BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking on the Commission's Own Motion to Conduct a Comprehensive Examination of Investor Owned Electric Utilities' Residential Rate Structures, the Transition to Time Varying and Dynamic Rates, and Other Statutory Obligations.	Rulemaking 12-06-013 (Filed June 21, 2012)

RESIDENTIAL RATE DESIGN PROPOSAL OF THE UTILITY REFORM NETWORK IN RESPONSE TO THE ALJ RULING OF 3/19/2013

TURN THE UTILITY REFORM NETWORK

Lower bills. Livable planet.

May 29, 2013

Matthew Freedman
Hayley Goodson
Marcel Hawiger

Attorneys for

The Utility Reform Network
115 Sansome Street, Suite 900
San Francisco, CA 94104
Phone: (415) 929-8876
Fax: (415) 929-1132
E-mail: marcel@turn.org

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

RESIDENTIAL RATE DESIGN PROPOSAL OF THE UTILITY REFORM NETWORK IN RESPONSE TO THE ALJ RULING OF 3/19/2013

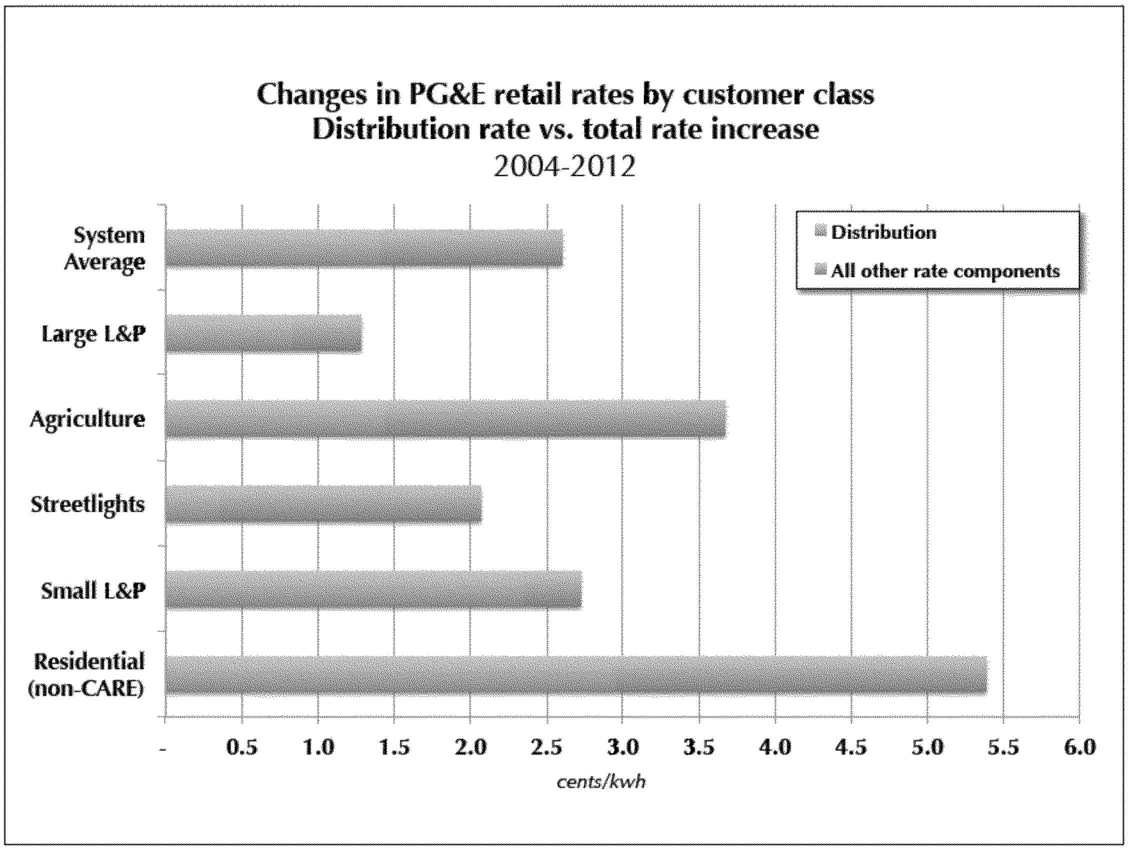
1. Summary of TURN's Proposal

1.1. TURN Proposes a Three-Tier Rate Design that Promotes Affordability and Conservation While at the Same Time Ameliorating the Volatility Effects of Current Tiered Rates

TURN proposes to continue the tiered rate structure, also known as "inclining block rates" (IBR), that has been in existence in California since 1975. This rate structure was designed to promote affordable prices for a certain basic amount of electricity (the baseline allowance) while at the same time encouraging conservation. Based on a review of available data regarding electricity prices and utility electric bills for customers in different climate areas of the state (detailed in Sections 2.1 and 2.2 below), tiered rates with geographically differentiated baseline allowances continue to serve this purpose. This approach rewards low users (who also tend to be lower income) and ensures that average rates are comparable throughout the service territory despite large variations in average usage between climate zones.

The two tier rates in place until 2001 were significantly changed due to the economic impacts of deregulation and the subsequent energy crisis. The Legislature enacted statutory protections on any increases to the first 130% of baseline as part of authorizing the Department of Water Resources to act as a procurement agent on behalf of the major utilities. In deciding to approve surcharges related to increased wholesale market procurement costs, the Commission created a five-tiered rate design in 2001. Despite hopes that rates would decline after high-priced DWR generation contracts expired, residential rates have escalated dramatically between 2004 and 2012, primarily as a result of the disproportionate increase in residential distribution rates, as illustrated in Figure 1 for PG&E.[1]

Figure 1: Change in PG&E Retail Rates (Distribution and Total), 2004-2012[2]



As average residential rates have increased, the utilities have pushed to eliminate Tier 5 (with the support of TURN) and to shrink the gap between Tier 3 and 4. The result is a very large difference in prices between the first two tiers and the upper tiers. Most new costs are included in tiers 3 and 4. The Order Instituting Rulemaking 12-06-013 (OIR) expressed great concern "it may become

[1] Some of these "distribution" increases are the result of public purpose programs wholly unrelated to distribution spending that have been included in this category. Because residential customers receive are allocated almost 50% of distribution costs, the practice of including new revenue requirements in this category has disproportionately effected residential rates.
[2] While this Figure contains much information, one key takeaway is that between 2004-2012 PG&E's average system distribution rate increased by about 1.4 cents, while the residential distribution rate increased by almost 3 cents.

more difficult for the utility to recover the necessary revenue requirement even from Tiers 3 and 4 customers" to pay for the costs of implementing state and Commission policies concerning distributed generation, electric vehicles, smart grid and demand response technologies.[3]

TURN agrees that the present rate design, with such large and uneven tier differentials, may not be sustainable if average rates continue to rise in excess of inflation.[4] If average residential rates spiral upwards, the current rate design (assuming ongoing statutory restrictions on Tier 1 and 2) would yield tier differentials that place greater burdens on customers who regularly consume large amounts (more than two times the average) of electricity. As a consequence, the larger tier differentials would significantly exacerbate bill volatility resulting from changes in consumption, especially changes caused by extreme weather events.

Moreover, the differential between Tier 3 and 4 rates has narrowed substantially in recent years as the utilities focused on bringing down the Tier 4 rate. The result has been a diminishing gap between Tier 3 and 4 and a much larger price differential between Tier 2 and Tier 3. Currently, the gap between Tier 2 and 3 is over 10 cents/kwh for SCE and 15 cents/kwh for PG&E. TURN is concerned that the removal of intermediate pricing signals has created excessive differentials that should be moderated through more evenly spaced tier prices.

[3] OIR 12-06-013, p. 14. (Hereinafter referred to as "OIR.") TURN remains very concerned that many of the new "costs" referenced in the OIR may not be a wise use of money to achieve our ultimate goal of a cleaner electricity system. There is no basis for assuming that average rates will, or should, rise consistent with the projections offered bythe utilities.

[4] Since Tier 1 and 2 non-CARE rates are indexed to the Consumer Price Index (+1%), limiting average rate increases to a level below this index would yield a narrowing of the gap between Tiers ½ and ¾ over time.

TURN recommends a reformed residential rate design using three tiers with fairly equal and meaningful price differences (also known as tier differentials) between each tier. TURN's proposal includes uniform tier differences between T2/T1 and T3/T2. If average rates increase over time, each tier would be permitted to rise consistent with maintaining a uniform ratio between tiers.[5] TURN also recommends replacing the current tier 2 quantity of 30% of the baseline allowance, with an evenly spaced 100% of baseline allowances. Thus, TURN proposes a three-tiered structure with Tier 1 at 0-100% of baseline, Tier 2 at 101-200% of baseline, and Tier 3 applicable to usage above 200% of baseline. TURN suggests that other tier boundaries should be analyzed, but the bill calculators of PG&E and SDG&E do not easily allow such a rate design change.

TURN uses the following rate structures as the basis for evaluating our three-tiered rate design. However, we emphasize that these rates are somewhat illustrative. There are significant limitations in the bill calculators which preclude determination of actual rates. However, this exercise illustrates the potential to develop a three-tiered rate structure which ameliorates the potential problems with current rate tariffs without unduly burdening customers with bill increases.

TURN used the utility bill calculators to evaluate several illustrative rate proposals adhering to these principles. We present an illustrative example for each utility. Because TURN seeks to moderate the top tier rate level, our rate proposal would significantly increase the bottom tier price. The impact of this

[5] As detailed below, TURN proposes non-CARE rates that result in a ratio of T2/T1 of about 1.3, and a ratio of T3/T1 of about 1.6. These ratios are maintained by increasing each rate (if revenue requirements increase) proportionately, resulting the same absolute "tier difference" betwen (T2-T1) and (T3-T2).

change, plus moving to a more equally-spaced three-tier rate for non-CARE customers, is to increase the average monthly bill for lower than average users and decrease the average monthly bill for higher users. While the bill increases appear higher on a percentage basis, the increases at lower usages on a "dollar" basis are much lower than the decreases at the upper usage ranges.

The utility bill calculators do not allow one to evaluate bill impacts for either the highest month or even the summer period. This limitation is a major problem for purposes of analyzing the bill impacts of various rate design proposals, particularly those involving time differentiated rates. Due to this limitation, TURN cannot easily ascertain the reduction in bill volatility under our proposal. However, the mathematical outcome of our proposal is to reduce bills for higher usage customers when compared to today's rates so this proposal will reduce volatility caused by heat waves in hot climate zones.

TURN also proposes to dampen seasonal bill volatility by modifying the method for calculating baseline allowances in certain Central Valley climate zones. These changes are discussed in Section 2.2.3.

1.2. TURN Proposes Tiered CARE Rates with Declining Discounts to Promote Conservation by CARE Customers

TURN has long championed the lowest possible rates for CARE customers as a means of ensuring energy security and protecting people's health and safety. In a time when a variety of safety net programs continue to erode, low-income Californians have been struggling to survive under very challenging economic conditions. At the same time, TURN recognizes that CARE customers have generally not been subject to rate increases for many years (increases have been limited to those associated with the introduction of and changes in the CARE

Tier 3 rate), while utility system costs have increased significantly, and that the costs of the CARE discount are significant. Moreover, TURN understands the need to balance affordability with pricing that promotes conservation for all customers. While poverty serves as an unfortunate conservation incentive in its own right, TURN believes that rate design for low-income customers should explicitly promote conservation, as it should for other residential customers.

The current CARE discount is a product of the statutory requirements constraining Tier 1 and 2 rate increases, the requirement of a minimum 20% discount on Tier 3 and the absence of a Tier 4 rate. These constraints have resulted in varying discount levels between the three utilities and proportionately higher CARE discounts for customers who use more electricity.

TURN proposes that CARE rates consist of three tiers with the largest discount for the first tier (to promote affordability for basic usage) and declining discounts for higher tiers. TURN proposes CARE rates calculated by discounting the comparable non-CARE tier 1, 2 and 3 rates by 50%, 30% and 10%. Table 1 below illustrates resulting rates for one possible scenario. TURN recommends that the same discount apply to each utility.

Table 1: Example of non-CARE rate calculation (cents/kWh)

s		non-CARE	Discount	CARE
	Tier			
	T1	15	50%	7.5
	T2	20	30%	14.0
	T3	25	10%	22.5

One result of more equally spaced non-CARE rates together with the same discounts for each utility will be to move the average effective CARE discount to be similar across utilities. Another result is to provide an enhanced conservation signal by sharply increasing the marginal price paid for consumption in excess of 100% and 200% of baseline. This structure would therefore accomplish the objectives of ensuring that basic amounts of electricity remain affordable while retaining the critical conservation incentives that are embedded into inclining block rates. CARE customers with low usage would be most protected and those with extremely high levels of usage would realize far smaller discounts than current rates provide.

1.3. The Benefits of a Modified Tier Rate Design Outweigh the Potential "Inequities" or "Cross Subsidies," Especially When Compared to Alternatives

The OIR expresses a number of criticisms of tiered rates under the heading "equitable rate treatment."[6] The OIR explains that tiered rates result in a number of unfair subsidies and inequities, such as:

- SCE non-coastal customers are responsible for a greater portion of the revenue requirement (above tiers 1 and 2) than coastal customers;[7]
- Because the correlation between income and consumption is not perfect, there may be rich low-consumption customers who pay less than their cost of service and may be subsidized by middle income customers living in non-coastal regions;[8]

---

[6] OIR, p. 12-16.
[7] OIR, p. 13.
[8] OIR, p. 14 and 16.

- Climate zone baselines create inequities among customers living close by but in different climate zones;[9]
- It is increasingly difficult to recover new costs only from upper tier consumption,[10] and this fact also impacts the ability to absorb the subsidy due to Net Energy Metering;[11]

While there are unresolved problems tied to the existing tier structure, TURN's proposed reforms address several key critiques. TURN's proposed rate structure does not artificially constrain rate increases that can be applied to the first 100% of baseline consumption and would link the tiers together by fixed ratios. As a result, any overall rate increases would be applied to all Tiers. Since the Tiers would move (up or down) together, there is no concern that changes to overall rates would drive increased disparities between the tiers.

TURN discusses in detail the justification for climate baselines and resulting geographic rate equity in Section 2.2. The data show that climate-differentiated baselines equalize rates within the geographically diverse service territory of California utilities. The problem mentioned in the OIR (the SCE inland customer) is resolved by TURN's proposal, and inland customers actually pay less than they would under TOU rates.

TURN discusses potential cost shifts between low and high usage customers due to tiered rates in Sections 2.1 and 2.3. Since there are significant correlations between usage and income especially within each climate zone, the ostensible "subsidy" to a rich low-consumption coastal customer may actually be

[9] OIR, p. 14. This reflects the general "boundary problem" for any program or policy that has strict eligibility criteria. There is always someone just on one side or the other ofthe boundary.
[10] OIR, p. 14.
[11] OIR, p. 16.

exacerbated with the elimination of baselines and introduction of a mandatory TOU rate, which would impose potentially greater costs on non-coastal users than TURN's proposal. This issue is difficult to analyze in theory, since the relative impacts all depend on the exact nature of a TOU rate (especially the on-peak/off-peak differential) versus a tiered rate.

1.4. TURN Recommends That Reduction in Peak Demand Be Better Addressed by Programs Targeting Customers with Automation Technologies, and TURN Supports the Adoption of a Simplified Optional (Opt-In) Time-of-Use Tariff

TURN's rate design proposal, which would be the default for all residential customers, does not incorporate any time differentiated (or dynamic) pricing attributes. Over the past decade, some have suggested promoted the desirability of replacing our inclining block rate design with various forms of mandatory dynamic pricing on the presumption that charging higher marginal prices during certain hours would yield a number of alleged benefits. The OIR asserts that "the Commission has stated on numerous occasions that dynamic pricing 'can lower costs, improve system reliability, cut greenhouse gas emissions, and support modernization of the electric grid.'"[12]

As the OIR itself notes, the Commission has usually explained that any such benefits come from "well-designed dynamic pricing tariffs *and* demand response programs."[13] Dynamic pricing for residential customers by itself offers one benefit – undifferentiated average peak load reduction. The data show that dynamic pricing on aggregate may result in load shifting of about 5-15% of the peak load, however such reductions would only occur under rate designs with

[12] OIR, p. 17, citing to D.08-07-045.
[13] OIR, p. 8.

very high on-peak rates that could also cause significant economic hardships for certain customer subgroups. Moreover, actual reductions vary depending on many factors such the presence of air conditioning, home size, climate, income, and customer education.

TURN's analysis of the data concerning mandatory (or default) dynamic pricing suggests that the potential of negative impacts on customers outweighs the limited economic and reliability benefits of load shifting. The OIR touts the fact that TOU could be desirable because off-peak generation is "less expensive, more efficient and cleaner."[14] But shifting a small portion of residential peak load due to dynamic pricing produces relatively small environmental, reliability or cost benefits, as further discussed in Section 2.4 below..

There are some customers who would benefit from dynamic pricing and are not adverse to the associated risks. In order to maximize voluntary participation, TURN would support the creation of a simplified TOU rate option that does not rely on tiers. Such an option would allow for greater experience with residential TOU rates based on voluntary participation. Although we presume that most customers opting into a TOU rate would be structural winners with favorable load shapes, these customers would continue to have incentives to further shift their loads to off-peak periods. While TURN is not proposing its own voluntary TOU structure at this time, we intend to review the TOU proposals submitted by other parties and will provide feedback with respect to the best option to use as a voluntary tariff.

TURN appreciates that if structural winners choose an optional TOU rate, there would eventually be a revenue loss that would result in a cost shift to other

[14] OIR, p. 11.

customers. As long as the TOU rate is properly designed to truly reflect temporal differences in generation costs, such a shift would appropriately increase the prices paid by other customers.

2. Public Policy Supports Reforming Baseline Rates as the Default Rate Design

2.1. Inverted Rates, with a Lower Baseline Rate, Promote Affordability of Basic Service

2.1.1. The Legislature Has Continuously Supported an Affordable Quantity of Baseline Electricity as a Public Policy Goal

The Legislature mandated tiered rates in 1975 with the Warren-Miller Energy Lifeline Act[15] that added §739 to the Public Utilities Code. Part of the original goal of the legislation was to ensure "lifeline" rate for basic electricity needs. [16] The lifeline quantity, as the baseline allowance was then called, was originally based on the usage necessary to support specified end uses for electricity.[17]

The definition of baseline allowance under the statute and under Commission orders has evolved over time, so that today § 739(a)(1) defines the baseline quantity as being "50 to 60 percent of the average residential consumption of these commodities," and § 739(b) mandates that the Commission designate a baseline quantity "which is necessary to supply a significant portion of the reasonable energy needs of the average residential customer." The utilities

---

[15] California Stats 1975, Ch. 1010, Section 1(a).

[16] See, for example, D.86087, 80 CPUC 182, 1976 Cal. PUC LEXIS 387 (interim order establishing "lifeline" quantities of electricity and natural gas and establishing rates structures for the provision of lifeline quantities of energy to residential customers, pursuant to the Warren-Miller Energy Lifeline Act of 1975). See, also,

[17] See, D.86087, 80 CPUC 182, 1976 Cal. PUC LEXIS 387.

presently calculate the baseline using between 50-55% of the average usage in each climate zone.[18]

Irrespective of the specific changes introduced by AB 1X (Keeley, 2001) and SB 695 (Kehoe, 2009), the Legislature has since 1975 continuously supported the use of "an appropriate inverted rate structure" as a method of ensuring an affordable level of basic electric service to all customers.[19] This principle of universal affordability is missing from the list of "principles for rate design" in Attachment A of the ALJ Ruling.

2.1.2. Tiered Rates Reward Low Usage, High Load Factor and Low Income Customers

Inverted tiered rates reward lower usage customers within each baseline zone since usage in the higher tiers is charged at higher marginal prices. This outcome is warranted because customers who use less total electricity also consume less on-peak electricity.[20] This outcome results from the fact that high consumption in California is linked to on-peak air conditioner use. This correlation is evident in the bill calculator data grouping customers by "load factor." As illustrated in Table 2, current PG&E load data shows that "high" load factor customers[21] have lower average bills than other customers under existing tiered rates. The lower bill results from a lower total usage under present volumetric tiered rates.

[18] The percentages are higher for all-electric customers.
[19] Cal. Pub. Util. Code §739.7.
[20] For example, see Testimony of William Marcus on Marginal Cost, Revenue Allocation and Rate Design for Southern California Edison, A.11-06-007, February 6, 2012, pages 55-80.
[21] The load factor is the ratio of average demand to peak demand. PG&E defines High load factor customers as having a load factor above 40%.

Table 2: PG&E Current and Cost Based Bill by Load Factor[22]

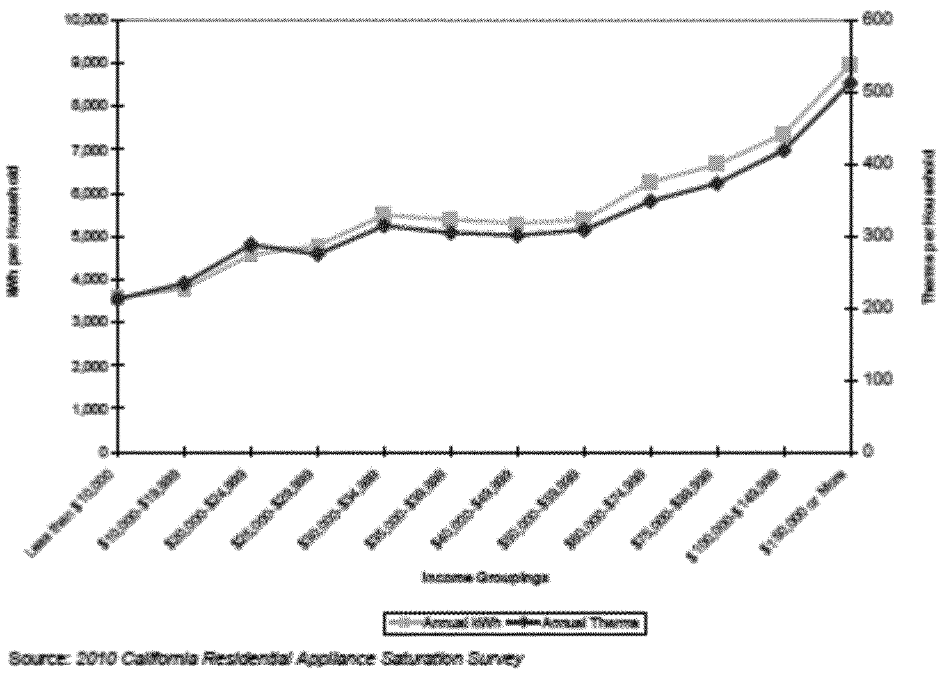
Load Factor Description	Load Factor Range	Avg. Current Bill	Avg. Cost Based Bill	Number of Households
Non CARE				
Low	0 to 25%	$95.05	$90.88	3276526.33
Medium	25% to 40%	$179.28	$101.73	70879.17
High	Above 40%	$28.24	$36.48	6143.67
Non CARE Average		$96.71	$91.01	3353549.17
All Customers				
Low	0 to 25%	$82.10	$89.96	4478652.27
Medium	25% to 40%	$130.91	$101.02	134406.14
High	Above 40%	$35.31	$45.29	8521.72
All Customers Average		$83.43	$90.20	4621580.13

The benefits of tiered rates are primarily realized by low and moderate income customers due to the established correlations between income and electric consumption. The OIR correctly notes that numerous variables influence electricity consumption, and that the correlation between income and consumption is "not perfect," even within a climate zone. The OIR expresses concern that some low-use customers may be high-income, and conversely some high-use customers may be low income. While TURN agrees that the correlations are not perfect, there is abundant evidence to demonstrate the basic validity of the correlation between electricity consumption and household income.[23]

[22] Data from Bill Calculator, Sheet "PGE-Bill-Impact-Output-3." Current Bill represent rates as of July 2012.
[23] For an excellent literature review, see, CPUC, Policy and Planning Division, "Electricity Use and Income: A Review," June 21, 2012.

The KEMA 2009 Residential Appliance Saturation Study (RASS)[24] aptly demonstrates the non-linear relationship between income and usage in California. The RASS Report showed that consumption increases with income for low-income households (incomes below $25,000), is somewhat steady for moderate income households (incomes between $25,000 and $75,000), and increases with income for higher income households (greater than $75,000), as illustrated in Figure 2.

Figure 2: Electric Use Versus Income[25]



Indeed, the RASS Report shows that if one divides usage into four quartiles, 41% of high-income households (above $75,000 annual income) have consumption in the top quartile (above 8,350 kWh/year), and 11% of high

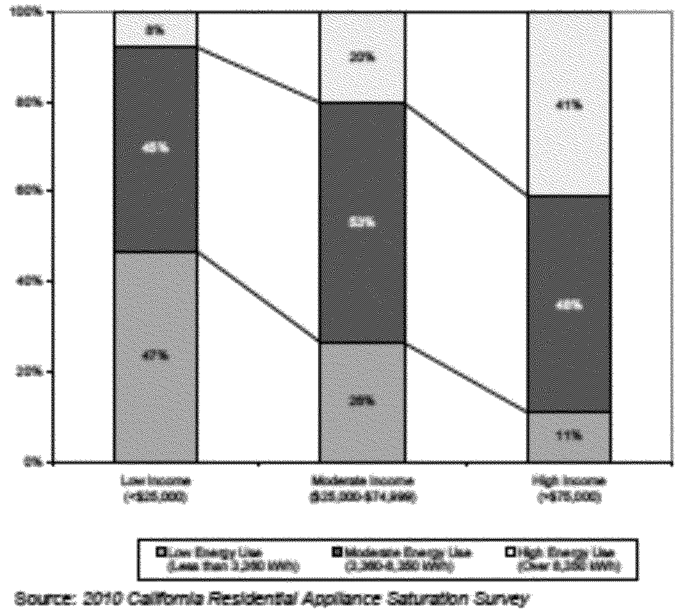
---

[24] KEMA, Inc., 2009 California Residential Appliance Saturation Study, October 2010, CEC-200-2010-004-ES.

[25] Kema, p. 32.

income customers consume in the lowest quartile (below 3,360 kWh/year). Conversely, only 8% of low-income households (below $25,000 annual income) have consumption in the top quartile, and 47% of low-income housholds consume in the bottom quartile of electricity use.

Figure 3: Electric Use and Income (aggregated by quartiles)[26]



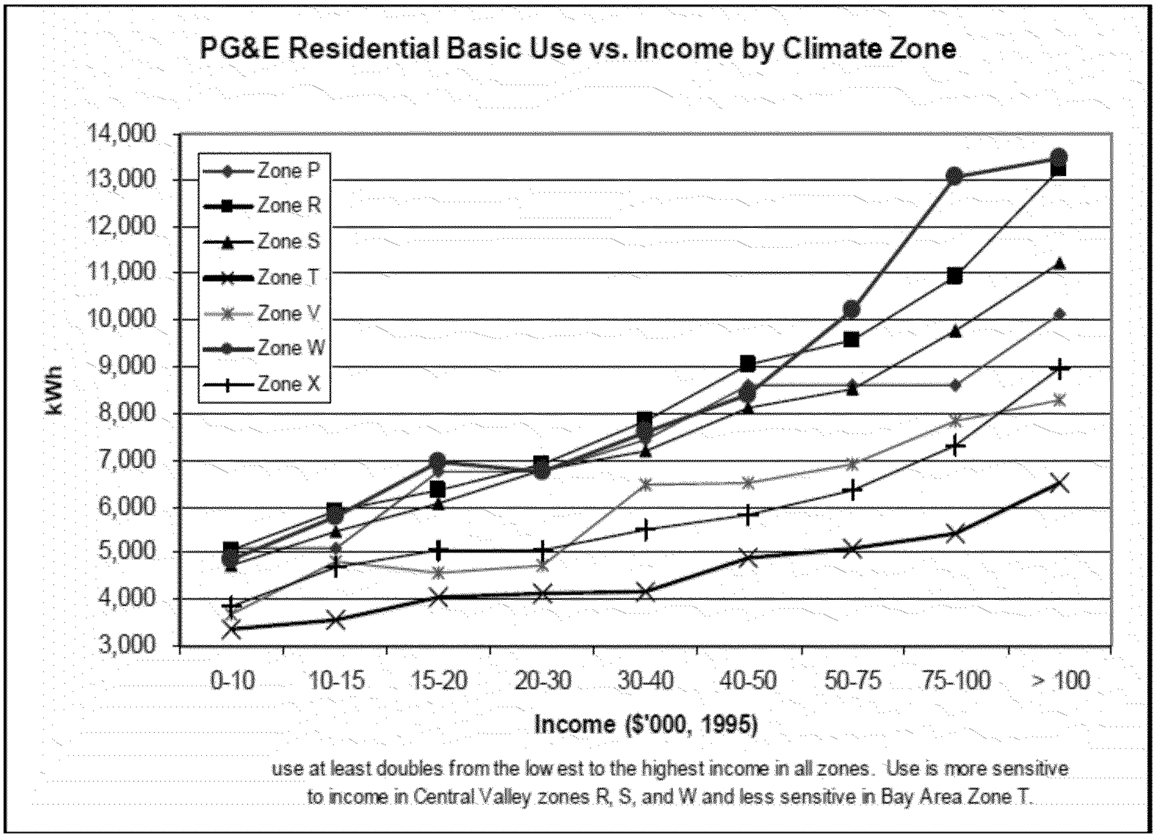
The 2010 RASS data substantiate the results found by TURN's consultants in prior evaluations of California utility data. JBS Energy, Inc. has repeatedly examined characteristics and electricity consumption patterns of California customers over the past decade.[27] Their findings concerning the relationship between income and usage for different PG&E climate zones, shown in Figure 4, are very similar to the RASS 2009 results in Figure 2 above.

---

[26] Kema, p. 33.

[27] W. Marcus, G. Ruszovan and J. Nahigian, "Economic and Demographic Factors Affecting California Residential Energy Use," September, 2002. Also W. Marcus and G. Ruszovan, "Know Your Customers: A Presentation to the UCEI Policy Conference," December 10, 2007. Both are available at http://jbsenergy.com/Energy/Papers/papers.htm .

Figure 4: PG&E Residential Basic Use vs. Income by Climate Zone[28]



The JBS analyses of demographic data also show the following:[29]

- Higher residential income is generally accompanied by higher electricity use. Electricity use by high-income customers (over $100,000) was 2-2.5 times that of households under $15,000 in nearly all utilities and climate zones.
- Energy use rises with the size of the dwelling unit. This result holds for all climate zones. The use in very large dwellings is typically 250-350% of usage in the smallest dwellings.
- Even when controlling for the climate zone of the customer, small

[28] W. Marcus, G. Ruszovan and J. Nahigian, "Economic and Demographic Factors Affecting California Residential Energy Use," September, 2002.
[29] Many of these conclusions parallel the various demographic conclusions concerning geography, building consumption and end-use consumption contained in the RASS 2009 report.

basic customers use proportionally less peak demand and peak energy than larger ones.[30] In particular, customers who use less than 130% of baseline have higher load factors and smaller percentages of summer energy and summer on-peak energy.[31]

- Central Valley customers use a higher percentage of their summer energy on peak than other customers and coastal customers use a lower percentage of summer energy on peak. This means that load factors of Coastal customers are better (flatter – because of less air conditioning) than those of Central Valley customers.
- Apartment dwellers have lower fixed costs of service per kWh than single-family households, higher coincident peak load factors, greater diversity between non-coincident peak and distribution and subtransmission peaks, and lower customer costs in absolute dollars.[32]
- Households with pools located in cool to mid climate zones have usage up to 75% higher than houses without pools. Single-family customers owning pools have average incomes 30-50% greater than single family customers without pools.[33]

These facts have important implications for the consequences of changes in rate design, specifically:

---

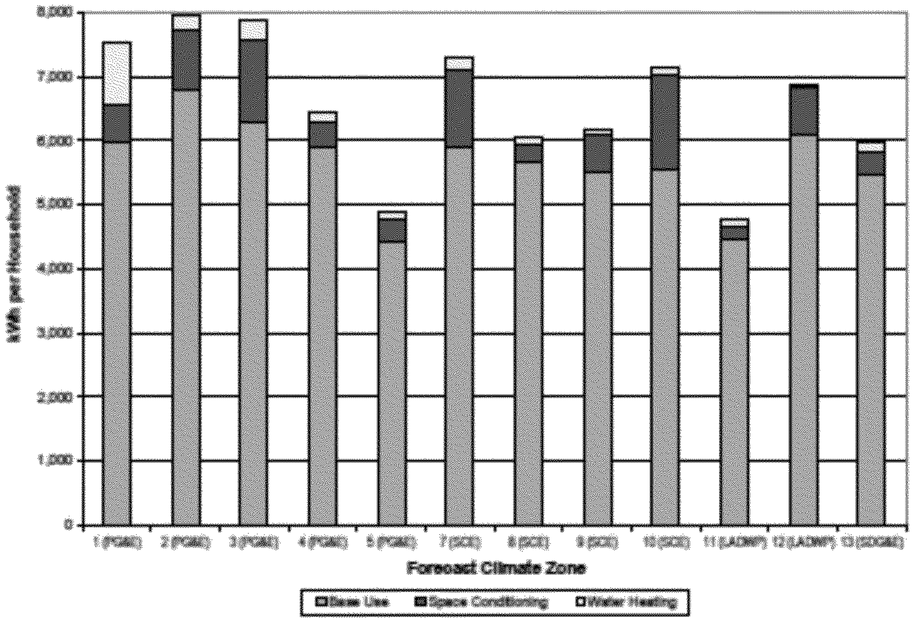
[30] This conclusion is at odds with at least one recent academic paper. See, Borenstein, "Effective and Equitable Adoption of Opt-In Residential Dynamic Electricity Pricing," April 2012, p. 23 (Haas WP 229).
[31] Testimony of William Marcus on Marginal Cost, Revenue Allocation and Rate Design for Southern California Edison, A.11-06-007, February 6, 2012, page 58.
[32] Testimony of William Marcus on Marginal Cost, Revenue Allocation and Rate Design for Southern California Edison, A.11-06-007, February 6, 2012, page 60.
[33] Testimony of William Marcus on Marginal Cost, Revenue Allocation and Rate Design for Southern California Edison, A.11-06-007, February 6, 2012, pages 80-82.

- Coastal customers, by virtue of smaller dwelling sizes and cooler climate, have lower overall electricity use than hotter areas. They also have a flatter load shape (less peaky).
- Unlike users in the Coastal zone, customers in hotter zones will generally exceed the 130% baseline allowance consistently.
- Smaller customers generally have less potential for demand response than larger customers. They have fewer electric appliances, live in smaller dwellings, and have a lower saturation of AC units.

It is true that the correlation between income and electricity consumption across the entire service territories of California utilities is not perfect, owing largely to the impact of independent variables such as climate and housing stock. Climate reduces coastal consumption irrespective of income; and multi-family housing, which is more prevalent in urban areas, consumes less than half as much electricity (per household) than single-family residences.[34] The result of both of these variables is that consumption in climate zones 5 (San Francisco) and 11 (Los Angeles) is significantly less than any other climate zone, irrespective of household income, as illustrated in Figure 5.

[34] KEMA RASS Study, October 2010, Figure ES-31, p. 29.

Figure 5: Electric Consumption by Climate Zone[35]



Source: 2010 California Residential Appliance Saturation Survey

TURN also compiled recent rate data from PG&E and SCE that show that current tiered rates result in average annual non-CARE rates which appear closely correlated with income, at least for the extreme low and high rate ranges. For example, Table 3 below shows the median annual household income for the fifteen municipalities with the highest and lowest average non-CARE rates in PG&E's service territory.[36] Every municipality[37] in the top fifteen (by average non-CARE rate) group has a median income higher than $100,000, and the average median income of this group is $161,753. Every municipality in the bottom fifteen rate group has a median income below $55,000, and the average median income is $38,113. There are literally no outliers.[38]

[35] KEMA RASS Study, October 2010, Figure ES-3, p. 7.
[36] The average rate is simply the total revenues from the municipality divided by total usage. A higher average rate means proportionally more billed usage in upper tiers. The average rate would be lower if combined with CARE customer rates.
[37] Income data was missing for a few of the municipalities in both the top and bottom range.
[38] The total number of non-CARE customers in incorporated municipalities is 2,556,334, and the average non-CARE rate for these customers is 17.7 cents/kWh.

Table 3: Usage v. Income for PG&E non-CARE Customers in Highest and Lowest Average Rate Cities

PG&E City	NON-CARE Customers Average Price (Cents/kWh)	Annual Household Income (median)
ATHERTON	$0.280	$223,611
WOODSIDE	$0.270	$186,359
ROSS	$0.256	$147,345
HILLSBOROUGH	$0.253	$209,231
LOS ALTOS HILLS	$0.252	$219,485
MONTE SERENO	$0.251	$165,484
PORTOLA VALLEY	$0.244	$164,479
PIEDMONT	$0.228	$169,674
BELVEDERE	$0.223	$119,511
SARATOGA	$0.219	$145,023
ORINDA	$0.216	$160,942
LAFAYETTE	$0.213	$134,000
DANVILLE	$0.213	$129,515
SCOTTS VALLEY	$0.209	$101,673
LOS ALTOS	$0.205	$149,964
MCFARLAND	$0.155	$35,615
COLFAX	$0.154	$41,210
GONZALES	$0.153	$48,957
PLACERVILLE	$0.152	$52,216
GRASS VALLEY	$0.152	$35,385
GREENFIELD	$0.152	$52,321
SONORA	$0.152	$34,944
HURON	$0.151	$22,969
ORANGE COVE	$0.151	$27,642
PARLIER	$0.151	$33,110
MENDOTA	$0.150	$25,109
SAN JOAQUIN	$0.150	$53,764
LAKEPORT	$0.149	$42,774
AVENAL	$0.147	$32,736
ARVIN	$0.146	$32,949

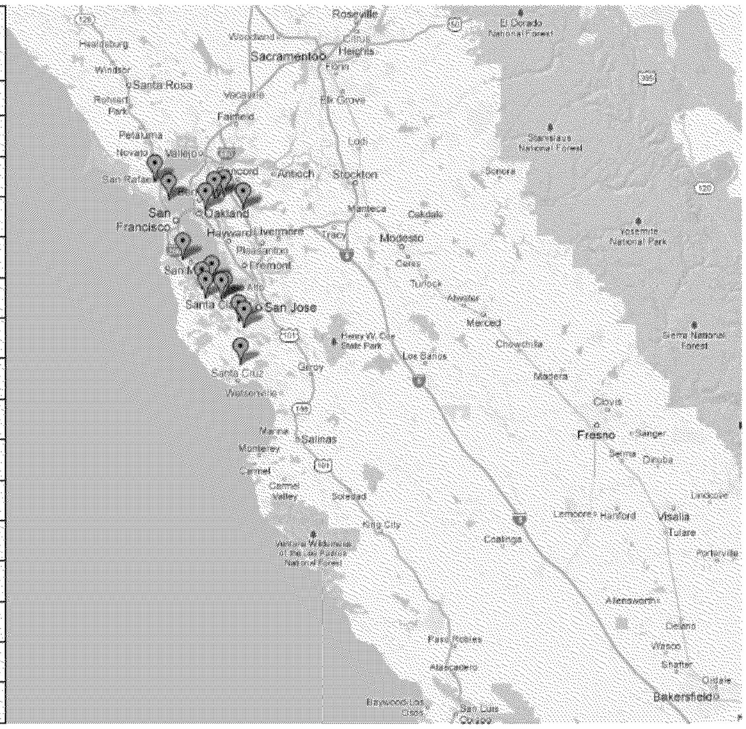
Figure 6 and

Figure 7 below show the locations of these low and high average non-CARE rate cities.

Figure 6: The 15 PG&E Cities with Highest non-CARE Rates

Highest PG&E non-CARE residential rates

City	Average non-CARE rate (cents/kwh)	Annual Household Income Median
Atherton	28.0	$223,611
Woodside	27.0	$186,359
Ross	25.6	$147,345
Hillsborough	25.3	$209,231
Los Altos Hills	25.2	$219,485
Monte Sereno	25.1	$165,484
Portola Valley	24.4	$164,479
Piedmont	22.8	$169,674
Belvedere	22.3	$119,511
Saratoga	21.9	$145,023
Orinda	21.6	$160,942
Lafayette	21.3	$134,000
Danville	21.3	$129,515
Scotts Valley	20.9	$101,673
Los Altos	20.5	$149,964



SB_GT&S_0508032

Figure 7: The 15 PG&E Cities with Lowest non-CARE Rates

Lowest PG&E non-CARE residential rates

	Average non-CARE rate	Annual Household Income
City	*(cents/kwh)*	*Median*
Arvin	14.6	$32,949
Avenal	14.7	$32,736
Lakeport	14.9	$42,774
San Joaquin	15.0	$53,764
Mendota	15.0	$25,109
Parlier	15.1	$33,110
Orange Cove	15.1	$27,642
Huron	15.1	$22,969
Sonora	15.2	$34,944
Greenfield	15.2	$52,321
Grass Valley	15.2	$35,385
Placerville	15.2	$52,216
Gonzales	15.3	$48,957
Colfax	15.4	$41,210
McFarland	15.5	$35,615

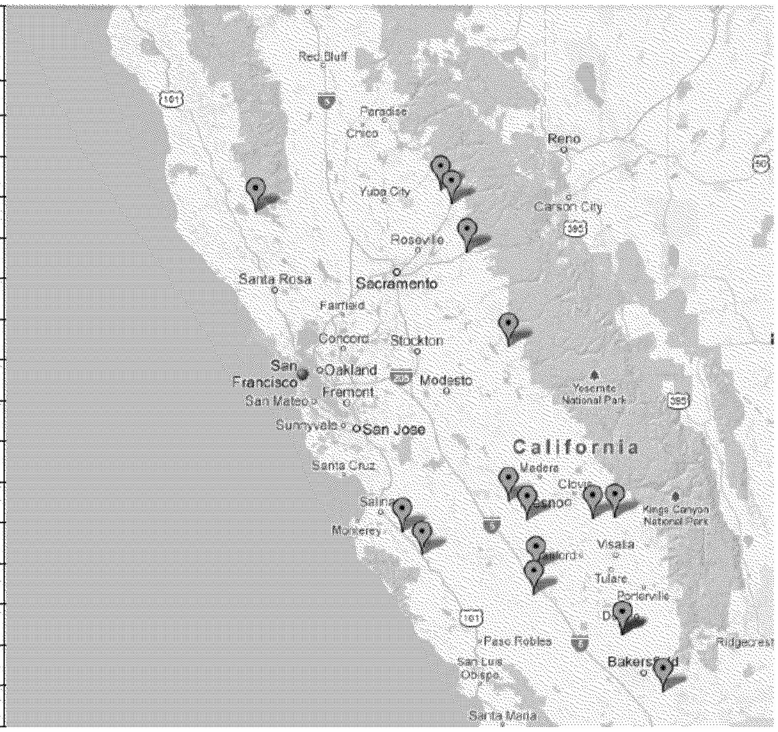


Table 4 presents similar data from SCE, showing the median annual income of the fifteen municipalities with the highest and lowest average non-CARE rates.[39] All but one (Beverly Hills) of the municipalities in the top fifteen rate group have incomes higher than $110,000, and the average median income is $132,158. Every municipality but two (Marina del Rey and Shaver Lake) in the bottom fifteen rate group has a median income below $55,000, and the average median income is $50,785.

[39] TURN excluded several municipalities due to missing income data, but all of those municipalities had very few customers (less than 1000 in all cases).

Table 4: Usage v. Income for SCE non-CARE Customers in Highest and Lowest Average Rate Cities

City	NON-CARE Customers Average Price (Cents/kWh)	Annual household income (median)	Usage per Customer (kWh/yr)
MALIBU	24.5	$125,202	12,345
CALABASAS	23.1	$116,403	12,694
VILLA PARK	23.1	$146,776	14,377
NEWPORT COAST	23.1	$164,659	11,418
BEVERLY HILLS	22.7	$83,463	10,864
TOPANGA	22.1	$120,234	11,697
SAN MARINO	21.9	$154,962	11,149
INDIAN WELLS	21.8	$128,127	19,148
PALO VERDES ESTATES	21.4	$163,542	9,902
LA CANADA	20.9	$136,818	11,302
STEVENSON RANCH	20.8	$110,284	9,662
YORBA LINDA	20.5	$115,279	9,278
ROLLING HILLS ESTATES	20.5	$142,763	8,795
LA HABRA HEIGHTS	20.5	$121,380	11,297
TRABUCO CANYON	20.5	$152,484	9,374
CRESTLINE	15.9	$54,654	3,672
SANTA FE SPRINGS	15.8	$54,694	5,200
PORT HUENEME	15.8	$51,555	3,623
SOUTH EL MONTE	15.8	$46,037	5,282
MONTEREY PARK	15.8	$52,159	4,810
ROSEMEAD	15.7	$46,706	5,086
HAWAIIAN GARDENS	15.5	$52,034	3,944
IDYLLWILD	15.5	$45,904	4,013
MONTEBELLO	15.4	$50,881	5,001
SOUTH GATE	15.4	$43,268	3,732
MARINA DEL REY	15.3	$86,326	3,639
SHAVER LAKE	15.2	$72,595	3,698
CUDAHY	15.2	$41,805	3,015
LAGUNA WOODS	15.1	$34,192	5,892
COMMERCE	15.1	$50,667	4,108
MAYWOOD	15.1	$38,740	2,919
ALHAMBRA	14.9	$51,527	4,213
WEST HOLLYWOOD	14.9	$52,009	3,731
BELL GARDENS	14.9	$39,167	3,177

By contrast, PG&E's bill calculator assumes an average income elasticity of 0.23. TURN does not agree that this figure is accurate and would note that it has never been approved by the Commission in any proceeding. This aggregate number underestimates the relationship between income and usage particularly within individual baseline zones. The bill impacts by income shown in the bill calculators should be considered as a minimum level. The Commission must recognize that the calculators underestimate the disproportionate impact of increasing the lower tier rates on moderate income customers and likely significantly underestimate the consumption levels of very high income customers.

2.2. Tiered Rates with Different Baseline Allowances for Different Climate Zones Promote Geographic Equity in California

2.2.1. Geographically-Differentiated Baselines Equalize Rates In California's Diverse Climate Zones

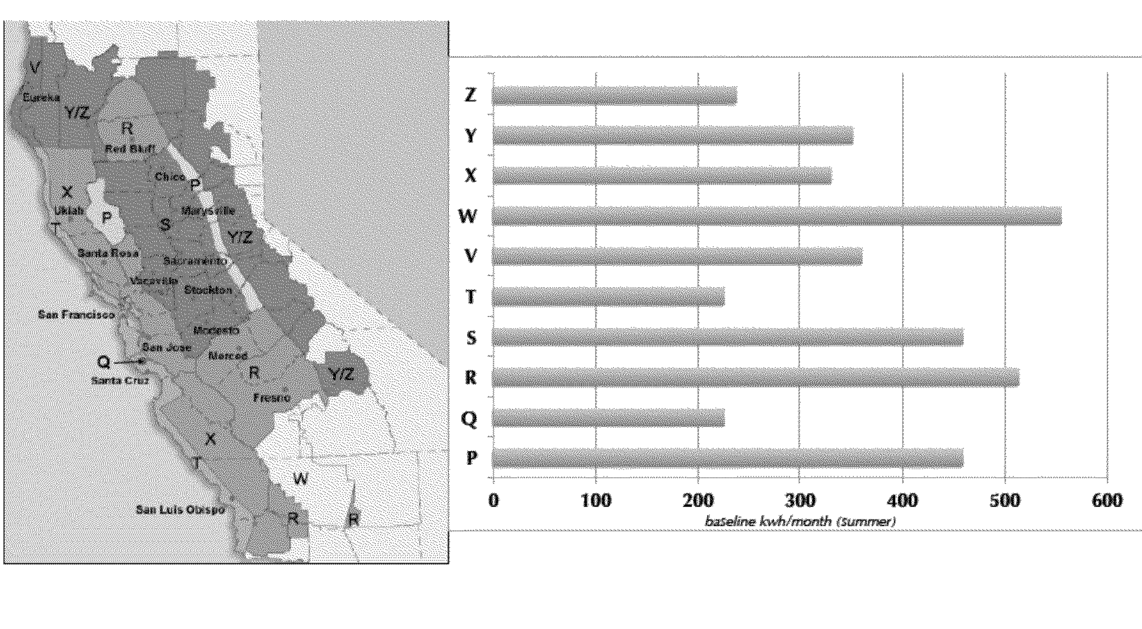
The existing baseline system promotes geographic equity by equalizing the average rates throughout the service territory of each utility. If baselines quantities were equivalent throughout the entire service territory, the average rates paid by each customer would depend entirely on their monthly consumption. Because high-usage customers pay a higher average rate (given the same baseline allowance), the absence of climate zone-differentiated baselines would result in inland customers paying much higher average rates due to their consumption of electricity for air conditioning.

The Legislature directed the Commission to "take into account climactic and seasonal variations in consumption" in determining the baseline allowance.[40] The Commission has implemented this statutory requirement by setting different baselines for different baseline territories, which are consistent with the climate zones identified in California. PG&E has ten baseline territories in its service territory, SCE has nine, and SDG&E has four.

Under state law, the baseline allowance is set equal to between 50-60% of the average consumption *within that baseline territory*. Different baselines are set for the summer (May through October) and winter (November through April) periods, with summer and winter presently each defined as a six-month period.[41] The climate zones and baseline allowances for PG&E's service territory are illustrated in Figure 8 below. This figure shows that customers in hot climate zones (such as in Bakersfield or Fresno) have much higher baseline allowances than customers in moderate climate zones (such as in San Francisco).

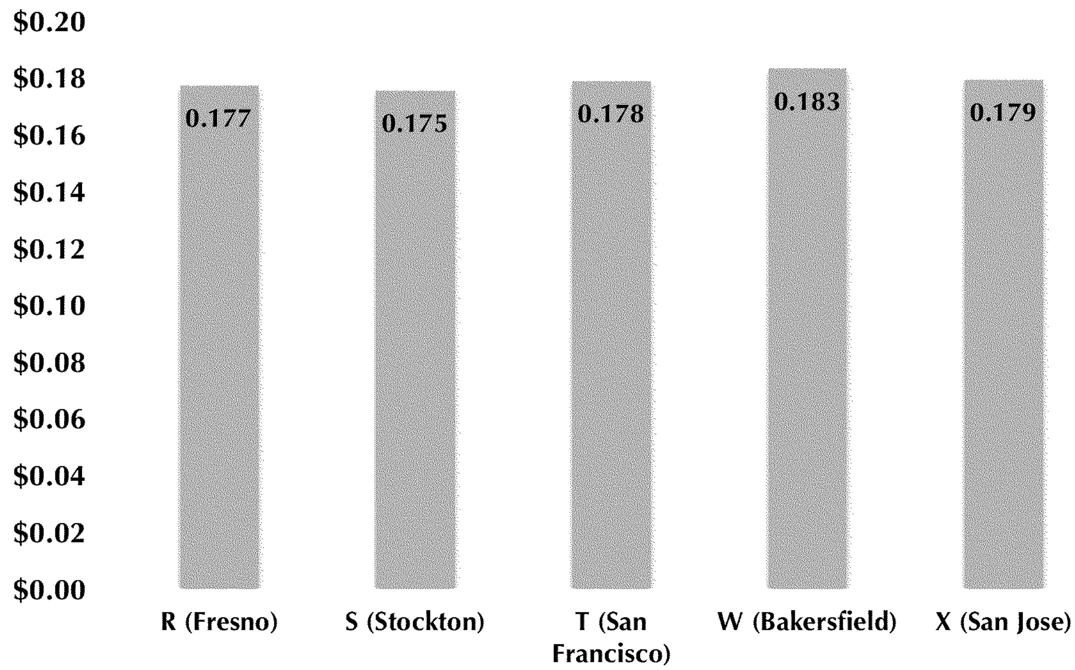
[40] Cal. Pub. Util. Code § 739(a)(1).
[41] TURN has proposed a 5-month summer season for PG&E inland zones. This proposal is pending in A.12-02-020.

Figure 8: PG&E Residential Electric Baseline Quantities



The effect of climate-differentiated baseline allowances is to temper impact of tiered rates between different climate zones. The result is that residents in each climate zone *pay almost exactly the same average annual rate, as shown in* Figure 9. This is a key impact of taking climate into account in setting baselines. As explained above, without such different baselines, residents in hot areas with significant air conditioning use would pay a much higher *average rate* for electricity.

Figure 9: Average PG&E non-CARE rates by climate zone in 2009 (Prices shown in $/kWh)[42]



It is important to keep in mind that having the same *average rate* does not mean that average monthly bills will be equal. On average, customers who use air conditioning will have larger summer bills because overall usage is much higher.[43] Residents in the Central Valley will continue to experience higher summer monthly bills due to extreme heat events during the summer. Some potential solutions to this problem are further discussed in Section 2.2.3 below.

[42] TURN previously provided data for 2011 for both CARE and non-CARE PG&E rates, showing exactly the same result. TURN Comments, Sec. 4.2.2.1, p. 21-23. The reference to individual cities next to each baseline zone indicator is illustrative and does not mean that the data is only for that city.
[43] In simple mathematical terms, the bill equals the product of the average rate times the monthly consumption.

2.2.2. The Explicit Legislative Directive to Provide Subsidies Based on Climate Reflects California's Diverse Geography

Existing law requires the Commission to consider differences in climate in setting baseline allowances.[44] There is a public policy rationale for such an outcome in California.

The basic underlying question is whether Californians residing in hot climate zones should pay a higher average price for electricity. Proponents of strict cost causation and economic efficiency argue that wholesale prices are higher during the "top 100" hours[45] which tend to occur during hot summer afternoons. Residential users with large air conditioning load consume disproportionately during those hours but pay the same marginal price irrespective of whether they consumer electricity on-peak or during the night.

California's two largest electric utilities – PG&E and SCE – have two of the largest service territories in the country. More importantly, few utilities in the United States have as much geographic and climate diversity within the footprint of their service territory. For example, the climatic differences between coastal San Francisco, mountainous Bishop or inland Stockton are very significant. Table 5 illustrates the differences by showing the average heating degree days and cooling degree days for several representative cities in California.[46]

---

[44] Cal. Pub. Util. Code §739(a)(1).

[45] TURN uses this term to denote the top 100 hours of an annual load curve (wholesale price versus number of hours when such a price is exceeded). The top 100 hours tend to occur during system peak, which occurs during hot summer days in California. Of course, actual wholesale prices during the day-of spot market can spike for other reasons, such as generation or transmission outages.

[46] TURN emphasizes that our focus is on the *climatic differences* within utility service territories. It is certainly true that on average California has a mild climate, so that there are probably many states with more extreme winter or summer climates on average. But those states probably do not have as large a variation in climates within the state as between coastal, inland and mountainous California.

Table 5: Representative Climatic Data for California Cities[47]

City	Baseline Territory	Heating Degree Days	Cooling Degree Days	Record Hi	Record Lo
San Francisco	PG&E- T	3042	108	106	20
Ukiah	PG&E- X	2954	894	113	14
San Diego	SDG&E- I	1256	984	11	29
Bishop	PG&E- Y/Z	4313	1037	109	-7
Greater LA	SCE-9	1154	1537	110	28
Red Bluff	PG&E- R	2688	1904	119	20
Barstow	SCE-14	2581	4239	116	3

Many utilities around the country have true "flat" rates for residential customers, where each customer pays exactly the same price per kilowatthour, irrespective of consumption quantity, time of consumption or location. Utilities do not differentiate between customers based on location within a service territory. In other words, the regulatory norm is to have geographic averaging of rates. The implicit assumption is that any single interconnected utility distribution system has a single uniform cost curve for utility service that can be allocated to all residential customers.

Climate-differentiated baselines serve to average geographic differences in generation costs. The result is that inland customers, on average, pay the same average rate for electricity as coastal customers while typically receiving higher summer bills due to higher summertime usage. On average, these customers do not pay a higher price just because they proportionally use more electricity on-peak.

[47] Source: The Pacific Energy Center's Guide to California Climate Zones, October 2006.

TURN does not support retail rate deaveraging. Although the costs on a per customer basis of building transmission and distribution to serve rural residents is likely much higher than to serve suburban developments or urban multi-family buildings, the process of developing geographically differentiated rates would violate longstanding principles regarding the offering of utility service at just, reasonable and affordable rates to all customers within a service territory.

2.2.3. The Problem of Bill Volatility Due to Heat Storms in the Central Valley Can Be Addressed Further By Modifying the Baseline Calculation

There have been at least two recent occasions which resulted in noticeably bill impacts on residents of the Central Valley – the heat storms in July 2006 and in July 2009. These summer heat storms triggered fairly large bill increases which caused economic harm to customers and resulted in numerous customer complaints.

The usage data for the Central Valley shows spikes in July and August driven by air conditioning and extremely hot weather.[48] The greater variability in usage in these areas during the summer months means that the standard deviation of monthly summer use is 26% of the average use in Zone W, compared to 5% in Zone X and 2% in Zone T. As a result, Central Valley zones generate more upper tier usage in hot months like July and August. This wide dispersion in monthly use is not found in the cooler zones.

Another way to understand the greater variation is to review the extent to

[48] See TURN opening brief in A.12-02-020, filed November 2, 2012, pages 20-22, See also testimony of Bill Marcus in A.12-02-020.

which there are differences in rate tier utilization between residential customers in various climate zones. The following table shows the percentage of PG&E residential customers remaining within various usage tiers within all months and highlights the significant disparity between customers in R/S/W (Central Valley) and T/X (Coastal):[49]

Figure 10: Average PG&E non-CARE usage by climate zone in 2009

Residential Households at Existing Baseline Quantities

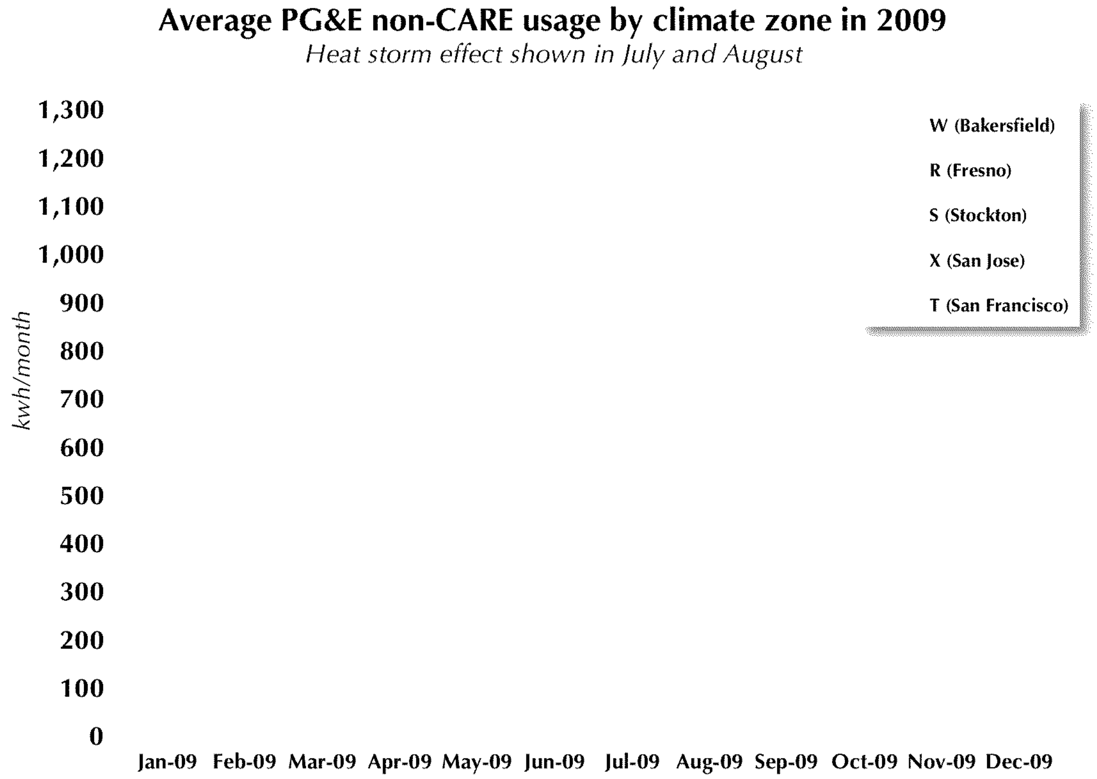
Non-CARE	R	S	W	T	X
0 to 130%	18%	18%	15%	32%	26%
130% to 200%	20%	23%	18%	25%	27%
200% to 300%	31%	32%	32%	24%	26%
Over 300%	31%	27%	34%	19%	21%
Total	100%	100%	100%	100%	100%

CARE	R	S	W	T	X
0 to 130%	18%	23%	18%	34%	36%
130% to 200%	25%	26%	25%	27%	28%
200% to 300%	31%	29%	32%	23%	22%
Over 300%	26%	22%	24%	16%	14%
Total	100%	100%	100%	100%	100%

As can be seen from this data, there is a gap between the percentage of customers who remain within 130% of baseline in the Central Valley (R/S/W) and the Coastal (T/X) areas. A far greater percentage of Central Valley customers have upper tier consumption during the summertime. The following comparison of electricity usage in five climate zones for PG&E in 2009 highlights this phenomenon:

[49] See TURN opening brief in A.12-02-020, filed November 2, 2012, page 21.

Figure 10: Average PG&E non-CARE usage by climate zone in 2009



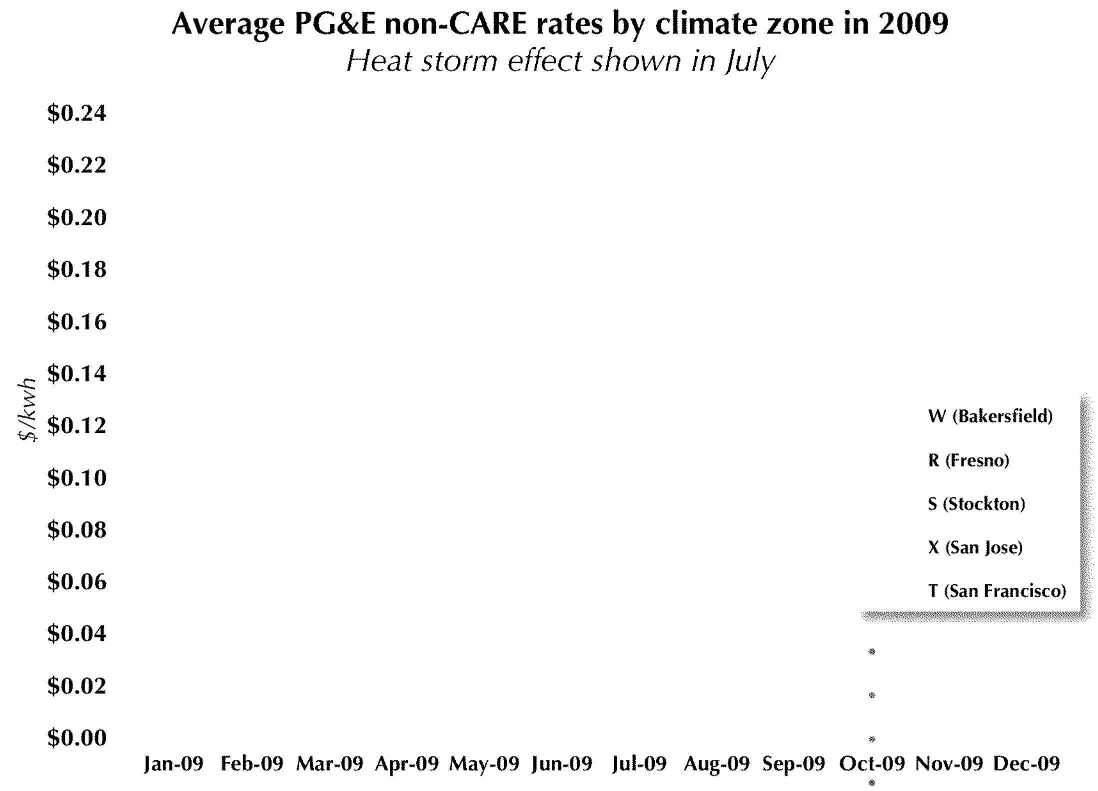
While air conditioning use increases total consumption, the contribution of air conditioning to total annual consumption is less than 10% on average.[50] But for consumers the more critical impact, especially with tiered rates, is the potential for extreme usage and bill volatility due to summer heat storms, as illustrated above.

The summer heat storm of July 2009 generated considerable consumer reaction in Bakersfield. Nevertheless, what is actually remarkable is how geographically differentiated baselines significantly mitigated the impact of

[50] KEMA Executive Summary, Figure ES-1, p. 3.

tiered rates across climate zones, resulting in a difference of less than four cents in average rates for the month of July 2009.

Figure 11: Average PG&E non-CARE rates by climate zone in 2009[51]



This graph shows that the current baseline system already minimizes bill volatility due to rate differences. Nevertheless, the potential extreme spikes in electricity use due to extended heat storms can create significant bill impacts that harm consumers. Presently, the primary means of preventing this impact is through balanced payment plans; but basic consumer "stickiness" plus a psychological bias[52] prevents many consumers from switching to such a plan.

---

[51] The cities shown next to each baseline zone are illustrative. The data applies to the entire population of customers in each zone.
[52] Consumers often believe that they can take actions to minimize use and bills, and that level payment plans would preclude such a benefit.

SB_GT&S_0508044

Moreover, a level payment plan precludes customers from responding to "price signals" associated with variations in monthly usage.

There are potential reforms that can minimize bill volatility in hot climate zones. One is to modify the calculation of the baseline quantity, so as to define it based on a higher percentage of average usage in hot, inland climate zones. In addition, the Commission could direct changes in the summer/winter seasonal definitions to better reflect summertime usage patterns. In A.12-02-020, TURN proposed a five-month summer season for PG&E's inland baseline zones, a change that would boost July and August baselines in the hottest areas and thereby additionally mitigate high bills during heat waves.[53]

The Commission has previously considered, and adopted, proposals that differentially impact the baseline calculations for various climate zones. For example, in D.96-04-050 the Commission allowed SCE to establish higher summer baseline allowances for Palm Desert area (Zone 15) in light of the excessive usage during the summer months. In R.01-05-047, the Commission agreed to exclude seasonal residences from the calculation of baseline quantities in certain climate zones. In that case, the Commission determined that seasonal residences should be excluded when their inclusion "would cause a material reduction in baseline quantities, so that baseline quantities more accurately reflect the average usage of permanent residential customers."[54]

TURN renews its recommendation that, in conjunction with the rate design we propose below, baseline allowances be adjusted in inland climate zones to provide larger summertime quantities. TURN did not include such

---

[53] The Commission has not yet issued a proposed or final decision in this proceeding.
[54] D.04-02-057, page 73.

adjustments in the bill calculators since the models do not support these types of baseline changes.

2.2.4. Public Policy Supports Reducing Air Conditioner Use by Other Means than Charging Higher Electric Prices

While air conditioning accounts for only 7% of total residential household consumption, it contributes disproportionately about 15% to the system peak demand. Thus, there is is a reliability benefit in reducing or shifting air conditioning load during peak periods. However, this benefit is *not* best achieved by undifferentiated price signals. Such price signals may result in total net peak load reduction over the entire service territory, but they will not achieve targeted load reductions in local areas impacted by a generation or transmission outage.

Targeted load reduction of residential air conditioning load can be achieved through air conditioner cycling programs. Additionally, there is the potential to achieve targeted load reduction through programmable controlled thermostats, if such a thermostat is linked to meter data through a Home Area Network and if the utility is capable of sending price signals that are translated into thermostat control signals.

Air conditioner use is even more effectively reduced at all times by improving air conditioner efficiencies, improving installation sizing and quality, and improving duct sealing. These improvements are likely more economical with tiered rates than dynamic pricing, though it is impossible to conclude without details concerning a particular rate.

2.3. Tiered Rates Promote Conservation

2.3.1. Most Academic Research Has Focused on Dynamic Pricing Due to Data Availability, But There is Evidence of the Conservation Impact of Tiered Rates

There is a relative dearth of data concerning the impact of IBR on consumption, at least in part due to the difficulty of implementing true random studies. Over the past ten years there have been numerous pilots conducted by several utilities testing the impact of dynamic pricing. These pilots have assigned small groups of customers to some type of dynamic price, and have compared resulting consumption patterns to those of other similarly situated customers, or even to a control group. These studies have thus yielded reliable data on short run price-elasticities and the impact of various demographic factors.[55]

In contrast, TURN is aware of only a single pilot that has tested the impacts of IBR on electricity consumption.[56] That study did not have the benefit of detailed load data and had to rely on complex modeling of the demand function. The data showed that there was a reduction in demand, though the calculated price elasticities were relatively low, between -0.02 and -0.04. The authors concluded that the IBR structure resulted in small overall impacts, but did result in reduced consumption by high-use customers.

There are additional studies that confirm that increasing block rates support conservation. Dr. Faruqui concluded that "[B]ased on empirical estimates of price elasticity from a number of different sources, inclining block

---

[55] TURN does not attempt to cite to the voluminous literature. Very usefulsummary work has been published by Faruqui. See, TURN Comments, Sec. 4.3.2, p. 27.

[56] See, Herriges and King, "Residential Demand for Electricity under Inverted Block Rates: Evidence from a Controlled Experiment," *Journal of Business and Economic Statistics*, Vol. 12, No. 4 (Oct. 1994), p. 419-430. Modeling the results of a two-tier pilot tariff used by the Wisconsin Electric Power Corporation.

rates can provide energy consumption savings in the 6 percent range over a few years and even higher savings over the long run."[57]

In 2007 BC Hydro proposed a residential inclining block rate design to support conservation efforts (moving from flat rates for electricity). A review of 105 peer- reviewed papers on electricity demand suggested a conservative short-run price elasticity of -0.075 to -0.15 for this winter-peaking utility.[58]

Use of increasing block rates for conservation is widely accepted in the water industry. "Properly designed increasing block rates recover class-specific, cost of service while sending a more conservation-oriented price signal to that class."[59] In 2008 the CPUC implemented increasing block rates for class A water utilities in order to promote water conservation.[60]

2.3.2. The Primary Academic Study Discounting the Impact of a Marginal Price Signal Does Not Account for Customer Information Bias

A recent study[61] found evidence that, when faced with a nonlinear electricity pricing tariff (such as tiered rates), customers respond to average

[57] Ahmad Faruqui, "Inclining Toward Efficiency," Public Utilities Fortnightly, August, 2008, P.26

[58] BC Hydro, Residential Inclining Block Rate Application, Final Argument, Project 3698504, July 9, 2008, P. 21. Testimony of Dr. Ren Orans: "The utilities that are encouraging or seeking to encourage conservation and are spending large amounts on DSM and programs, where there is market failure, have tried to tilt their rates upwards so they have inclining block rate structures." P. 74

[59] American Water Works Association, *Principles of Water Rates, Fees, and Charges, Manual of Water Supply Practices M1*, 2000 edition, p.99. See also http://www.awwa.org/Resources/topicspecific.cfm?ItemNumber=3649&navItemNumber=3650.

[60] See, D.08-02-036. See also CPUC Report to Legislature, "Progress and Achievements Towards Water Conservation Goals PUC§ 2714.5."

[61] Koichiro Ito, "Do Consumers Respond to Marginal or Average Price? Evidence from Nonlinear Electricity Pricing," Energy Institute at Haas Working Paper 210, November 2010.

rather than marginal electricity prices. The findings in the paper have been used to support some of the following conclusions:[62]

- Because customers respond to average rather than marginal prices, heavily inverted tiered rates do not promote conservation.
- Because tier 1 and tier 2 rates provide a discount to the actual cost of service, consumers in those tiers engage in "excess consumption."
- A customer charge, which can raise average prices, can have a conservation effect.

These conclusions are not technically correct. The study itself found that in a more complex rate environment, customers appear to respond to average rates. This finding is not surprising because there is a cost (in time and effort and sometimes money) to determine the marginal electricity price. The author also argues that customers respond to hourly marginal rates in the context of Critical Peak Pricing.[63] But this finding may be related to the fact that customers participating in CPP experiments are subjected to intensive education regarding the hourly marginal rates, are typically in a monitored pilot project, and have opted into the experiment. This customer sample is not reflective of the likely experience of typical customers under a default CPP pricing scenario.

Inverted tiers and higher marginal rates can exert an important conservation effect, however, even in a world where customers respond to average prices. This effect happens because the marginal price and the number

---

[62] A. 10-02-028 and A. 10-08-005, "Reply Comments of Pacific Gas and Electric Company to March 30, 2012 Comments on Rates for 2012-2020 and Peak Time Rebate Expenditures in the February 7, 2012 Joint Ruling of the Assigned Commissioner and Presiding Administrative Law Judge,"April 26, 2012, p. 11-13.
[63] Takanori Ida, Koichiro Ito, and Makoto Tanaka, "How do Consumers Respond to Dynamic Pricing? Experimental Evidence of Variable Critical Peak Electricity Pricing," January 7, 2013.

of kWh consumed at that price are components of the average price. To the extent that customers rely on the pricing signal provided by average rates, the tiered system does result in higher average rates for larger users (who typically have more discretionary usage) and lower average rates for smaller users (who typically have less discretionary usage).

It is very problematic to assume that customers would be familiar with, and respond to, marginal prices under a TOU or CPP structure but can only be expected to respond to average prices under tiered rates. The Commission should not presume that customers are only motivated to determine marginal electric prices when subjected to a non-tiered rate structure. Instead, the Commission should find that one of the biggest problems with a lack of customer response to marginal tier prices is the lack of any effort by the utilities to provide effective rate education to customers.

TURN has urged the utilities to do a better job of explaining the message of "the more you use, the more you pay." Unfortunately, the utilities have typically been more interested in undermining support for tiered rates than in promoting customer acceptance and understanding.

A proper education campaign would teach customers that reductions in usage will produce bill savings based on their highest billed usage tier. This information is readily available to customers based on even a cursory review of recent bills (or a quick online check of their usage). TURN acknowledges that the education challenge has been frustrated by adoption of up to five separate rate tiers, some of which have been separated by very small rate increments. TURN believes that a simplified system of three rate tiers with even price and usage differentials between tiers, would help to promote better customer understanding. A superior educational effort by the utilities and third parties could substantially increase customer responsiveness and promote maximum efforts to reduce usage through efficiency and conservation.

The utility approach to tier rate education is reflected in the "tier alerts." TURN had long pushed for the utilities to use smart meter capabilities to educated customers about marginal tier pricing. The Commission finally pushed the utilities to implement tiered alerts, which apply only to customers who actively sign up for this feature from the utility website. A recent PG&E "tier alert" for a customer contains the following information in the third paragraph:

> *Under the PG&E tiered pricing structure, every residential customer starts in Tier 1, where electricity costs the least. As you use more electricity through the billing period, you move into Tier 2, Tier 3 and Tier 4. As you move into higher tiers, the cost for electricity increases.*

Notably, there is absolutely no price information mentioned in the Alert. There is the feel-good statement that "With Energy Alerts you can take steps to manage your energy use," but there is absolutely no statement that if the customer conserves electricity, they can avoid moving into the higher tiers.

Indeed, the fundamental paradigm of increasing block rates is that customers should save at all times, in order to prevent facing the high marginal price. This is very different from the notion of shifting use to another time period in order to avoid a marginal price. Sadly, the utilities do not seek to convey this message to their customers. On its website section entitled "How do Energy Alerts help me save?" PG&E states that "if you receive an alert that you've just moved into Tier 4, where the price of electricity has increased, you may make different choices on how you use energy for the rest of your billing cycle." This is precisely the wrong message concerning tiered rates. The goal is for customers to take action *prior* to getting the tier alert, so as to reduce the amount of time during the month the customer would incur the high tier rate. While taking action *after* crossing into Tier 4 is helpful, the education message should be to take action so as to avoid consumption in Tier 4 by reducing in advance.[64]

The fact that tiers 1 and 2 are discounted below the actual cost of service does not represent a failure of economic efficiency that results in "excess consumption." The creation of below-cost Tier 1 and 2 rate was intended to provide basic quantities of electricity at an affordable rate. The same principle applies to telephone service, healthcare, and other basic human needs that enable residents to participate in commerce and as citizens. The fact that many customers in these tiers are lower income customers only increases the importance of this affordability factor.

Ito's paper observed that electricity consumption under the tiered rates was 0.54% higher than consumption under an alternative flat-rate structure, where the flat rate is equal to the average cost of electricity under the tiered structure.[65] This relatively small impact on consumption by low-usage customers should not be interpreted as an indictment of inclining block rates. Indeed, the underlying purpose of "lifeline" rates was to provide a slightly discounted amount of electricity, even if there is a deviation from strict cost-of-service pricing.

---

[64] SCE's "Budget Assistant" appears to send a similar message, though it is not possible to access detailed information without an SCE account.
[65] Ito, p. 30-31.

2.4. The Goal of Load Shifting Should Not Drive Residential Rate Design

TOU and/or CPP pricing with significant on-to-off peak differentials will increase bill volatility for inland residents and will increase total annual bills for some customers. More vulnerable customers who have to stay at home (i.e. senior citizens) and rely on air conditioning to survive during hot summer months could face significantly higher bills. Peak load shifting through undifferentiated price response may provide some long-term cost reductions, but does not provide any significant reliability benefits. And dynamic pricing may actually negatively impact the economics of certain efficiency investments.

2.4.1. Load Shifting By Itself Does Little to Achieve Environmental Objectives of Reducing Pollutant Emissions or GHG Emissions

One of the claimed benefits of peak load shifting is a reduction in emissions of GHG and priority pollutants. But such a net reduction in emissions is likely to be relatively small, and future environmental benefits are questionable in light of the significant expected increase of solar output during the system peak hours.

Given California's resource adequacy procurement requirements, spikes in wholesale prices due to peak load conditions occur only in the top 100 or so hours. Any potential emissions reductions due to load shifting result from the difference in heat rates between marginal units and shoulder peak units, which are both likely to be natural gas fired generators. Simply put, the net emissions reduction over 100 hours is small.[66]

[66] Academic papers show that in some areas load shifting can actually increase emissions by increasing the output of baseload coal units.

Since TOU rates could significantly reduce the economic benefits of conservation and degrade the value of investments in efficiency measures that produce savings outside of peak periods, there is no guarantee that any peak-period environmental savings will not be more than offset by the environmental impacts of increased off-peak usage.

Moreover, TOU or CPP pricing may actually negatively impact the economics of energy efficiency investments for end-uses that do not operate disproportionately on-peak (for example, any lighting or refrigeration that operates extensively during off-peak periods).

Shifting residential peak further towards evening hours may turn out to be less desirable in the coming years, as demonstrated by the ISO's "duck curve." In order to provide any benefits, dynamic pricing may need to send mixed messages to residential customers, encouraging them to reduce their usage in the middle of hot summer days but shift more usage into the middle of spring days. The potential for customer confusion is significant.

2.4.2. Undifferentiated Price Response Does Not Improve Reliability or Renewable Integration

Moreover, there will be no reliability benefit from undifferentiated price response unless the Commission quantifies peak load reductions and, notwithstanding expected opposition from the CAISO, uses these assumptions to reduce both system and local Resource Adequacy requirements.[67] In light of the fact that new conventional generation is being constructed primarily to address specific local reliability concerns, rather than system-wide peak demand, it is not

[67] Reliability benefits are obtained from dispatchable demand response, such as air conditioner cycling. The vision of M2M load reduction of residential appliances is not a realistic alternative in the next 5-10 years.

reasonable to assume that time differentiated pricing would yield any reduction in new conventional power plant development. Finally, there is no evidence that any fraction of renewable integration needs can be satisfied with undifferentiated price response.

Just as power plants have different characteristics which impact their ability to provide services for reliability purposes (for example, ramp speed), so demand-side load shifting also has different characteristics. The Commission has long recognized this distinction between "reliability" and "price-responsive" demand response. However, some proponents of dynamic pricing continue to conflate the different types of demand response and suggest that rate design may be a tool for reliability and renewable integration.

In order to use load shifting to mitigate reliability concerns or to address renewable intermittency, the demand-side resource must be "dispatchable." An operator must be able to "call" upon the resource and to ensure load is reduced within some (relatively short) specified time period.

Some types of demand-response programs provide dispatchable demand response. These programs range from residential air conditioner cycling programs to aggregator demand response programs that focus on commercial or industrial load.

However, residential rate design that encourages load shifting does not in any way provide "dispatchable" demand response. It may result in certain system benefits over time due to improvements in system load factor; but that is a very different type of benefit than the reliability or environmental benefits associated with dispatchable demand response.

The OIR notes that "tiered rates based on monthly consumption provide customers with little incentive to shift usage from peak hours."[68] While this may be true in the absence of other mechanisms, TURN believes that far more significant (and less economically disruptive) reductions can be achieved with automated, dispatchable, response programs that rely on 'set it and forget it' approaches. These approaches can be offered on top of tiered rates as optional programs that provide time-differentiated discounts in exchange for automated response by certain appliances (including air conditioning, refrigeration, and electric vehicle chargers).

3. Proposed Optimal Three-Tiered Rate Design

3.1. Non-CARE Tiered Rates

3.1.1. Rationale for A Three-Tiered Rate with More Fixed Tier Differentials

Over the past several years the IOUs have alleged that the present tiered system is inequitable and unsustainable. The statutory protections for rate increases for tiers 1 and 2 (up to 130% of baseline) result in most new costs being allocated to usage above 130% of baseline. The utilities contend that this constraint results in unfairly high bills for customers in upper tiers and high bill volatility. The IOUs also allege that users above and below 130% of baseline fall into all economic brackets, so the protections based on usage level do not promote economic affordability for low-income customers. These concerns are reiterated in the OIR, which focuses on the perceived problem of allocating costs for new policies and programs (DG, EV, smart grid) to just upper tier rates.

[68] OIR, p. 11.

TURN does not dispute that the 130% of baseline protections have resulted in rate increases for upper tier rates and have caused relatively large differentials between tier 2 and tier 3 rates. TURN is especially concerned that the large difference between tier 2 and 3 rates results in significant bill volatility whenever a customer's monthly consumption exceeds tier 2 levels.

However, as a matter of policy the Commission should note that all customers benefit from lower-priced tiers and recognize that a relatively small number of high consumption customers account for substantial usage in the upper tiers. For example, the total usage of less than 5% of the largest PG&E residential customers exceeds the total amount of sales contained in Tier 4.[69] Given the fact that a very small number of residential customers use a disproportionate amount of electricity, the Commission should be careful about designing rate changes that are intended to benefit customers with extensive usage in Tier 4.

There are two metrics relevant to evaluating the impacts of SB 695 protections. First, the percentage of total load falling below 130% of baseline shows the net impact of these protections. Second, the percentage of customers whose usage never exceeds 130% of baseline provides a more limited view of customers who are entirely protected by SB 695 due to their very limited electric use.

Additionally, in considering the impacts of a potentially reformed tiered rate design, it is useful to note that less than 15% of residential consumption falls into the current Tier 4 (above 200% of baseline). Since only a very small percentage of usage falls above the 200% limit, the expected bill impacts, and

[69] This calculation is based on data provided by PG&E in A.12-02-020.

especially bill volatility, may be disproportionally affected by the nature of the existing tier 4 rate.

3.1.2. A Reformed Three-Tier Rate Design Could Reduce the Problems Caused by Current Rate Design

TURN has reviewed data concerning consumption by usage levels and has determined that many of the alleged problems with "tiered rates" can be addressed by reforming the rate structure, assuming statutory rate protections are amended. TURN thus proposes a rate design based on the following principles:

- Residential rates should include three tiers.
- The tier difference (the absolute price change in price between two tiers) should be sufficient to motivate customer behavior in response to marginal prices.
- The tier difference should be fairly equal between tiers, meaning the difference between T1 and T2 should be similar to the difference between T2 and T3.
- If rates increase, the difference between tiers should also increase so as to maintain constant tier differentials based on equal percentage changes.

To implement these principles TURN has developed illustrative rates using a tier differential of 1.3 (ratio of T2/T1) and 1.6 (ratio of T3/T1). The following illustrates such a potential tier rate structure at two different points in time. The example illustrates that the tier differences are constant for each of the

SB_GT&S_0508058

two time periods. Although the price spread increases as the rates increase, the ratios between the tiers are constant.

Table 5: Illustrative Rates Using Constant Tier Differentials

	Ratios	Rates at Time 1	Rates at Time 2
T1	1.0	15.0	17.0
T2	1.3	19.5	22.1
T3	1.6	24.0	27.2

The impact of having a constant tier differential means that the price "difference" between tiers increases as average rates rise. The intended purpose is to maintain an equal and meaningful difference between tiers while not artificially constraining the pricing of the lowest tier. TURN suggests that such a model will minimize the extreme bill volatility and bill impacts on upper tier customers.

3.2. CARE Rates

3.2.1. Existing CARE Discounts Cause Inequity Between Utilities and Reward Higher Consumption

Under the current statutory framework, the size of the CARE discount results from a combination of several specific rate design requirements. First, CARE rates must be no more than 80% of the corresponding non-CARE rates, with certain charges first removed.[70] Second, CARE customers may have no

[70] P.U. Code § 739.1(b)(4) provides that "Tier 1, tier 2, and tier 3 CARE rates shall not exceed 80 percent of the corresponding tier 1, tier 2, and tier 3 rates charged to residential customers not participating in the CARE program." P.U. Code §§ 739.1(b)(4) and (5) also require that the CARE rate ceiling be applied to the corresponding rates for non-CARE customers after certain charges have been removed, including; "any Department of Water Resources bond charge imposed pursuant to Division 27 (commencing with Section 80000) of the Water Code, the CARE surcharge portion of the public goods charge, any charge imposed pursuant to the California Solar Initiative, and any charge imposed to fund any other program that exempts CARE participants from paying the charge." Because of these exclusions, in practice the CARE rate

more than 3 Tiers, pursuant to P.U. Code § 739.1(b)(5). No similar limit exists on the number of tiers in the rate structure for non-CARE residential customers. Hence, electricity consumption by a CARE customer that would have been charged a tier 4 (or higher) rate, if the customer were not on CARE, will be discounted by more than 20 percent compared to the otherwise applicable rate because the CARE customer will still pay the discounted tier 3 rate for that energy. Third, P.U. Code § 739.1(b)(2) limits rates increases for CARE Tier 1 and 2 to the annual percentage increase in benefits under the CalWORKs program (but not to exceed 3%). Fourth, the CARE Tier 3 rate, if newly established, must be phased in to prevent rate shock.[71] Last but certainly not least, P.U. Code § 739.1 requires that that the CARE discount be set at a level that ensures that electric and gas rates are not burdensome for low-income electric and gas customers. While this mandate has directly informed the advocacy of groups representing low-income customers (including TURN), as a practical matter, it has had less of a direct impact on the size of the CARE discount than the previous factors.

As a result of these statutory requirements, CARE rates vary significantly by utility. PG&E's, SCE's, and SDG&E's current CARE rates, as compared to non-CARE rates, are as follows:

---

ceiling for tiers 1, 2 and 3 will be less than 80 percent of the total tier 1, 2 and 3 rates paid by non CARE residential customers.

[71] P.U. Code § 739.1(b)(5) ("An electrical corporation that does not have a tier 3 CARE rate may introduce a tier 3 CARE rate that, in order to moderate the impact on program participants whose usage exceeds 130 percent of baseline quantities, shall be phased in to 80percent of the corresponding rates charged to residential customers not participating in the CARE program… For an electrical corporation that does not have a tier 3 CARE rate that introduces a tier 3 CARE rate, the initial rate shall be no more than 150 percent of the CARE baseline rate.").

Table 6: CARE Rates and CARE Discounts

	Tier 1	Tier 2	Tier 3	Tier 4	2012 Total Effective Discount
PG&E*					
CARE	$0.083	$0.096	$0.140	$0.140	
Non-CARE	$0.132	$0.150	$0.311	$0.351	
Discount	37.1%	36.4%	55.1%	60.2%	47%
SCE**					
CARE	$0.085	$0.107	$0.207	$0.207	
Non-CARE	$0.128	$0.160	$0.271	$0.311	
Discount	33.6%	33.1%	23.6%	33.4%	31%
SDG&E*					
CARE	$0.100	$0.116	$0.170	$0.170	
Non-CARE	$0.143	$0.166	$0.271	$0.291	
Discount	30.1%	30.1%	37.3%	41.6%	33%

* Source: PG&E Current Rates as of May 2013, www.pge.com

** Source: SCE Advice Letter 2872-E-A and -B, currently pending
*** Source: SDG&E Model Inputs, average of summer, winter rates

These differences are attributable in part to the different vintages of each utility's CARE Tier 3 rate. PG&E did not have a CARE Tier 3 rate until 2012, at which point the phase-in statutory requirements, which did not exist when SCE and SDG&E introduced their own CARE Tier 3 rates, limited the size of that rate.[72] The result is that PG&E's CARE customers receive a deeper CARE discount for any level of usage than the low-income customers of SCE and SDG&E.

Furthermore, the total effective CARE discount, reflecting all usage billed at CARE versus non-CARE rates, varies among the utilities. As the table above

[72] D.11-05-047.

shows, in 2012, this discount level was 47% for PG&E, 31% for SCE, and 33% for SDG&E.[73] This discrepancy flows from the different discount levels per tier and the different usage patterns among CARE customers of each utility. As a result, a PG&E CARE customer receives on average more assistance than a CARE customer of SCE and SDG&E.

At the same time, CARE customers of PG&E and SDG&E who are the largest users receive the deepest discount of all – a 60% discount for PG&E customers and a 42% discount for SDG&E customers. Because Tier 3 is the highest permissible CARE rate, CARE customers who would be charged a Tier 4 rate (or higher) if not for being on CARE would receive that higher usage at the much lower Tier 3 rate (with the CARE discount). Thus, the effective discount for consumption over 200% of baseline quantities is significantly higher than the discount provided for lower usage, as the table above illustrates. While the impact for SCE is less dramatic, customers with Tier 4 consumption still receive a larger discount for that usage than for any usage but Tier 1. In this way, the structure of the current CARE discount works contrary to the long-established legislative and regulatory goal of promoting conservation through rate design.

3.2.2. TURN's Proposal for Declining Tier Discounts Addresses These Problems, While Strongly Promoting Affordability

TURN recommends that the structure of the CARE discount be re-designed to provide a very significant discount for the lowest usage, with

[73] PG&E Response to TURN DR-03, Q8; SCE Response to TURN DR-03, Q4c; SDG&E Response to TURN DR-01, Q3a-c. TURN notes that these 2012 discount levels are different than the "current effective CARE discount" levels generated by PG&E's and SCE's rate design models of 49% and 27%, respectively. We presume that the differences have to do with changes in revenue requirements and/or rate designs in 2013 (as opposed to 2012) that the utilities built into their models.

declining discounts as usage increases. Our proposal includes a 50% discount for Tier 1, a 30% discount for Tier 2, and a 10% discount for Tier 3. As discussed elsewhere, TURN proposes to adjust the usage quantities for each tier, with Tier 1 set as 0-100% of baseline, Tier 2 as 101% - 200% of baseline, and Tier 3 as 200% of baseline.[74] As a result of these parameters and continuing to set baseline usage at 50-60% of average usage per climate zone, the lowest discount rate of 10% would apply to Tier 3 usage that by definition exceeds the average seasonalusage for that particular climate zone. Providing only this modest discount would create an economic incentive via rate design for customers to reduce usage through conservation and/or energy efficiency (e.g., by participating in the Energy Savings Assistance Program, which has no cost for participants).[75] Also, because TURN's rate design has three tiers for both non-CARE and CARE rates, it would avoid the present result wherein the discount implicitly increases for the highest users, who are charged a CARE Tier 3 rate for Tier 4 usage and above.

In contrast, the lowest users – those with usage up to 100% of baseline – would receive heavily discounted rates under TURN's proposal in order to promote affordability of basic quantities of electricity. TURN's illustrative rates for all three utilities include Tier 1 rates that are lower than current Tier 1 rates, and all CARE customers would benefit from these low Tier 1 rates. The bill impacts of TURN's illustrative rates (described in detail in Section 3.4.2) illustrate this effect; small users would see bill reductions in furtherance of affordability, while larger than average users would face bill increases compared to current

[74] Though TURN's illustrative tier quantities were influenced by bill calculator functionalities. TURN suggests that an optimal rate design might include different tier break points.
[75] TURN does not intend to gloss over the conservation incentive provided by the fact of poverty itself, but rather to highlight the incentives built into rate design.

rates. A lower Tier 1 rate is an appropriate trade-off for the higher Tier 2 and 3 rates in TURN's proposal and a necessary component of preserving the affordability purpose of CARE.

TURN's proposal would additionally introduce some standardization to CARE rates. By adopting the same effective discount per tier for each of the three tiers across the utilities, CARE customers would have access to the same level of benefit, no matter where they resided. The total effective (or aggregate) CARE discounts paid for by ratepayers of the three utilities would also start to converge, due to the combination of uniform discount levels and three non-CARE tiers per utility. Since the total aggregate CARE discount is a product of the usage patterns of CARE customers in addition to the rate design parameters, TURN does not recommend trying to make this variable the same for all utilities. However, TURN's proposal would move the aggregate discount levels closer together, while also introducing some structural limits on the rate of growth of the revenue requirement for the CARE discount by providing for the movement of CARE and non-CARE rates in tandem.

In these ways, TURN's proposed rate design eliminates or at least mitigates the structural problems with current CARE rate design.

3.2.3. Alternative Approaches to Promoting Affordability for CARE Customers Should Be Considered in the Future.

The CARE discount, coupled with other low-income assistance programs, must be set at a level that makes energy utility bills affordable for low-income ratepayers. P.U. Code § 382(b) provides as follows:

> In order to meet legitimate needs of electric and gas customers who are unable to pay their electric and gas bills and who satisfy eligibility criteria

> for assistance, recognizing that electricity is a basic necessity, and that all residents of the state should be able to afford essential electricity and gas supplies, the commission shall ensure that low-income ratepayers are not jeopardized or overburdened by monthly energy expenditures. Energy expenditure may be reduced through the establishment of different rates for low-income ratepayers, different levels of rate assistance, and energy efficiency programs.

Consistent with this objective, TURN considered two additional approaches to promoting affordability for CARE customers, but has declined to specifically promote either at this time because of their complexity. However, we recommend that the Commission explore both approaches in a later phase of this docket or a future CARE proceeding.

The first approach would segment CARE customers by income and provide a larger set of discounts to the lowest income customers. CARE provides benefits to customers with incomes up to 200% of the Federal Poverty Guidelines (FPG). Under an income segmentation approach, for instance, customers with incomes up to 100% of FPG could receive larger discounts than those with incomes between 101% - 200% of FPG. TURN's 50%-30%-10% discount structure could be adapted to this end by increasing the discount levels for the lower income segment, while decreasing the discount levels for the higher income segment. The rationale for the income segmentation approach is based on the assumption that bill affordability varies with degree of poverty relative to the FPG.

Complicating matters is the fact that the cost of living varies greatly across the State of California and within each utility service territory (particularly PG&E's and SCE's). In December 2009, the United Way issued a report, *Overlooked and Undercounted 2009: Struggling to Make Ends Meet in California*, which used a comprehensive cost-of-living methodology called the "Self-Sufficiency Standard" to calculate the annual income needed in each California county to cover basic needs, including housing (with utilities), child care, food, transportation, health care, taxes, and other essential items (but excluding any allowance for restaurant food, savings, emergency funds, credit card payments or loan payments).[76] For each county, the authors calculated a Self-Sufficiency Standard-based annual income for a household of two adults and one infant. The necessary income range at that time (four years ago) in the lowest-cost California counties was $43,381 - $37,705, while the necessary income range in the highest-cost California counties was $63,871 - $51,946.[77] Under this methodology, the highest-cost counties are between 38% and 47% more expensive to live in than the lowest-cost counties.

As a result of this variation in cost of living, two low-income households with the same incomes but living in a high cost and low cost area of the state, which often correlate with living in a coastal versus inland county, will not be similarly situated even if they face the same charges for utility service. Fine tuning the CARE program to more strategically promote affordability might require a consideration of local cost of living, in addition to or instead of simply focusing on income level. Cost of living segmentation could be used to target CARE discount levels, with higher discounts going to customers living in counties with higher costs of living, and vice versa.

---

[76] *Overlooked and Undercounted 2009*, Executive Summary, p. X, available at http://www.selfsufficiencystandard.org/pubs.html.

[77] See Attachment 1, *Overlooked and Undercounted 2009*, p. 6, Figure B. The Self-Sufficiency Standard by County: California. The highest cost counties include (from north to south) Napa, Marin, San Francisco, San Mateo, Santa Clara, Santa Cruz, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego County.

Given the schedule in this proceeding and our own resource constraints, TURN has not been able to examine the pros and cons of these two segmentation strategies for CARE rates. However, we believe that the CARE program could be reformulated to more strategically target the discount according to varying need to promote the ultimate CARE goal of universal access to affordable electricity service. To this end, we recommend that the Commission undertake this examination at some point in the near future. In the mean time, we welcome the preliminary responses of other parties in this proceeding to the concepts TURN puts forth here.

3.3. The Bill Calculator Results Indicate That TURN's Proposal Results in Reasonable Rates That Equalize Costs Between Customers and Equalize CARE Discounts Between Utilities

3.3.1. Calculator Functionality Limitations

Before discussing the results for TURN's proposed rate structure, TURN addresses several concerns regarding the model functionality. While TURN certainly applauds the utilities for developing such sophisticated rate models within a relatively short amount of time, we caution that several significant limitations in the model functionalities have affected our ability to design an "optimal" rate structure and to evaluate the impacts of different rate designs.

- All of the calculators provide only average annual bill impacts in the outputs. Even though for a "TOU" rate structure there is input data concerning summer and winter on-peak and off-peak pricing, there is no easy way to aggregate consumption and bill impacts for only the summer months, or for individual high consumption months, so as to test the impacts of a rate design on monthly or seasonal bill volatility.

- The bill calculators have pre-set tier quantities, which means that any IBR structure can only have rate changes at 100%, 130%, 200%, and 300% of baseline.
- The different models calculate the "discount" to the CARE rate differently. PG&E calculates a discount to the total non-CARE tiered rate, while SCE and SDG&E first subtract several components (DWR Bond Charge, CSI, CARE surcharge) from the non-CARE rate before applying the discount. This means that to represent the same effective CARE subsidy (between utilities) requires additional manipulation and is not transparent in the bill calculator results. TURN has performed this manipulation for SCE,[78] but we were unable to do so for SDG&E outputs. Our outputs are thus not exactly comparable across the utilities.
- The SDG&E calculator does not readily calculate the shifts in the amount of the CARE subsidy between rate classes, including shifts to non-CARE residential customers or non-residential customers, so it is difficult to isolate whether bill impacts are caused by rate design changes or changes in the CARE customer class subsidy.
- Each potential iteration of the calculator takes several minutes and produces an output file of over 20 Megabytes. In other words, this is not a trivial exercise.

[78] This means that the "CARE discount" as shown in the SCE input file is not the same as the "effective CARE discount" in TURN's tables. We tried to adjust the numbers to be able to compare SCE and PG&E results. Too late we discovered that SDG&E also calculates the discount differently.

3.3.2. Details of TURN's Proposal

TURN tested our proposed rate design framework by using the utility bill calculators to develop illustrative rates consistent with the principles above. TURN developed two scenarios for each utility, so as to be able to measure bill impacts compared to current rates on an 'apples to apples' basis.

First, TURN calculated a revenue neutral three-tier non-CARE rate, together with a declining CARE rate, that resulted in exactly the same effective CARE bill discount as exists today. Second, TURN applied a uniform declining CARE discount of 50% for tier 1, 30% for tier 2, and 10% for tier 3, to calculate CARE rates, using the non-CARE rates from Scenario 1. This output shifted some revenues between CARE and non-CARE customers (in a different direction for different utilities), resulting in an effective CARE discount different from today's effective CARE discount. Non-CARE rates had to be iteratively adjusted to maintain revenue neutrality.

In Section 3.4 below we analyze the impacts of TURN's proposed rate design on customer bills and usage. Some of the detailed bill calculator input and output sheets are provided as attachments to this pleading.

3.4. Impact of TURN's Proposed Rate Structure

TURN recognizes that its proposed rate structure will result in bill increases for lower-usage non-CARE customers. TURN is willing to accept such increases in recognition of the fact that this customer segment has been protected against significant rate increases since the AB 1890 rate freeze. Given the fact that massive increases in system costs have been allocated to upper tier rates over the past decade, TURN understands that the time has come to rebalance the allocation of these costs amongst the tiers. TURN's tolerance to accept such increases is dependent upon continuing rate benefits for lower usage customers in the new rate design framework. Our proposed inclining block tiers, with meaningful tier differentials, is intended to achieve this outcome.

3.4.1. Bill Impacts for non-CARE customers

TURN's proposed rate structure for non-CARE customers relies on block pricing for three usage tiers. The tiers follow the current baseline structure but omit a separate price for the current Tier 2 usage band of 100-130% of baseline. TURN's tiers are set at 0-100% of baseline, 101-200% of baseline, and 201%+ of baseline. With respect to pricing, TURN ran the utility models to try and achieve a ratio of approximately 1.6 between the Tier 3 and Tier 1 rate and 1.3-1.4 between the Tier 2 and Tier 1 rate. The results of this exercise are shown below:

Table 7: TURN's Proposed Illustrative non-CARE Residential Rates

	Non-CARE (TURN)	Ratio vs. Tier 1 (TURN)	Non-CARE (current)	Ratio vs. Tier 1 (current)	Difference (TURN vs. Current)
PG&E					
0-100%	15.7	1.00	13.2	1.00	2.5
100-130%	21.0	1.34	15.0	1.14	6.0
131-200%	21.0	1.34	31.1	2.35	(10.1)
201%+	25.4	1.62	35.1	2.65	(9.7)
SCE					
0-100%	15.8	1.0	12.8	1.00	3.0
100-130%	21.0	1.33	16.0	1.24	5.0
131-200%	21.0	1.33	27.1	2.11	(6.1)
201%+	25.8	1.63	31.1	2.42	(5.3)
SDG&E					
0-100%	15.7	1.0	14.3	1.00	1.4
100-130%	21.2	1.35	16.6	1.16	4.6
131-200%	21.2	1.35	27.1	1.89	(5.9)
201%+	25.4	1.62	29.1	2.03	(3.7)

As shown in this table, TURN's proposal involves significant rate increases for non-CARE usage up to 130% of baseline. The largest increases are for usage between 100-130% of baseline. All customers would see a reduction in marginal prices for usage in excess of 130% of baseline. Higher usage customers would realize significant benefits in the form of lower upper tier rates.

While the pricing ratios between Tier 4 and Tier 1 currently range from a low of 2.03 (SDG&E) to a high of 2.65 (PG&E), TURN's proposal would yield a relatively uniform, and far less severe, ratio of approximately 1.6. TURN believes that this Tier 3 ratio should be sufficient to promote all cost-effective conservation and efficiency without being punitive for higher-usage customers.

In the following sections, TURN provides a summary of bill impacts for non-CARE customers. Detailed outputs from the utility models are attached to this pleading. TURN modeled two scenarios for each utility. The non-CARE rates from the first scenario (in which the total CARE discount is not changed) are shown in this analysis. The non-CARE rates from the second scenario (in which the total CARE discount is modified) are not shown in this analysis because the CARE modifications cause changes to the average non-CARE rates. TURN prefers to show its non-CARE rate proposal without assuming any changes to average non-CARE rates for simplicity's sake.

3.4.1.1. *Modeled impacts for PG&E non-CARE customers*

The following table provides a summary of bill impacts for PG&E customers under TURN's proposal:

Monthly bill impact	% of customers	Average monthly kWh	Average bill change (%)	Average bill change ($)
25% to 30%	0.4%	344	25%	$11.49
20% to 25%	38%	295	23%	$8.74
15% to 20%	10%	416	18%	$10.50
10% to 15%	10%	508	12%	$9.70
5% to 10%	7%	560	7%	$6.84
0% to 5%	8.0%	630	2%	$2.56
0% to -5%	8.0%	714	-2%	$(3.12)
-5% to -10%	8.0%	795	-8%	$(13.12)
-10% to -15%	7.0%	996	-13%	$(29.37)
-15% to -20%	2.0%	1,331	-17%	$(59.64)
<-20%	1.0%	980	-21%	$(61.82)

This table shows that approximately 74% of customers would experience bill increases. Although the percentage increase in bills is significant for these customers, the raw dollar increase is more moderate. Almost 80% of customers receiving increases would experience $8.74-11.50 per month bill impacts. Higher bill impacts are correlated with lower usage. The largest raw dollar increases occur for customers using 130% of baseline in inland zones.

Approximately 26% of customers would experience bill reductions. Almost 70% of customers receiving reductions would save an average of at least $13.12 per month. The largest winners (reductions of $60 per month or more) would be the 120,000 highest users on the system. All customers with extensive usage in Tier 3 would appear to realize substantial savings on both a percentage and raw dollar basis.

3.4.1.2. ***Modeled impacts for SCE non-CARE customers***

The following table provides a summary of bill impacts for SCE customers under TURN's proposal:

Monthly bill impact	% of customers	% change	Average change ($)
$20-25	0.1%	18.2%	$23.04
$15-20	0.3%	16.4%	$16.73
$10-15	8.6%	16.1%	$11.24
$0-10	58%	9.7%	$5.84
($10)-0	15.9%	-2.9%	-4.07
($30)-($10)	11.8%	-7.7%	-17.33
<($30)	5.3%	-12.2%	-55.38

This table shows that approximately 67% of customers would experience bill increases. Almost 90% of customers receiving increases would experience $0-10 per month bill impacts. The largest increases would be experienced by an extremely small number of customers using exactly 130% of the current baseline in the hottest climate zones (where baselines are highest). Although the percentage increase in bills is significant for all customers receiving increases, the raw dollar increase is more moderate.

Approximately 33% of customers would experience bill reductions. Almost 85% of customers receiving reductions would save between $0-30 per month. The largest winners (reductions more than $30/month) would be the 150,000 highest users on the system, particularly customers located in coastal climate zones (where baselines are the lowest). All customers with extensive usage in Tier 3 would appear to realize substantial savings on both a percentage and raw dollar basis.

3.4.1.3. *Modeled impacts for SDG&E non-CARE customers*

The following table provides a summary of bill impacts for SDG&E customers under TURN's proposal:

Monthly bill impact	% of customers	Average monthly bill change ($)
10% to 15%	18.4%	5
5% to 10%	40.1%	4
0% to 5%	11.2%	2
No change	1.2%	0
0% to -5%	13.0%	($3)
-5% to -10%	14.7%	($18)
-10% to -15%	1.4%	($65)

This table shows that approximately 70% of SDG&E customers would experience bill increases. The increases are small on both a percentage and raw dollar basis due to the fact that TURN's proposed Tier 1 rate is only 1.4 cents above the current rate. The largest increase is for customers using exactly 130% of baseline. It appears that customers using below 600-700 kwh per month would receive bill increases and those using more than this amount would receive reductions.

Approximately 29% of customers would experience bill reductions. Within this group, 45% would see quite small reductions (average of $3) while 50% would receive somewhat larger benefits (average of $18). A very small subgroup (1.4% of total customers) with extensive usage in Tier 3 would receive average bill reductions of $65. The biggest beneficiaries would be less than 950 customers receiving average bill reductions of $223.52.

3.4.2. Bill Impacts for CARE customers

TURN's proposed CARE rate structure relies on declining discount spread across the three non-CARE tiers. TURN modeled two CARE discount options. The first option ("preserve current discount") reallocates the total CARE discount dollars currently included in rates. This scenario was performed to illustrate how existing discounts could be redeployed to provide the largest discount on Tier 1 and the smallest discount on Tier 3. TURN also ran a "preferred" scenario that set the CARE discount at 50% on Tier 1, 30% on Tier 2, and 10% on Tier 3.[79]

The results of this exercise are shown in the following table:

[79] TURN's preferred CARE rate scenario yields different average effective CARE discounts than are currently included in rates.

	CARE rates (current)[80]	CARE rates (TURN - preserve current discount)	CARE rates (TURN - preferred)
PG&E			
Avg. discount		49%	41%
0-100%	8.3	7.9	7.9
100-130%	9.6	11.6	14.7
131-200%	12.5 (2012) 14.0 (2013)	11.6	14.7
201%+	12.5 (2012) 14.0 (2013)	15.2	21.3
SCE			
Avg. discount	27%	26%	36%
0-100%	8.5	9.8	8.1
100-130%	10.7	15.3	15.1
131-200%	20.7	15.3	15.1
201%+	20.7	22.1	23.7
SDG&E			
Avg. discount	33%	33%	43%
0-100%	10.0	9.3	7.5
100-130%	11.6	16.3	14.4
131-200%	17.0	16.3	14.4
201%+	17.0	22.1	22.2

Although TURN has identified a "preferred" CARE scenario, it is important to note that this approach would result in overall increase to current CARE rates for PG&E due to the large discount (in excess of 45%) embedded into existing rates. For SCE and SDG&E, the "preferred" scenario would lead to modest increases in the CARE discount relative to existing levels.

[80] TURN shows the most current CARE rates in this table. PG&E's model uses2012 CARE rates which have a Tier 3 price of 12.5 cents. While TURN presents a comparison of its proposals with current CARE rates, the PG&E bill impact analysis is based on a comparison to the 2012 CARE rates.

3.4.2.1. *Modeled impacts for PG&E CARE customers*

As noted previously, PG&E's model includes CARE rates for 2012 rather than current 2013 rates. Because Tier 3 CARE rate rose from 12.5 cents in 2012 to 14.0 cents in 2013, the use of 2012 rates in the model has the effect of skewing the bill impact results. As a result, the bill impacts shown in the following tables overstate the bill increases associated with the two TURN scenarios for customers using more than 200% of baseline and fail to accurately model the bill impacts for customers using between 130-200% of baseline.

The "preserve current discount" scenario bill impacts are shown in the following table:[81]

Monthly bill impact	% of customers	Avg kWh	% change	Average change ($)
15% to 20%	0.1%	3,579	16%	$66.52
10% to 15%	1%	2,068	14%	$32.12
5% to 10%	2%	1,364	8%	$11.22
0% to 5%	14%	826	2%	$1.74
0% to -5%	54%	519	-2%	$(0.89)
-5% to -10%	27%	249	-6%	$(1.19)
-10% to -15%	1%	183	-13%	$(2.55)

The "preserve current discount" table shows that approximately 17% of CARE customers would experience bill increases relative to 2012 CARE rates. Approximately 3% of CARE customers would experience impacts in excess of $11.22 per month, and a very small number with average monthly usage in excess of 2,000 kwh would see significant raw dollar bill increases.

[81] When considering the bill impacts of thisscenario, the bill increases associated with TURN's rates are overstated because the PG&E model assumes a current Tier 3 CARE rate of 12.5 cents/kwh. This rate was in place during 2012. The actual Tier 3 CARE rate in 2013 is 14 cents/kwh.

Approximately 82% of CARE customers would experience bill reductions. These customers, with average usage below 519 kwh/month, would receive very small reductions that do not exceed a few dollars per month. Those receiving reductions would be customers remaining entirely within Tier 1 (or 100% of baseline) or customers using between 160-200% of baseline.

The TURN "preferred" scenario results are as follows:[82]

Monthly bill impact	% of customers	Avg kWh	% change	Average change ($)
60% to 65%	0.5%	2,579	61%	$183.47
55% to 60%	0.1%	2,113	58%	$139.26
50% to 55%	0.2%	1,469	53%	$88.32
45% to 50%	1%	1,316	47%	$68.21
40% to 45%	1%	1,591	41%	$70.96
35% to 40%	1%	1,201	37%	$47.66
30% to 35%	2%	792	33%	$27.51
25% to 30%	4%	853	28%	$24.82
20% to 25%	3%	874	23%	$19.67
15% to 20%	7%	804	18%	$13.91
10% to 15%	13%	626	12%	$6.98
5% to 10%	13%	527	8%	$3.60
0% to 5%	15%	489	3%	$1.11
0% to -5%	12%	392	-2%	$(0.83)
-5% to -10%	27%	247	-7%	$(1.38)
-10% to -15%	1%	228	-11%	$(2.22)
-15% to -20%	0.4%	82	-19%	$(1.46)
<-20%	1%	37	-52%	$(3.09)

The "preferred" table shows that approximately 60% of CARE customers would experience bill increases relative to 2012 CARE rates. Approximately 41% of CARE customers would experience modest increases (between $0-$6.98 per month). Of the CARE customers experiencing greater increases, 10% would receive an additional $13.91-$19.67 per month and the remaining 9-10% would

[82] As with the previous scenario, the PG&E model uses 2012 CARE rates which have 12.5 cents for Tier 3. The current Tier 3 CARE rate is 14 cents.

experience severe bill impacts with the top 3% experiencing significant (and in some cases very severe) raw dollar increases.

Approximately 41% of CARE customers would experience bill reductions. These customers, with average usage below approximately 400 kwh/month, would receive very small reductions that do not exceed a few dollars per month.

3.4.2.2. ***Modeled impacts for SCE CARE customers***

The "preserve current discount" scenario bill impacts are shown in the following table:

Monthly bill impact	% of customers	% change	Average change ($)
$10-15	0.2%	4.2%	$12.29
$0-10	85%	5.6%	$3.04
($10)-0	15.2%	-1.4%	$(1.50)

The "preserve current discount" table shows that approximately 85% of CARE customers would experience bill increases. Almost all of these increases are modest with a very small percentage experiencing significant raw dollar increases to monthly bills.

Approximately 15% of CARE customers would experience bill reductions. These customers would receive very small reductions that do not exceed a few dollars per month. Those receiving reductions would be customers consuming approximately 200% of baseline.

The TURN "preferred" scenario results are as follows:

Monthly bill impact	% of customers	% change	Average change ($)
$25-30	0.1%	7.5%	$27.00
$15-20	0.6%	6.3%	$18.04
$10-15	0.8%	4.8%	$12.67
$0-10	7.7%	1.8%	$2.24
($10)-0	90.3%	-4.7%	$(2.51)
($30)-($10)	0.4%	-7.0%	$(13.52)

The "preferred scenario" table shows that approximately 9% of CARE customers would experience bill increases. The vast majority of increases are modest in raw dollar terms. A very small percentage of CARE customers would experience increases above $10 per month.

Approximately 90% of CARE customers would experience bill reductions. Practically all customers receiving reductions would realize modest benefits of a few dollars per month. A very small group (0.4%) using approximately 100% of baseline in hot inland zones would receive more significant reductions due to the lower Tier 1 rate.

3.4.2.3. *Modeled impacts for SDG&E CARE customers*

The "preserve current discount" scenario bill impacts are shown in the following table:

Monthly bill impact	% of customers	Average monthly bill change ($)
15% to 20%	1.9%	34
10% to 15%	3.3%	20
5% to 10%	13.2%	9
0% to 5%	25.8%	2
No change	0.0%	0
0% to -5%	24.4%	($1)
-5% to -10%	31.3%	($1)

The "preserve current discount" table shows that almost 45% of CARE customers would experience bill increases. While 25% of CARE customers would experience modest increases, almost 20% would see larger bill impacts. CARE customers with usage above 1,000 kwh would receive the largest bill increases.

Approximately 55% of CARE customers would experience bill reductions. These customers would receive very small reductions that do not exceed a few dollars per month. Those receiving reductions would be customers consuming approximately 100% of baseline due to the slightly lower Tier 1 rate.

The TURN "preferred" scenario results are as follows:

Monthly bill impact	% of customers	Average monthly bill change ($)
15% to 20%	1.5%	24
10% to 15%	1.5%	12
5% to 10%	2.4%	4
0% to 5%	0.0%	0
No change	10.4%	($3)
0% to -5%	6.6%	($7)
-5% to -10%	20.2%	($7)
-15% to -20%	14.5%	($8)
-20% to -25%	43.0%	($5)

The "preferred scenario" table shows that approximately 5% of CARE customers would experience bill increases. The vast majority of increases are modest in raw dollar terms. A small percentage of CARE customers with usage above 1250 kwh would experience increases above $20 per month.

Approximately 95% of CARE customers would experience no impact or receive bill reductions. Almost half of CARE customers would receive reductions of less than $5 per month. The largest bill savings (in dollar terms) would be realized by customers using exactly 100% of baseline and 200% of baseline. This result is due to TURN's lower Tier 1 rate and the difference between the proposed Tier 2 rate and SDG&E's current Tier 3 rate (which overlap for usage between 131-200% of baseline).

3.5. Utility Cost of Service Assumptions are Not Reasonable and Cannot be Relied Upon for Purposes of the Rate Models

TURN does not agree with the "cost-based" rate analysis included in the utility models and therefore provides no such analysis as part of this proposal. Because TURN believes that a number of cost parameters represent only the utility's wishes or conventions that have little to do with reality, TURN urges the Commission not to rely on the purported relationships between rates and costs that are embedded into the models. In the following sections, TURN identifies several major flaws in the methodologies used by the utilities in the models. These flaws render unusable the "cost-based" comparisons embedded into the rate models.

3.5.1. Customer Costs

Customer costs have been controversial for 25 years in California, and Edison and SDG&E essentially base their "cost based" estimates filed in this rulemaking on their own positions in recent Phase 2 cases. The table below shows the customer costs (before scaling to the revenue requirement) in each of the utilities' models, in each utility's last Phase 2 proceedings, and as proposed by TURN or SDCAN, the participating customer intervenors, in those cases.

	Utility Model	Utility Phase 2	TURN or SDCAN
Edison	$12.10[83] (settlement)	$13.30 (updated)	$ 4.50
Sempra	$11.65	$11.65 (rebuttal)	$ 7.55
PG&E	$ 7.64[84]	$ 7.64 (updated)	$ 7.07

In the PG&E phase 2, there is a different problem. The calculations originally presented by PG&E were alleged by other parties to have serious quantitative deficiencies beyond the normal issues raised in Phase 2 cases. TURN's testimony stated:

> TURN believes that PG&E's modeling is riddled with errors, so it has not only proposed alternative estimates of marginal cost but has had to fix a variety of modeling errors, conceptual errors, and unsupported numbers presented in PG&E's showing.[85]

As a result, the Phase 2 settlement stated: the "There is no agreement on marginal cost for purposes of revenue allocation."[86] PG&E's calculations were used only "as the starting point for the mechanical calculations described in part f. below."[87] Thus, it is fair to state that, while parties may be "advocating for

[83] Edison Settlement number using Rental Method. Settlement was averaged with NCO settlement value of $7.18 and was $9.64.
[84] Excludes "miscellaneous fixed charge" of $5.00 per customer per year which appears not to have been used in PG&E's model.
[85] William B. Marcus, Prepared Testimony in CPUC App. 10-03-014, page 1. A detailed review of TURN's testimony reveals large numbers of individual mistakes, both arithmetic and conceptual.
[86] Marginal Cost and Revenue Allocation Settlement Agreement in A.10-03-014, p.9 (adopted in D.11-02-053).
[87] Id.

their preferred marginal costs in any other Commission proceeding"[88] there are really no costs from which to derive "cost-based" rates for PG&E. It would therefore be completely inappropriate to rely on these settlement numbers for the purpose of determining "cost-based" retail rates.

3.5.2. Distribution Demand costs

While TURN does not object to the quantification of distribution demand costs, TURN strongly opposes assigning these costs within the residential class based on dollars per non-coincident kW of residential demand. The major offenders are Edison and Sempra.[89] Edison assumes $5.17 per non-coincident kW while SDG&E assumes $6.40.

Distribution demand costs come in several types: substations, feeders, new business, and (for PG&E) demand-related improvements to older secondary lines. PG&E's are calculated by area and aggregated. As one moves farther away from the customer, there is more and more diversity, and the individual peak demand of a residential customer becomes less relevant to the sizing and operation of the system. The only costs that may have some relationship to the customer peak are the new business primary cost and PG&E's secondary cost; but even those costs exhibit diversity between the customer and the final line transformer.[90]

---

[88] Id., page 8.
[89] For PG&E, we were never able to determine how the "cost based" distribution charge was developed in its rate model
[90] PG&E's secondary distribution demand includes capacity additions to older systems where secondary lines may be networked among several transformers.

3.5.2.1. ***Costs are Not Estimated by the Sum of Individual Customer Demands***

Both Edison and Sempra use the NERA regression method to quantify the marginal costs of feeders and substations are based on peak demand – though at the substation level, not the system level.[91] PG&E quantifies these costs based on distribution planning area (DPA) peak demands aggregated from over 200 DPAs to 17 divisions. Each DPA is forecast individually. PG&E's calculation is based on a peak at a diversified level (the substation and its feeders) rather than at the level of the customer.[92] PG&E makes separate calculations for Distribution New Business and for minor investments to increase capacity in older secondary distribution systems that Edison and SDG&E do not make. Here, the appropriate load for analysis is closer to the customer, but still diversified to some degree: the load at the Final Line Transformer.[93]

The allocation of demand distribution costs to customer classes also has little or nothing to do with the peak demands of individual customers. In the case of SDG&E, the dollars per kW of residential non-coincident demand was calculated as an afterthought. For SDG&E, the allocation of substation and feeder costs were based on the loads on individual substations and circuits at the time of the station or circuit peak – again a concept unrelated to individual customer non-coincident peak loads.

[91] CPUC App. 11-06-007, SCE-2, p. 29 describes Edison's calculation method; CPUC App. 11-10-002, Chapter 6, page RME-4 describes SDG&E's calculation method.
[92] See generally A 10-03-014, Exhibit PG&E-2, Chapters 4 and 5.
[93] Id., pp. 6-7 and 6-8.

3.5.2.2. *Costs are Not Allocated to Customer Classes Using Individual Customer Demands*

The allocation of marginal distribution demand costs to customer classes is also not generally based on individual customer demands. SDG&E makes a calculation of the contribution of each class to circuit peaks and substation peaks.[94] PG&E allocates distribution demand costs using a Peak Contribution Allocation Factor (PCAF). This PCAF assigns a cost weighting to each hour above 80% of the peak load in the division. The weight is the amount by which the load exceeds 80%. Thus the peak hour in the division receives a weighting that is 20 times the weighting of an hour at 81% of the peak. Most of the hours are in the summer but several coastal divisions are winter-peaking.

Edison starts with the peak demands of individual customers but then estimates diversity among the customers to develop effective demands at the circuit and substation level. While Edison starts with the individual customer demands, the diversity factors are so low for the residential class that the individual customer demands in fact have little influence on circuit and substation demands The diversity factor of the residential class is 35% for single-family and 26% for multi-family at the 12 kV primary distribution level. At subtransmission, the factors are 34% and 25%.[95] In other words, there there is very little coincidence between customer demand and the demands which cause equipment to be built upstream on utility distribution systems. In addition, we notice that Edison has done nothing to reflect the lower coincidence of apartment dwellers in its "cost based" analysis in its bill calculation model – thus assuring

[94] CPUC App. 11-10-002, Chapter 6, page RME-4 describes SDG&E's calculation method.
[95] CPUC App. 11-06-007, SCE-2, Appendix B describes Edison's calculation method, the cited results are on page B-7.

that the "costs" included in that model overcharge every apartment dweller and undercharge every resident of a single-family home. The use of non-coincident demand is therefore as unreasonable for Edison as for the others.

3.5.2.3. *Residential Non-Coincident Peak Loads Are Unlike Other Classes*

There is considerably more variability in residential class individual loads than in other classes. When analyzing each customer's contribution to coincident peak, the largest explanatory item is peak period energy use since the impact of the non-coincident peak (NCP) on the coincident peak is small.[96] Yet the utilities ignore the role of peak period energy use in their modeling of distribution costs attributable to residential customers.

An analysis of load research data provided in Edison's last general rate case shows that summer on-peak energy explains 47% of the variance in the data, while summer customer NCP explains only 36% of the variance. When the two variables are put together for the whole sample, the following equation is found (t-statistics in parentheses).

CP = .002357 * Summer on-peak energy + 0.157 X Customer NCP

(27.42) (14.35)

In other words, there is some relationship between customer NCP and coincident peak but it is small and attenuated, and would support a demand charge of a maximum of 15.7% of the raw NCP demand.

---

[96] William B. Marcus

However, when the sample is divided, the NCP demand becomes even less predictive: less than 10%. Dividing the sample at 2000 kWh of summer use (500 kWh per month average) one finds that the NCP has less coincidence with peak. The slightly higher number associated with NCP under 2000 kWh is not statistically different from the lower number over 2000 kWh.

Constant>2000	0.472575
On┐・ 괇ĠPeak>2000	0.002315
NCP>2000	0.094701
Constant<2000	┐・ 괇ĠC
On┐・ 괇ĠPeak □ð <20	0.004318
NCP<2000	0.098294

Therefore the calculation of a cost-based residential demand charge, for distribution or any other function, is highly problematic. There is very low coincidence. The only portion of the system that is even vaguely related to non-coincident demand would be the portion of the distribution system represented by new business (about 20% for PG&E).

3.5.3. PG&E inappropriately classifies a variety of usage-based expenditures as fixed costs without any valid justification

PG&E unreasonably assumes that $106.15 per year ($8.85/month) of other costs (e.g., public purpose, nuclear decommissioning, etc.) should be treated as fixed for residential rate design. Assuming it is reasonable to fix all these costs is a controversial assumption that has never been approved by the Commission and is unsupported by a rational and unbiased review of these costs.

Why should a person who uses 250 kWh be assumed to be responsible for the same amount of energy efficiency costs as a customer who uses 1000 kWh and has more opportunities to participate in energy efficiency programs? Why should a person who uses 250 kWh be assumed to be responsible for the same amount of nuclear decommissioning costs (which are logically tied to the amount of nuclear energy consumed) as a customer who uses 1000 kWh? Why should someone who uses 250 kWh and earns $25,000 (but as an individual is ineligible for CARE under the new income guidelines[97]) be assumed under a "cost based" rate to pay the same amount for CARE discounts as a customer who uses 1000 kWh and earns $100,000. There is no reason or equity behind this approach. These costs, particularly those associated with CARE, should not be treated as a poll tax – equal dollars per head – even in an illustrative example, such as PG&E's bill calculation model.

3.5.4. Apartments Are Cheaper to Serve than Single Family Houses, But the Utilities Ignore this Fact in their Bill Calculators

Edison and PG&E have both done analyses in past rate cases that show apartments have lower customer-related costs than single-family houses. Edison assumes that apartments have greater diversity than single-family dwellings when calculating transmission and distribution demand. Edison's load research study also shows that apartments have lower use of generation capacity per unit

[97] A single person's care eligibility level drops from $31,800 to $22,340. http://www.pge.com/about/newsroom/newsreleases/20120601/thousands_of_pge_customers_now_eligible_for_lower_bills.shtml

of energy than single-family houses. TURN conducted an analysis taking all these factors into account and finding that despite lower average usage than houses, apartments cost less to serve in CENTS PER KWH.[98] Despite this abundant research, the bill calculator assumes the same cost for apartments and single-family houses and thereby overstates costs attributable to small users who are more likely to live in apartments than in single-family homes.

3.6. Legal barriers to the implementation of TURN's pro

The ALJ ruling asks parties to explain whether there are any "legal barriers" to the implementation of any suggested rate design changes. Under current law (as amended by SB 695 in 2009), there are specific binding restrictions on increases to non-CARE Tier 1 and 2 rates and on changes to CARE Tier 1, 2 and 3 rates.[99] All of these statutory restrictions must be modified before the Commission could adopt TURN's complete rate redesign proposal. The Legislature is currently considering potential changes to these provisions in this session.[100] TURN recommends that the Commission continue to explore alternative rate designs until the Legislature enacts statutory changes that would permit more significant modifications.

TURN has proposed one modification that does not require any statutory changes – the use of a 5-month summer season for calculating baseline quantities in PG&E's inland climate zones (R, W, S). This proposal is currently pending in A.12-02-020 (PG&E 2012 Rate Design Window). The creation of higher summer

[98] Garrick F., Jones and William B. Marcus, Prepared Testimony on behalf of TURN, A.11-06-007, page 60.
[99] See Cal. Pub. Util. Code §739.1 and 739.9.
[100] TURN is opposed to AB 327 (Perea) in its current form and believes that meaningful consumer protection measures should replace the current provisions governing non-CARE and CARE rates.

baseline quantities for PG&E's Central Valley customers will moderate bills during peak summer months, a result that is justified because of the heavy economic burden on these customers during extended heat waves.

4. Additional Responses to Questions Posed in the ALJ Ruling

To the extent they have not been addressed above, TURN provides the following additional responses to the questions posed in Attachment A of the ALJ Ruling:

1. *Please describe in detail an optimal residential rate design structure based on the principles listed above and the additional principles, if any, that you recommend. For purposes of this exercise, you may assume that there are no legislative restrictions. Support your proposal with evidence citing research conducted in California or other jurisdictions.*

   TURN has provided significant details concerning our preferred rate design. TURN's rate design emphasizes the principles of affordability (Section 2.1), geographic equity (Section 2.2) and conservation (Section 2.3). While TURN supports peak load reduction and load shifting, our analysis indicates that this goal is better achieved by automation and programs, rather than by rate design, especially given the potential negative consequences of dynamic pricing.

   While cost-causation is a fundamental principle of cost allocation, TURN does not support dynamic pricing in order to achieve economic efficiency with respect to generation pricing. To achieve such efficiencies in a way that significantly lowers costs (by reducing capacity needs, rather than just dispatch order of existing plants) would likely require geographically differentiated dynamic pricing, which TURN does not support.

While TURN does not cite every research article used in forming our opinions and analyses, TURN in general has relied on the following research and data:

- Actual utility load and price data provided to TURN in response to data requests.
- Utility load research sample data as reflected in the 2009 RASS report.
- Analyses of specific utility load and price data, in conjunction with demographic data, conducted by JBS Energy, Inc., and submitted as part of expert testimonies in various proceedings at the CPUC.
- Analyses of utility data, and modeling of potential load response, prepared by Severin Borenstein and associates at the Energy Institute at Haas.
- Analyses of demand response and price elasticies under various pilot programs prepared by Ahmad Faruqui and associates at The Brattle Group.
- Analyses of demand response and price elasticities under the PG&E SmartRate conducted by Stephen George and associates at Freeman, Sullivan & Co.

2. *Explain how your proposed rate design meets each principle and compare the performance of your rate design in meeting each principle to current rate design.*

Please discuss any cross-subsidies potentially resulting from the proposed rate design, including cross-subsidies due to geographic location (such as among climate zones), income, and load profile. Are any such cross-subsidies appropriate based on policy principles? Where trade-offs were made among the principles, explain how you prioritized the principles.

TURN has discussed how our proposed rate design advances the principles of affordability, equity and conservation in various sections of this pleading. TURN agrees that tiered rates result in a shift in costs to customers who consume more electricity, who also tend to be higher income customers who have a more peaky load profile (lower load factor). At the same time, geographically-differentiated baselines minimize this impact across different climate zones, resulting in similar average rates for all baseline territories. The impact of these two aspects of our proposed rate design is to provide some subsidy to customers who require air conditioners due to climate, while at the same time rewarding lower users within an individual baseline territory.

TURN explains in Section 2 of the pleading why public policy warrants geographic averaging due to the significant geographic and climate differences in California's large utility service territories.

The modification TURN proposes to the present rate design reduces the cost shift to large users, resulting in a somewhat muted conservation signal. Such an outcome is justified due to the significant bill volatility and total bill impacts on a small subgroup of users under the present rate design.

3. *How would your proposed rate design affect the value of net energy metered facilities for participants and non-participants compared to current rates?*

   TURN did not explicitly model the impacts of its proposed rate design on net energy metered (NEM) customers. However, based on previous analyses concerning the impacts of NEM on participants and non-participants, TURN believes that the impact of its proposed changes would be as follows:

   - A modest bill increase for customers with solar sized to offset only upper tier usage.
   - An increase in the potential for economically viable net metered solar for customers with lower levels of usage.
   - An increase in the potential for economically viable net metered solar for CARE customers with substantial usage in Tier 3.

   Overall, TURN's rate proposal is expected to have modest negative impacts on the overall value of net metered facilities for existing participants. This result would benefit non-participants by yielding additional revenue from net metered customers. What remains unknown is whether the increase in average rates for lower-usage non-CARE customers, and the significant increase in CARE Tier 3 rates, would result in new opportunities for cost-effective net metered solar amongst these customer subgroups.

4. *How would your proposed rate design structure meet basic electricity needs of low-income customers and customers with medical needs?*

TURN discusses in detail the basis for, and impact of, its proposed CARE rate design in Sections 3.2, 3.3 and 3.4. TURN's CARE rate design provides more assurance of affordability for a basic level of service (approximately 50% of average), but provides less discount, and hence a conservation incentive, for CARE customers using above 200% of baseline (above average use for a specific baseline territory).

5. *What unintended consequences may arise as a result of your proposed rate structure and how could the risk of those unintended consequences be minimized?*

6. *For your proposed rate structure, what types of innovative technologies and services are available that can help customers reduce consumption or shift consumption to a lower cost time period? What are the costs and benefits of these technologies and services?*

TURN's preferred rate design does not impact the availability of any technologies, though it might impact the economics of potential products and services. In general, tiered rates make large investments in physical HVAC assets (air conditioners, ducts and sealing, home weatherizing) that operate during many hours (including most summer afternoon hours)[101] more economical. The flattening of tiers in TURN's proposal reduces the economics for extremely high users, but improves the economics for most moderate users with air conditioning load.

There are likely new software applications targeted to mobile control of just space conditioning thermostats. It is difficult to predict the impact of TURN's proposed scenario on the payback period for such applications,

[101] Using the six-month definition of summer, and a 6-hour afternoon period, results in 1080 hours. However, fewer hours actually represent high-price hours in the wholesale market.

as compared to the payback under current rates or under dynamic pricing.

Any “energy management system” that requires the installation of multiple controls for HVAC or lighting likely requires higher fixed costs. TURN’s proposal likely improves the economics of such systems, since it provides greater benefits for reductions at all times, including reductions in lighting use. Energy management systems are likely more economical if value can be extracted for more than just the “top 100” hours. However, TURN has not explicitly evaluated the impacts for any particular product.

7. *Describe how you would transition to this rate structure in a manner that promotes customer acceptance, including plans for outreach and education. Should customers be able to opt to another rate design other than the optimal rate design you propose? If so, briefly describe the other rate or rates that should be available. Discuss whether the other rate(s) would enable customers opting out to benefit from a cross-subsidy they would not enjoy under the optimal rate.*

TURN supports the availability of voluntary opt-in tariffs that would be designed to promote distributed generation and load-shifting, including a voluntary simplified (non-tiered) time-of-use tariff. In general, TURN prefers that such a tariff be available to all residential customers. It would be an option for all customers, including those who have on-site solar, thermal air conditioning (ice cooling systems) and or electric vehicles. We recommend that the Commission establish a separate rulemaking docket to address comprehensively the potential benefits and drawbacks of such a voluntary tariff(s).

While TURN does not advocate adopting several different tariffs in an attempt to create DSM "resource diversity" through pricing tariffs, TURN is open to consideration of separate tariffs that would apply only to customers with specific technologies, such as distributed generation or electric vehicles.

7. *Are there any legal barriers that would hinder the implementation of your proposed rate design? If there are legal barriers, provide specific suggested edits to the pertinent sections of the Public Utilities Code. If there are legal barriers, describe how the transition to your proposed rate design would work in light of the need to obtain legislative or other regulatory changes and upcoming general rate cases.*

   TURN provides a partial response in Section 3.6 above.

8. *How would your proposed rate design adapt over time to changing load shapes, changing marginal electricity costs, and to changing customer response?*

   As explained in various sections, TURN's proposed rate design maintains a relatively constant proportion between the three tier rates, thus allowing all tiers to increase (or decrease) proportionately in response to revenue requirement changes. TURN's proposal does not directly address load shapes. Thus, the proposal would not require modification if system conditions change so that the net peak is shifted to late afternoon.

   TURN's proposal does not alter rates in response to marginal energy prices in the wholesale market. TURN does not believe that the state's primary environmental and social goals for residential electricity consumption are best served by having retail rates fluctuate in response to wholesale market prices.

   Some people continue to advance arguments based on the harm caused during the energy crisis when retail rates were frozen and wholesale rates spiked. TURN notes that California's spot market for electricity presently covers only a small percentage of total energy sales, as opposed to the 100% of energy that was traded in the PX during 1998-2001. The present market structure of the ISO, as well as the regulations concerning energy procurement and capacity resource adequacy, make comparison to the 2000-2001 energy crisis mostly irrelevant.

If an optional dynamic pricing tariff is implemented in conjunction with TURN's default tiered rate structure, there could eventually be a revenue loss due to selective participation by structural winners. Such a revenue loss would be addressed by annual rate increases for tiered rates pursuant to decoupling balancing accounts. While modeling results[102] suggest that the rate impacts would be less than 10% even if all structural winners opted-in, TURN suggests that if voluntary tariff participation exceeds a certain threshold level, the Commission should review the underlying rate designs to ensure long-term equity.

10. *How would your proposed rate design structure impact the safety of electric patrons, employees, and the public?*

By promoting affordability and geographic equity, and by reducing bill volatility, TURN's proposal promotes the health and safety of vulnerable populations. There are numerable instances of elderly residents who have died as a result of heat waves, sometimes exacerbated by a reluctance to

[102] Borenstein, Haas WP 229, April 2012, p. 26-28.

incur additional costs for air conditioning use. Estimates of elderly California residents who died as a result of the 2006 heat wave range from 200-400 people.

May 29, 2013

Respectfully submitted,

By: ________/s/________________
Marcel Hawiger
Matthew Freedman
Hayley Goodson

Energy Attorneys for

THE UTILITY REFORM NETWORK
115 Sansome Street, Suite 900
San Francisco, CA 94104
Phone: (415) 929-8876, ex. 311
Fax: (415) 929-1132
Email: marcel@turn.org