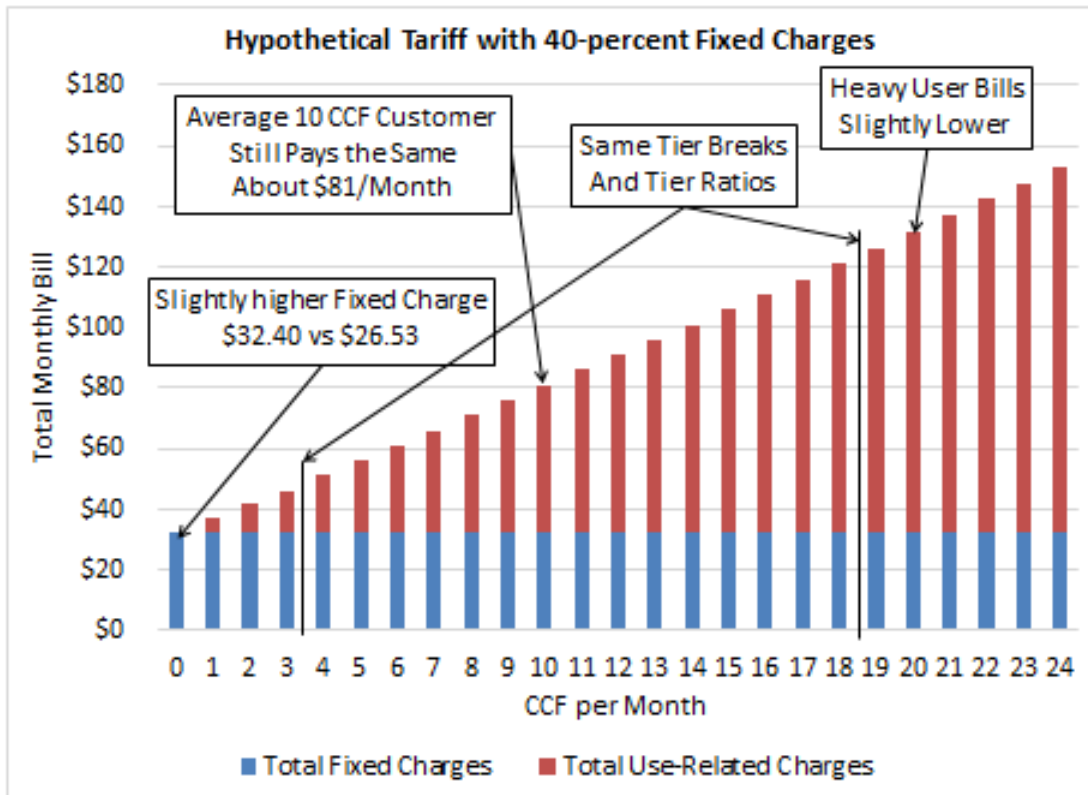
The Company’s fixed charges, including special conditions charges are \$26.53 in its current tariff, about 33-percent of the total bill of the average customer. For this 40-percent of the bill scenario, we raise fixed charges to \$32.39. The usage rates, in consequence, must be lowered to produce the same total bill for the 10-CCF average customer who, along with all the other customers, pays the higher fixed charge. Keeping the same special conditions usage charge of about \$0.90 per CCF, the new first-tier rate

falls to approximately \$3.68 per CCF, followed by the two additional tiers that are set, as before, approximately 10-percent and 22-percent above the first tier. The table below shows the new rates, and the chart that follows provides a view of the pattern of total bills. The calculated bills for all usage levels, from 0 CCF to 24 CCF, are shown in Appendix 2.

Table 2

Hypothetical Tariff with 40-percent Fixed Charges	
Based On Current Tariff of SJWC	
Bill for 10 CCF Remains as Before	
Fixed Charges	
For 5/8x3/4" Meter or 3/4" Meter Service	\$32.39
Special Conditions Charges included above	\$0.00
Total Fixed Charges	\$32.39
Use-Related Charges (Per CCF)	
Tiered-Rate Charges	
For Total Monthly Usage from 0 to 3 CCF	\$3.6769
For Total Monthly Usage from 3 to 18 CCF	\$4.0854
For Total Monthly Usage over 18 CCF	\$4.4940
Use-Related Special Conditions Charges, Total	\$0.8962
Percentage Increase 1st Tier to 2nd Tier	11.1%
Percentage Increase 2nd Tier to 3rd Tier	10.0%
Percentage Increase 1st Tier to 3rd Tier	22.2%
Total Bills Calculated at Selected Usage Levels	
5 CCF (Light User -- Half the Average)	\$56.08
10 CCF (Average User)	\$80.98
15 CCF (Heavy User)	\$105.89
20 CCF (Heavy -- Double the Average)	\$131.62

Chart 2



There are two results that stand out from changing the fixed charges up from 33-percent to 40-percent for the average customer while leaving all of the other billing determinants in place and unchanged:

- First, low-usage customers pay bills a little bit higher while high-usage customers pay bills a little bit lower than under the actual SJWC tariff; and
- Second, the cost of consumption of an additional CCF of water delivered is slightly lower at all levels of consumption.

For the low-usage customer, the bill for 5 CCF (half the usage of the average customer) rises to \$56.08 from \$53.05 under the current SJWC tariff. For a high-usage customer taking 20 CCF (double the usage of the average customer) the hypothetical bill falls to \$131.62 from \$137.79 under the current SJWC tariff. All across the spectrum of usage from low to high, the usage rates are lower by about 13-percent under the hypothetical scenario. They have to be, of course, to make up for the additional revenue raised from the higher fixed charges. Note that the decline is mitigated by the continuation of the Company's Special Conditions Charges in the rate. Those Special Conditions Charges, about \$0.90 per CCF, remain in place in this hypothetical rate design and in all of the hypothetical rate designs to follow.

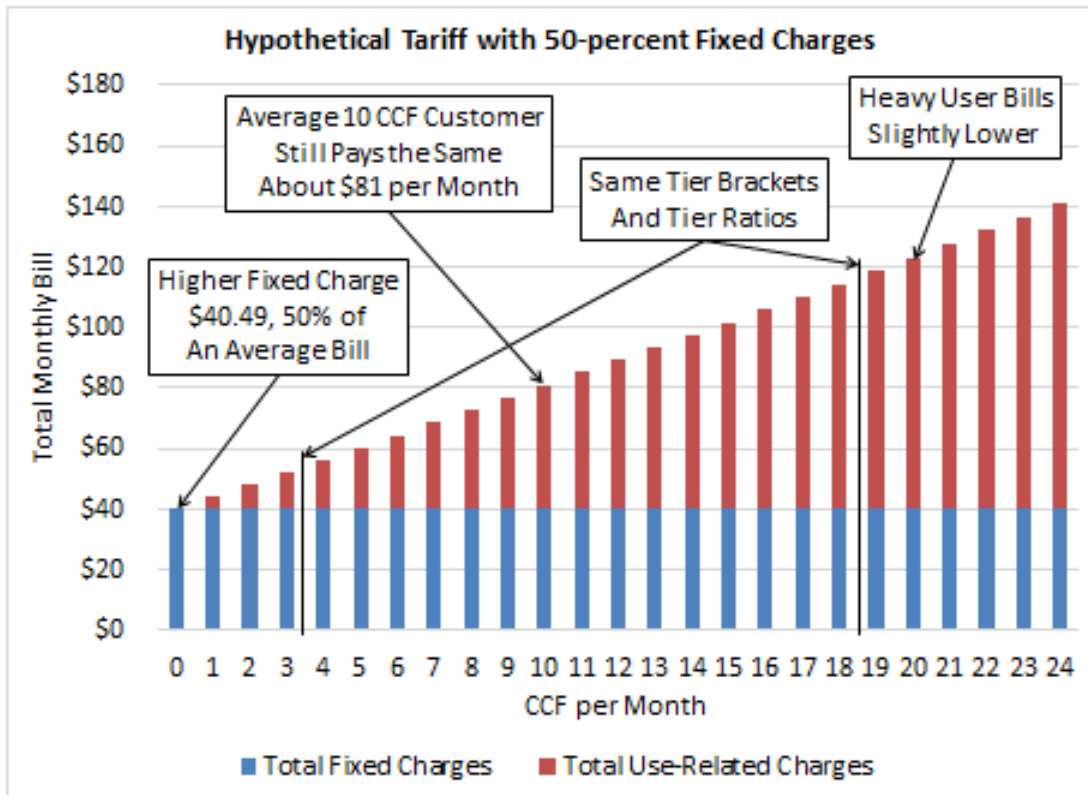
Scenario 2: Same structure as Current SJWC tariff, but with Fixed Charges Raised to 50-percent of Total for the Average Customer

In its current actual tariff, fixed charges, including special conditions charges are \$26.53, about 33-percent of the total bill of the average customer. To raise that ratio to 50-percent of the bill, the total of fixed charges rises to \$40.49, half the bill of the average customer. The usage rates are lowered correspondingly so that the average customer's bill remains unchanged. Keeping the same special conditions usage charge of about \$0.90 per CCF, the new first-tier rate falls to approximately \$2.93 per CCF, followed by the two additional tiers that are set approximately 11-percent and 22-percent above the first tier. The table below shows the new rates, and the chart that follows provides a view of the pattern of total bills. The calculated bills are shown in Appendix 2.

Table 3

Hypothetical Tariff with 50-percent Fixed Charges	
Based On Current Tariff of SJWC	
Bill for 10 CCF Remains as Before	
Fixed Charges	
For 5/8x3/4" Meter or 3/4" Meter Service	\$40.49
Special Conditions Charges included above	\$0.00
Total Fixed Charges	\$40.49
Use-Related Charges (Per CCF)	
Tiered-Rate Charges	
For Total Monthly Usage from 0 to 3 CCF	\$2.9255
For Total Monthly Usage from 3 to 18 CCF	\$3.2506
For Total Monthly Usage over 18 CCF	\$3.5756
Use-Related Special Conditions Charges, Total	\$0.8962
Percentage Increase 1st Tier to 2nd Tier	11.1%
Percentage Increase 2nd Tier to 3rd Tier	10.0%
Percentage Increase 1st Tier to 3rd Tier	22.2%
Total Bills Calculated at Selected Usage Levels	
5 CCF (Light User -- Half the Average)	\$60.25
10 CCF (Average User)	\$80.98
15 CCF (Heavy User)	\$101.72
20 CCF (Heavy -- Double the Average)	\$123.10

Chart 3



The results of the 50-percent fixed-charges calculation are similar to those of the 40-percent fixed-charges calculation, except that the effects are more pronounced. Once again, low-usage customers pay higher bills while high-usage customers pay lower bills. And the cost of additional usage is even less at each tier level than it was in the 40-percent fixed charges case. For illustration, in the 50-percent Fixed Charges case, a 5-CCF bill is \$60.25. A 20 CCF bill is \$123.10. Appendix 2 contains all of the bill calculations from 0 CCF to 24 CCF.

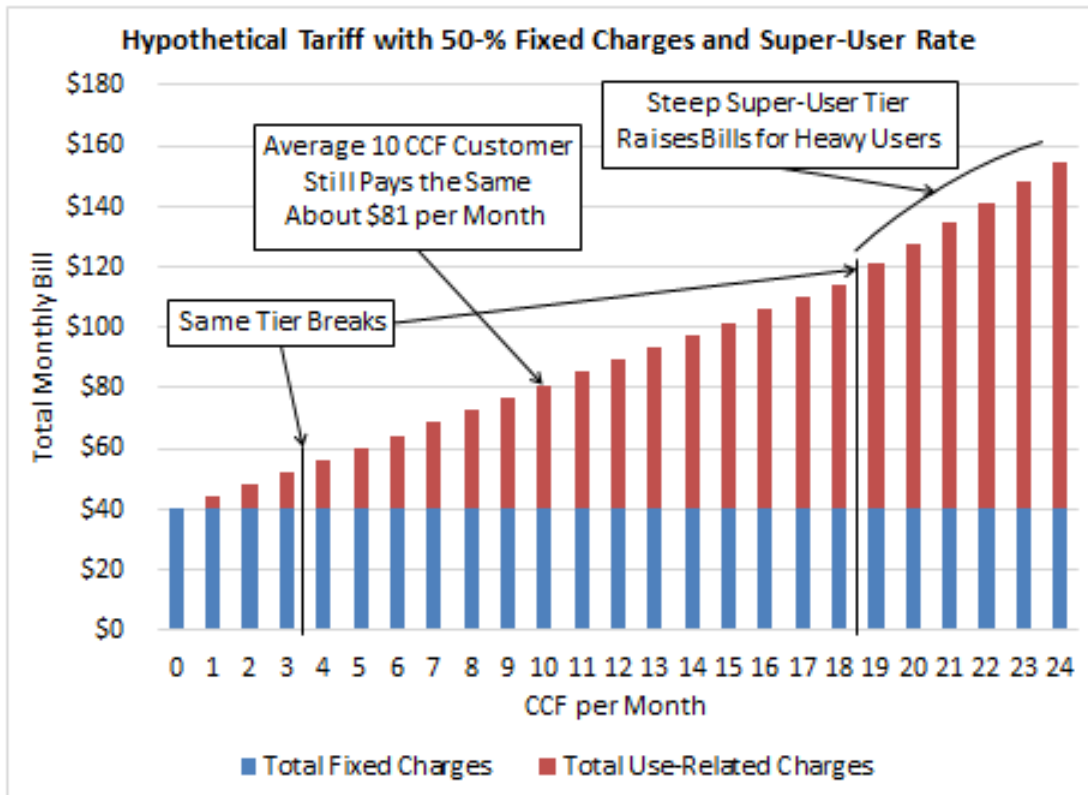
Scenario 3: Super-user Charge (Double the First-Tier Rate) Begins at 18 CCF Combined with 50-percent Fixed Charges

The Guidance decision recommends that utilities consider a super-user charge in addition to other tariff modifications. There are infinite possibilities for tariff modifications, and there are infinite ideas for how high a super-user tier should be in comparison to the other tiers. Moreover, the break point for the super-user tier is another variable. This example leaves the break point for the third tier in place, the same place as is currently used in the SJWC tariff for the third tier, 18 CCF. But instead of the mild increase of approximately 11-percent in the current SJWC tariff, this example uses a tier that is double the size of the first tier, and fully 80-percent above the second tier. The result is shown below.

Table 4

Hypothetical Tariff: 50% Fixed Charges and SuperUser Charge	
Based On Current Tariff of SJWC	
Bill for 10 CCF Remains as Before	
Fixed Charges	
For 5/8x3/4" Meter or 3/4" Meter Service	\$40.49
Special Conditions Charges included above	\$0.00
Total Fixed Charges	\$40.49
Use-Related Charges (Per CCF)	
Tiered-Rate Charges	
For Total Monthly Usage from 0 to 3 CCF	\$2.9255
For Total Monthly Usage from 3 to 18 CCF	\$3.2506
Super-User Charge for over 18 CCF	\$5.8510
Use-Related Special Conditions Charges, Total	\$0.8962
Tier Percentage Increase: 2nd to 1st	11.1%
Tier Percentage Increase: 3rd to 2nd	80.0%
Tier Percentage Increase: 3rd to 1st	100.0%
Total Bills Calculated at Selected Usage Levels	
5 CCF (Light User -- Half the Average)	\$60.25
10 CCF (Average User)	\$80.98
15 CCF (Heavy User)	\$101.72
20 CCF (Heavy -- Double the Average)	\$127.65

Chart 4



In Chart 4, for the first time, there is a visible change in the height of the bars for charges above 18 CCF. The high super-user rate of \$5.85 per additional CCF provides for a steep climb for the super users. All of the bill totals for lower-usage customers from 0 CCF to 18 CCF remain the same as the previous example; only high-usage customers are affected by the super-user charge. (Note: This Super-User example and the comparison between it and the previous example point out the naivety of this entire exercise. These two examples clearly would yield different revenue levels. A proper calculation would be based on information about all of the customers, not just the average-usage customer. And all of the rates would be adjusted to produce the same overall revenue.)

Scenario 4: Higher Step Tier (67-percent) replacing the 11-percent tier in the current tariff, and earlier introduction of a High Super-User Tier, combined with 50-percent Fixed Charges

We extend the analysis by instituting a higher rate for the second tier. The current SJWC tariff's second tier is approximately 11-percent higher than the first-tier rate. The Guidance Decision orders the water utilities to consider higher tiers as well as a super-user tier. In Table 5, we see the second tier raised to a level two-thirds (66.7-percent) above the first tier, far higher than the 11-percent rise in the SJWC tariff. The super-user tier likewise is kicked up to another two-thirds above the second tier (an additional 66.7-percent) so that it is more than double the rate of the first tier. Finally, the super-user charge in this

example is introduced at 15 CCF rather than at 18 CCF as in the previous examples and in the SJWC tariff.

Table 5

Hypothetical Tariff: 50% Fixed Charges and SuperUser Charge Combined with a High 2nd Tier (66.7% above 1st Tier) And High Super-User (66.7% above 2nd Tier) Beginning at 15 CCF Bill for 10 CCF Remains as Before	
Fixed Charges	
For 5/8x3/4" Meter or 3/4" Meter Service	\$40.49
Special Conditions Charges included above	\$0.00
Total Fixed Charges	\$40.49
Use-Related Charges (Per CCF)	
Tiered-Rate Charges	
For Total Monthly Usage from 0 to 3 CCF	\$2.1498
For Total Monthly Usage from 3 to 15 CCF	\$3.5830
Super-User Charge for over 15 CCF	\$5.9717
Use-Related Special Conditions Charges, Total	\$0.8962
Percentage Increase 1st Tier to 2nd Tier	66.7%
Percentage Increase 2nd Tier to 3rd Tier	66.7%
Percentage Increase 1st Tier to 3rd Tier	177.8%
Total Bills Calculated at Selected Usage Levels	
5 CCF (Light User -- Half the Average)	\$58.59
10 CCF (Average User)	\$80.98
15 CCF (Heavy User)	\$103.38
20 CCF (Heavy -- Double the Average)	\$137.72

Chart 5

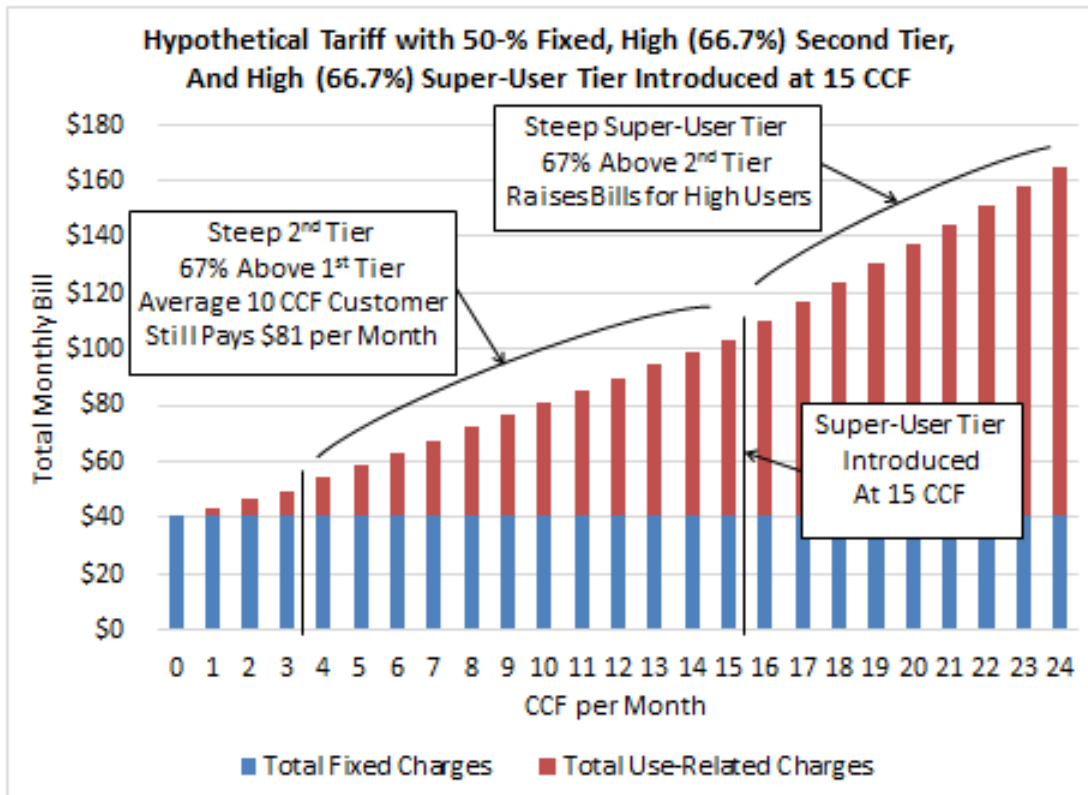


Table 5 indicates that the average customer, who uses 10 CCF, is still paying the same \$81 per month. But now the first-tier rate has been cut to only \$2.15, while the second-tier rate has been raised to \$3.58, 67-percent above the first-tier rate. The super-user-tier rate is now \$5.97 per CCF, two-thirds higher than the second-tier rate.

The chart demonstrates that under this scenario there is a steep price for increased consumption for most customers – for all but the Tier 1 customers. Counting in the Use-Related Special Conditions charge of \$0.90 per CCF along with the high second-tier rate of \$3.58, additional consumption costs \$4.48 per CCF for customers along the middle zone from 4 CCF up to 15 CCF. For the super-users above 15 CCF, the total is \$6.87 for additional consumption.

While this scenario is purposely designed to leave the average user’s bill unchanged at \$80.99, customers at all other rates of consumption are affected. A light user’s bill is only \$58.59 in this example, \$1.66 less than in the previous example, even though that user still carries the burden of the same high fixed charge. That is because in this example the first-tier rate is lower. And in this example the very high user’s bill, at \$137.72, is within pennies of the bill under the existing SJWC tariff, and about \$10 higher than under the previous example. Once again, all of the calculations from 0 CCF to 24 CCF are presented in Appendix 2.

Scenario 5: Budget-based Rate for a Family of four, using 55 gallons-per-day standard and an out-door water allocation of 10 CCF

Budget-based rates provide a minimum of three tiers, an indoor-use tier for the indoor water budget, an outdoor-use tier for the outdoor budget, and an excess-use charge for use higher than the total of the two budgets. Recent examples have set the indoor budget at 55 gallons per resident per day. The outdoor budget would be set by scientific means related to lot size and other factors. As for the price tiers, there are infinite possibilities. In this example, the outdoor tier is set 50-percent higher than the indoor tier, and the excess-use tier is set another 50-percent above the outdoor tier. The fixed charge is set at 50-percent of the average user's bill, and the average user is still the same 10-CCF per month customer that has been the average user for all of the examples. Finally, that average user's bill will remain at the same level of \$81 per month. Every one of these parameters is an arbitrary number. A 55-gallon per person per day budget for a family of four is 6,600 gallons for a 30-day billing period. That is equivalent to approximately 8.8 CCF for the month.³² For simplicity's sake, the outdoor budget in this example is 10 CCF, bringing the total water budget to 18.8 CCF, a number close to the third-tier break in the existing SJWC tariff. This is an arbitrary number used for convenience and consistency. Excess usage charges begin when the total of the indoor water budget and the outdoor water budget is consumed. So, in this example, the excess water charge begins at approximately 18.8 CCF.

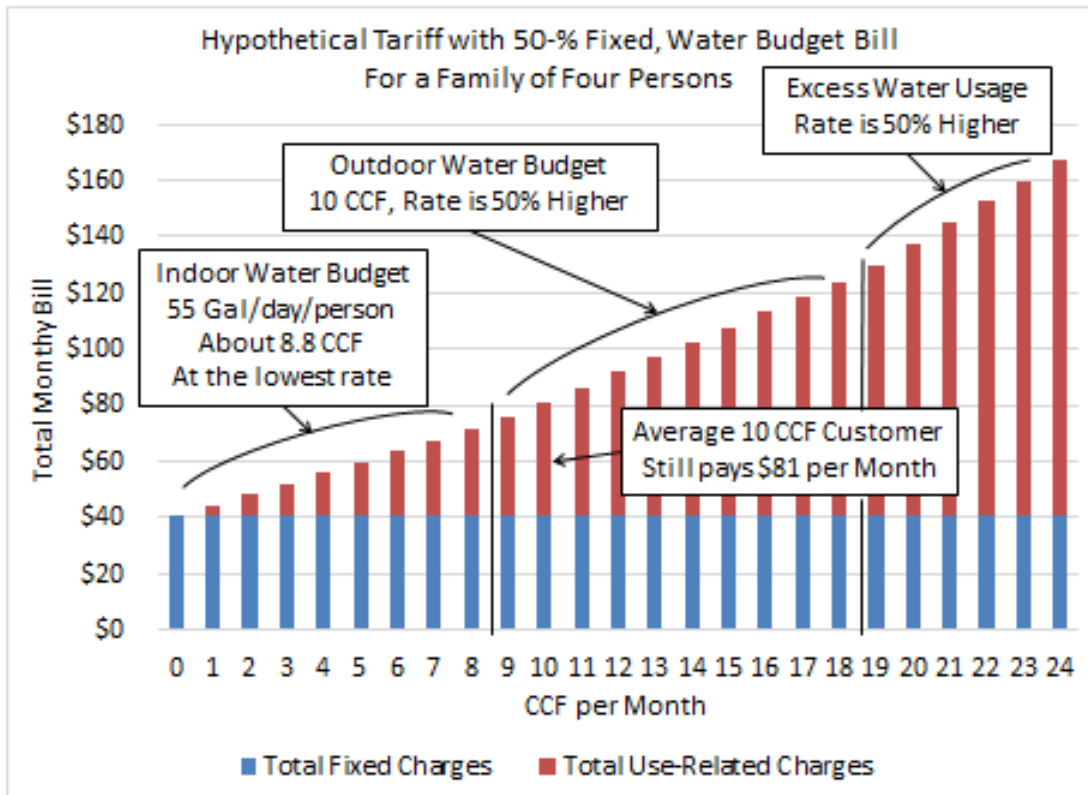
The results are shown in the table and chart. There are differences between the hypothetical Water-Budget tariff and the hypothetical tariff discussed previously (Table 3) that collects 50-percent of the average bill through a fixed charge: First, the first tier, the indoor-water tier, is based on the number of residents, not on a standard such as three CCF. For the specific example of the four-person household, the first tier extends to approximately 8.8 CCF, more than double the standard in the SJWC tariff. And the second is that the breaks between the tiers have been set to higher ratios: 50-percent higher for the outdoor-water tier, and an additional 50-percent higher for the so-called excess-water tier.

³² A CCF contains approximately 748 gallons. Therefore, a 6,600 water budget is equal to approximately 8.82 CCF.

Table 6

Hypothetical Tariff: Water Budget Bill w 50% Fixed Charges	
Family of Four Persons, 55 Gal/Person/Day	
Bill for 10 CCF Remains as Before	
Fixed Charges	
For 5/8x3/4" Meter or 3/4" Meter Service	\$40.49
Special Conditions Charges included above	\$0.00
Total Fixed Charges	\$40.49
Use-Related Charges (Per CCF)	
Tiered-Rate Charges	
Indoor Water Budget from 0 to 8.8235 CCF	\$2.9779
Outdoor Water Budget: 10 CCF (up to 18.8235 CCF)	\$4.4669
"Excess Water Charge" for over 18.8235 CCF	\$6.7003
Use-Related Special Conditions Charges, Total	\$0.8962
Tier Percentage Increase: 1st to 2nd	50.0%
Tier Percentage Increase: 2nd to 3rd	50.0%
Tier Percentage Increase: 1st to 3rd	125.0%
Total Bills Calculated at Selected Usage Levels	
5 CCF (Light User -- Half the Average)	\$59.86
10 CCF (Average User)	\$80.99
15 CCF (Heavy User)	\$107.80
20 CCF (Heavy -- Double the Average)	\$137.24

Chart 6



For the most part, the chart of water bills in this hypothetical water-budget-based rates structure looks mostly the same as the other charts presented above. The major differences are in the size of the first tier – extending out to more than eight CCF for a family of four – and the steepness of the tiers – 50-percent higher for each tier instead of about 11-percent in the current SJWC tariff and in some of the hypothetical tariffs discussed above. As before, in this analysis the customer consuming 10 CCF – SJWC’s average residential customer – continues to receive a bill of approximately \$81 per month. A light user of only five CCF (note that five CCF is well below the budgeted indoor usage for a family of four) would receive a bill of \$59.86 per month, while a heavy user – still a family of four in this example – drawing 20 CCF would receive a bill of \$137.24. These numbers are based on one particular example. Any alternative rate structure would result in different bills. Calculations for all levels of usage from 0 CCF to 24 CCF are presented in Appendix 2.

What Do We Learn from This Exercise?

The five hypothetical rate structures presented in this paper are developed from the Guidance decision. But they are only five among an infinite number of possible rate structures. They can be compared from any direction. The table below presents the primary differences among them with regard to their design.

Table 7

Hypothetical Water Utility Rate Designs Review Table							
Showing General Rate-Design Characteristics							
Tariff Scenario	Fixed Charge Percentage of an Average Bill	Fixed Charge	1st-Tier Rate	1st- and 2nd-Tier Usage Allowances	2nd-Tier Percentage Increase From 1st Tier	3rd-Tier Percentage Increase From 2nd Tier	
	%	\$	\$	CCF	%	%	
Existing SJWC Schedule 1 Tariff – This is what people are paying now	33	\$26.53	\$4.2210	3, 18	11.1	10.0	
1 Modification of SJWC Tariff to Collect 40-percent of an average bill through a fixed charge	40	\$32.39	\$3.6769	3, 18	11.1	10.0	
2 Modification of SJWC Tariff to Collect 50-percent of an average bill through a fixed charge	50	\$40.49	\$2.9255	3, 18	11.1	10.0	
3 Further Modification of the SJWC Tariff to include a Super-User Charge (double the rate of the first tier)	50	\$40.49	\$2.9255	3, 18	11.1	80.0	
4 Further Modification of the SJWC Tariff to include a a High 2nd tier ratio (67-percent higher than the 1st tier) along with a Super-User Charge (67-percent higher than the 2nd Tier)	50	\$49.49	\$2.1498	3, 15	66.7	66.7	
5 Water-Budget-based rate design (calculated for a household of four residents) based on 55/gal/day/person still to Collect 50-percent of an average bill through a fixed charge	50	\$40.49	\$2.9779	8.8235, 18.8235	50.0	50.0	

The percentage of the typical bill that is composed of fixed costs is a simple and elementary billing component. In the Guidance decision, the Commission has determined that California’s water utilities should raise that percentage from its current rate at about 30-percent up to a range of between 40-percent and 50-percent. This paper presents two side-by-side rate-structure examples that provide exactly those two boundaries, 40-percent and 50-percent, while changing nothing else in the tariff except for the variable-rate charges as necessary to keep the bill of the average customer unchanged.

The Guidance decision recommends that the California water utilities consider a super-user rate, and that they also consider higher intermediate tiers. Examples in this paper provide both. Finally, this paper provides an example of a Water-Budget-based tier structure. The main difference between the existing SJWC tariff and a water-budget tariff is that the Company’s tier structure is based on specific quantities – 3 CCF and 18 CCF. In a budget-based rate, the tier breaks would be based on water allocations, not on general quantities.

All of these examples are subject to further manipulation. And there are many different ways to change the tariffs based on the criteria developed in the Guidance decision.

Table 8 presents sample bill calculations from the actual SJWC tariff and from the five hypothetical examples. There are no surprises in the results: a higher percentages of fixed charges result in bills that are higher for those with little or no use (including for vacation homes and other residences that are occupied only part of the time) and flatter increases across changes in usage. The addition of higher tier ratios, including a super-user charge, result in making the rates less flat, charging more for those who use large amounts of water (such as large families or those with extensive outdoor water usage). Finally, a water budget rate is shown. The primary interesting result is that the break between the first tier (the indoor water tier) and the second (the outdoor water tier) changes from household to household. The example provided in this paper is for a family of four. A smaller family would receive a smaller water budget. A larger household would receive a larger budget. The tiers would move depending on the number of residents, and the bill for any specific amount of water – say 10 CCF – would change with the household size and the water budget.

Table 8

Hypothetical Water Utility Rate Designs Review Table					
<u>Showing Calculated Bill Results -- at Monthly Usage Rates</u>					
Tariff Scenario	Low User	Avg User	High User	Very High User 20	
	<u>5 CCF</u>	<u>10 CCF</u>	<u>15 CCF</u>	<u>CCF</u>	
Dollars (\$) per Month					
	Existing SJWC Schedule 1 Tariff – This is what people are paying now	\$53.05	\$80.99	\$108.92	\$137.79
1	Modification of SJWC Tariff to Collect 40-percent of an average bill through a fixed charge	\$56.08	\$80.98	\$105.89	\$131.62
2	Modification of SJWC Tariff to Collect 50-percent of an average bill through a fixed charge	\$60.25	\$80.98	\$101.72	\$123.10
3	Further Modification of the SJWC Tariff to include a Super-User Charge (double the rate of the first tier)	\$60.25	\$80.98	\$101.72	\$127.65
4	Further Modification of the SJWC Tariff to include a a High 2nd tier ratio (67-percent higher than the 1st tier) along with a Super-User Charge (67-percent higher than the 2nd Tier)	\$58.59	\$80.98	\$103.38	\$137.72
5	Water-Budget-based rate design (calculated for a household of four residents) based on 55/gal/day/person still to Collect 50-percent of an average bill through a fixed charge	\$59.86	\$80.99	\$107.80	\$137.24

Appendix 1

Goals and Objectives for Balanced Rate Design

(Attachment A to CPUC Decision D.16-12-026, the Guidance Decision)

1. Implement the legal requirement that investor owned water utilities provide safe and reliable water supply and delivery at just and reasonable rates.
2. Promote efficient use of water, promptly identify and fix water leaks, and reduce the incidents of system and customer water leaks, consistent with state law.
3. Simplify rate design, customer notices, and customer bills while providing necessary information for customers to make wise choices about their use, and transparent information about water service costs and the regulatory process.
4. Consider in rate design marginal costs including long run marginal costs of anticipated sources of water.
5. Align cost recovery with revenue requirement in balance with the Commission's and state's public policy goals.
6. Provide protections for low-income customers consistent with the Commission's and state policies.
7. Provide conservation incentives for customers and utilities consistent with the Commission's and state policies
8. Initiate investment in Advanced Metering Infrastructure (AMI) that will enable both customers and the utilities to observe usage and costs in real time to promote more efficient and effective water conservation and advance water safety such as through prompt identification of backflow incidents that may put water quality at risk.
9. Provide opportunity for timely utility recovery of its revenue requirement.
10. Align utility risk and return in a way that affords the utility an opportunity to attract capital for investment on reasonable terms.
11. Reduce or eliminate the causes of high WRAM/MCBA surcharges and extended recovery periods, including through realigning revenue recovery to increase the percentage of revenues recovered from as compared to variable rates.
12. Improve sales forecasting methodology.
13. Optimally balance investment, conservation, and affordability.
14. Optimally amortize current reasonably incurred balances in WRAM/MCBA and drought-related revenue shortfall.