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May 18, 2016

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS
DOUG LITTLE - Chairman
BOB STUMP
BOB BURNS
TOM FORESE
ANDY TOBIN

IN THE MATTER OF THE APPLICATION OF TRICO ELECTRIC COOPERATIVE, INC., AN ARIZONA NONPROFIT CORPORATION, FOR A DETERMINATION OF THE CURRENT FAIR VALUE OF ITS UTILITY PLANT AND PROPERTY AND FOR INCREASES IN ITS RATES AND CHARGES FOR UTILITY SERVICE AND FOR RELATED APPROVALS.	DOCKET NO. E-01461A-15-0363 **Notice of Filing of Direct Testimony**

I hereby file my Direct Testimony in the above docket.

RESPECTFULLY SUBMITTED this 18th day of May, 2016

Robert B. Hall

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DIRECT

TESTIMONY

OF

ROBERT B. HALL

TRICO ELECTRIC, MEMBER

MAY 18, 2016

Table of Contents

1.0. Introduction

Q. Please state your name and address.

A. My name is Robert B. Hall. My address is 4809 W. Pier Mountain Place, Marana, Arizona 85658.

Q. What is your relationship to TRICO?

A. I have been a TRICO member since 2000. In 2005 with the assistance of the TRICO rebate available at that time I was their first member to install a residential roof-top PV-array on my home. Since then, I have annually reported to them the performance of my 2.4-kW array. For two years (2010-2011) I served on the TRICO Member Ambassador Council. In recent years I have had the opportunity to meet several times with TRICO management to discuss developments, challenges and opportunities for both residential and community solar PV.

Q. Have you previously testified before this Commission?

A. No

Q. What is the purpose of your direct testimony?

A. In my testimony I will:

1. briefly describe the components of a rate case.
2. introduce the Bottom-Line Accounting Method as a simple, more straight-forward method for carrying out the rate design process.
3. describe how the Bottom-Line Accounting Method works in relating required revenues to bill rate structure.
4. illustrate that excessive Basic Service Charges are regressive.
5. indicate the need to differentiate between direct and indirect fixed costs.
6. discuss the effectiveness of employing the presently proposed two-tiered inclined rate structure.
7. address the billing ramifications of a Peak Demand Charge.
8. introduce the Net Billing Method as a replacement for Net Metering.
9. Introduce a more-fair and transparent method for determining the value of solar electric DG.
10. discuss the impacts of TRICO's proposed rate structure for the future of solar DG installations.
11. address "lost revenues" due to DG and how to recover them.
12. briefly discuss the utilization of SRECs to generate revenue for TRICO and support residential DG.

2.0. Rate Case Testimony

Q. What are key parts of a Rate Case?

A. There exist two basic parts of a rate case: annual revenue requirement determination and a subsequent rate design. There are traditional methodologies and policies for setting the revenue requirement and rate design that are well-established.

Q. What steps are necessary in determining annual revenue requirement?

A. It is necessary for the utility to generate revenues to cover its fixed costs (loan costs associated with capital expenditures, buildings, service equipment, labor, billing services, etc.), and variable operating costs (fuel to power their generators).

Q. Are there other considerations?

A. Yes, in the case of an investor-owned utility (IOU) there needs to be a reasonable opportunity to earn its Commission-authorized rate of return, and for Cooperatives the desire to be able to retire capital credits to annually benefit its members.

Q. What is the traditional methodology employed by utilities in setting revenue requirements and rate design?

A. It is referred to as "the criteria of theoretically sound cost causation"[1]. It appears to be a tenet of this approach that "there is no requirement that residential customers fully understand the components of rates to promote sound decisions related to a more complex rate design."[2]

3.0. Beyond Fixed Cost Accounting....Bottom Line Accounting.

Q. Is there a more straightforward way to carry out the Rate Design process?

A. Yes, the Bottom-Line Accounting Method.

Q. How does it compare to the "...theoretically sound cost causation" method?

A. Bottom-Line Accounting is a simple results-driven methodology. It is simple and transparent in contrast to the cost causation method which is complicated, cumbersome, tedious and opaque.

Q. Are there other advantages to the Bottom-Line Accounting Method?

A. Yes. The Bottom-Line Accounting approach can be utilized to get to billing rate numbers in a straight-forward manner. It can be implemented on a customer-class by customer-class basis, and within a customer class on a rate-schedule by rate-schedule basis. Finally, these results can be summed together in a way to ensure that any utility can have a reasonable opportunity to earn its desired rate of return.

[1] Docket # E-04204A-15-0142, UNSE Rebuttal Testimony, January, 19, 2016 – H. Edwin Overcast Testimony -. Page 37

[2] Docket # E-04204A-15-0142, UNSE Rebuttal Testimony, January, 19, 2016 – H. Edwin Overcast Testimony -. Page 36

Q. How does the Bottom-Line Accounting Method work?

A. The Bottom-Line Accounting approach uses three design and/or measurable inputs to determine an Average Energy Charge ($/kWh) for a given customer class. The three inputs are

- the required/desired annual revenues ($)
- the required/estimated production (kWh), and
- the number of customers in that class.

Q. Can you give an example of how the Bottom-Line Accounting approach works?

A. Yes. Figure 1 shows an example of the Bottom-Line Accounting approach applied to the Residential Customer Class for two cases based on available input data numbers. The input numbers were derived from data provided in the TRICO Rate Case filing (Docket # E-0146A-15-0363), or estimated, as noted at the bottom of Figure 1.

A spreadsheet was created to employ these numbers as INPUTS for the *TRICO Adjusted year* ending December 31, 2014, and yield the OUTPUT numbers for Average Energy consumption (862) per month, the Average Monthly Bill ($120.16) and the Average Energy Charge Rate ($0.1220/kWh). The latter number reflects the inclusion in the monthly bill of the fixed Basic Service Charge of $15.00 per month.

Bottom Line Acounting Method for getting to Customer bill - Residential Class

INPUTS	Units	Adjusted Dec. 31, 2014	**note**	TRICO Proposed	**note**
Revenue					
Annual Revenue Required	($/year)	53,664,676	**a**	54,986,781	**c**
Annual kWh Required	(kWh/yr)	385,101,443	**b**	380,000,000	**d**
Number of Customers	(#)	37,219	**b**	37,837	**c**
Charges					
Direct (Fixed Cost) Service Charge	($/month)	15		20	
OUTPUTS					
Average Energy Consumption	(kWh/mo.)	862		837	
Average Monthly Bill	($/month)	120.16		121.10	
Average Energy Charge Rate	($/kWh)	0.1220		0.1208	

Note a: TRICO Application [October 23, 2015] - Volume 2 of 2 - Schedule E-7.3
Note b: TRICO Application [October 23, 2015] - Volume 2 of 2 - Schedule H-5.0
Note c: TRICO Application Amendment {May 4, 2016] - Exhibit DWH-S1 - Alt. Schedule H-2.1
Note d: Assumed a 1.325% decrease in Annual kWh Consumption by Residential Members

Figure 1

The input numbers in Figure 1 for the *proposed TRICO budget* for the residential customer class include the Annual Revenues Required ($54,986,781.00) and the Number of Customers (37,837). The Annual Production Required is an estimate (380,000,000-kWh) and represents a 1.3% decrease from the December 31, 2014 reflecting recent residential kWh-consumption trends. These input numbers yield the output numbers for Average Energy consumption (837-kWh) per month[3], the Average Monthly Bill ($121.10) and the Average Energy Charge Rate ($0.1208). This Average Monthly bill takes into account the contribution of the fixed cost Basic Service Charge of $20.00/month.

Based on these data the increase in the average TRICO member bill from $120.16/month to $121.10/month, a 0.78% increase, is somewhat lower than the 1.66% increase indicated by TRICO in its Amendment to its Application.[4]

4.0. Testimony on Residential Rate Design

Q. What can the Bottom Line Accounting approach tell us about rate design?

A. Once the average monthly residential rate is determined, it is then necessary to identify the components that contribute to determining the residential monthly bill.

Q. What are examples of the components that can be employed to determine a monthly bill.

A. In a conventional two-part rate structure, there is a fixed-cost component (often referred to as the Basic Service Charge), that is the same for all customers, and an energy charge (sometime referred to as the volumetric rate) that depends on the customer's consumption of kWhs.

Q. Can you illustrate the effects these two components have in determining what a customer's bill would be, based on their consumption of kWhs?

A. Yes. Figure 2 shows two plots of the monthly bill (in $) on the vertical axis as a function of the monthly consumption (in kWhs) on the horizontal axis. For the cases depicted in this plot, the average monthly bill is $120.16/month – the value where the two straight-line curves intersect. The solid line plot corresponds to the case where there are no fixed monthly charges; the entire bill is based on kWh-consumption. As indicated at the bottom of the figure, the volumetric charge rate would be $0.13935/kWh. It is noted that in this case since all customers are paying the same volumetric rate, there is no subsidization between high-kWh consumers and low kWh-consumers. And, if during a given month the customer used no electricity, then their bill would be $0.00.

The dash-dot line in Figure 2 corresponds to the case where the only charge that depends on kWh consumption is based on what it costs the utility to buy fuel (this is referred to as the avoided cost rate – presently it is $0.03662/kWh for TRICO[5]). However, in this case, even if the customer consumes no kWhs in the month, their bill would still be $88.58 (i.e. the dollar value where the dash-dot plot intercepts the vertical axis) . This amount is what the utilities would prefer to receive to cover all their so-called fixed costs.

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[3] Similar to the number reported in TRICO Application Amendment, May 4, 2016 – Page 1.

[4] Docket # E-01461A-15-0363, TRICO Application Amendment, May 4, 2016 – Page 1.

[5] Docket # E-01461A-15-0363, TRICO Application, October 23, 2015 – Page 4.

In contrast to the case where there are no fixed monthly charges, the monthly $88.58/month fixed monthly cost (to cover all the utility fixed costs) plus the volumetric avoided cost rate lead to significant subsidization between high-consuming members and low-consuming members. In this case, all customers using more than the average monthly consumption (837-kWh) are paying less than if the monthly bill was strictly determined by the volumetric rate (see Figure 2 for monthly consumption greater than 900-kWhs). On the other hand, customers using less than the average monthly consumption are paying more than if the monthly bill was determined by only a volumetric rate (see Figure 2 for monthly consumptions less than 800-kWhs). This amounts to the low-consuming customers subsidizing the high-consuming customers, clearly an unfair situation.

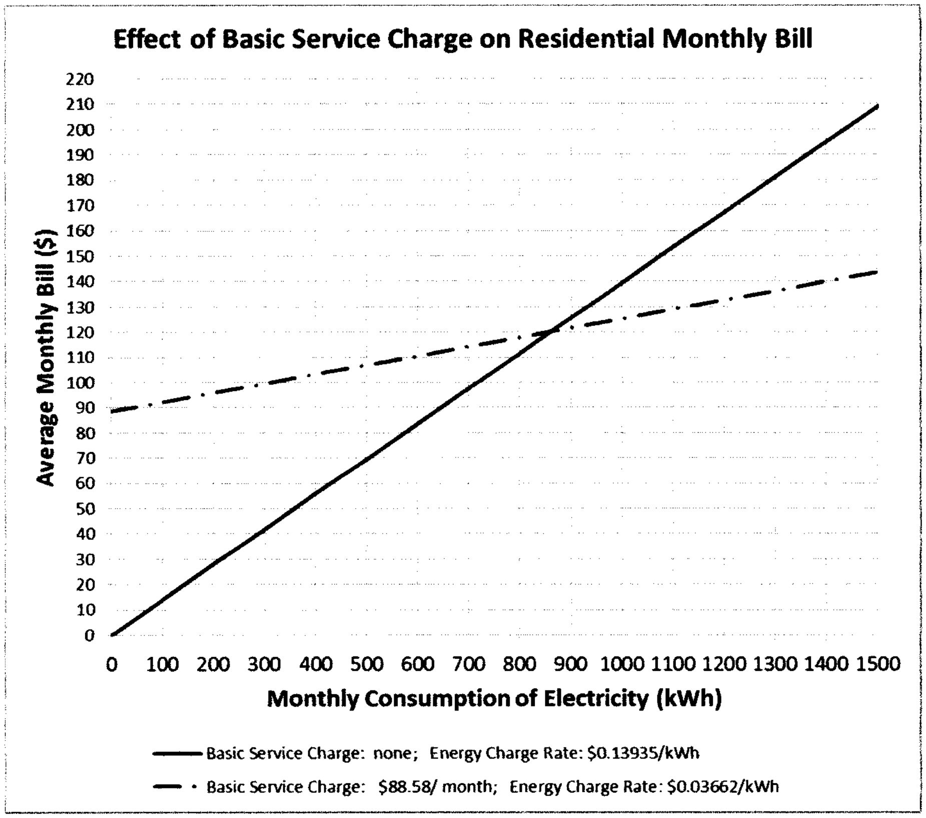

Figure 2

Q. Can you illustrate how fixed charges less than $88.58/mouth would impact monthly bills?

A. Yes. Figure 3 shows four plots of the monthly bill (in $) on the vertical axis as a function of the monthly consumption (in kWhs) on the horizontal axis. In addition to the two plots depicted in Figure 2 (the solid line and the dot-dash line), are two additional plots depicting a basic service charge rate of $10.00/month (the dashed curve) and a basic service charge rate of $30.00/month (the dotted curve). Note, as shown at the bottom of the figure, that the corresponding volumetric rate required to achieve the bill average

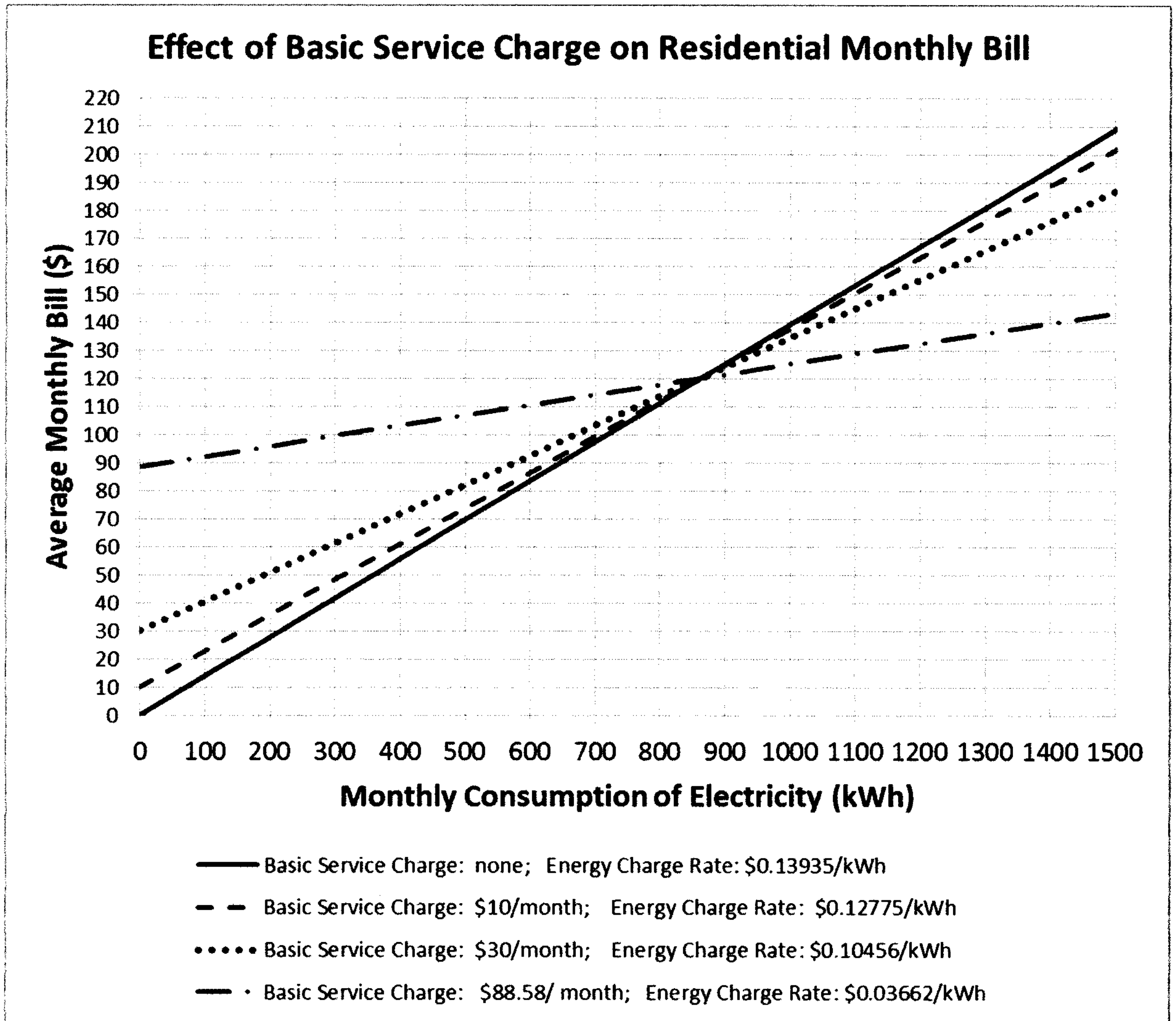

Figure 3

($120.16/month) is $0.12775/kWh for the $10.00/month basic service charge, and $0.10456/kWh for the $30.00/ month basic service charge. Again, the low-consuming customers (< 800-kWh/month) are subsidizing the high-consuming customers (>900-kWh/month) in that they are paying more for the electricity they consume compared to a volumetric only billing rate.

5.0. Basic Service Charge Testimony

Q. How do Electric Utilities view the fixed Basic Service Charge?

A. In general, the utility rational for employing increased Basic Service Charges is based on the desire to cover more of their fixed costs (i.e. every cost they incur other than for fuel). However, as demonstrated above, the Basic Service Charge is effectively a regressive charge in that the lower monthly kWh-consumption customers are effectively subsidizing the higher monthly kWh-consumption customers.

Q. What are the implications of the regressive charge associated with excessive basic service charges?

A. This regressive charge effect can be illustrated using the data provided in the Schedule H-5 form.[6] The median usage of all members is 607-kWh per month (i.e. half of the members consume that amount or less per month, the other half more than that).[7] Using the Cumulative Bill and Cumulative kWh numbers provided on the Schedule H-5 form for the year 2014, it is inferred that the lower half of the member-population consumes just 21.6% of all the electricity consumed by all residential TRICO members. Accordingly, the top half of the member-population consumes 78.4% of the electricity consumed by TRICO members in 2014.

This consumption group imbalance needs to be fairly taken into account regarding a charge for fixed costs. From the standpoint of covering fixed costs, it is fair to charge an amount that reflects the customers' use of the various components that make up the delivery of electricity to the customer (generation, transmission, delivery). The wear and tear on the system parts is much greater (almost four times as much) by the top half of consuming customers compared to those in the lower half of consuming customers. Clearly then, using a fixed monthly service charge to cover these costs is not fair; such a charge effectively results in the lower-consuming 50% of customers subsidizing the higher consuming 50% of customers. Therefore, covering the fixed cost associated with the wear and tear on the system is more appropriately, and fairly, covered as part of the volumetric rate ($/kWh).

Q. Is there a fair and appropriate Basic Service Charge?

A. Yes. There is still an appropriate place for a fixed monthly basic service charge on the member bill based on the type of fixed charge.

Q. What are the kinds of fixed charges?

A. Fixed charges can be *direct* or *indirect*. A *direct* service charge is levied to cover a service that all customers utilize to the same degree. Traditionally, line hook-up to the residential member (perhaps including costs associated with the step-down transformer that a residential member shares with six to eighty nearby neighbors), meter, meter reading and billing are fairly charged, and typically across the country are covered by a $5.00 to $10.00 per month Basic Service Charge.[8]

Other *indirect* fixed charges, as discussed above related to customer usage of other generation, transmission and distribution equipment, are more fairly covered as part of the volumetric rate.

Q. Is TRICO's reclassification and addition of other costs to the basic service charge appropriate?

A. No. The customer fixed charge should be consistent with the definition contained in Bonbright's *Principals of Utility Rates.*[9] Bonbright defines basic customer costs as those operating and capital costs found to vary with the number of customers regardless, or almost regardless, of power consumption. These costs include only those related to metering, accounting, billing, and other direct customer service costs.

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[6] Docket #E-01461A-15-0363, TRICO Application (October 23, 2015) – Volume 2 of 2 – Schedule H-5.0

[7] Note: The Median Customer kWh Usage value indicated (750 kWh/month) on Schedule H-5.0 is incorrect.

[8] Melissa Whited, et al., "Caught in a Fix: The Problem with Fixed Charges for Electricity", Synapse Energy Economics, Inc., Cambridge, MA 02139, February 9, 2016, p.8.

[9] Bonbright, James . 1961. *Principles of Public Utility Rates*, page 347.

6.0. Two-Tier Inclined Block Rate Design

Q. Are there other rate mechanisms that can be employed to help remove the subsidy from low-kWh-consuming members to the high-consuming members owing to the implementation of a basic service charge.

A. Yes. A two (or more) inclined block rate can be utilized to help off-set the impact of increased Basic Service Charges on lower kWh usage members.

Q. Has TRICO recommended a two-tier inclined block rate?

A. Yes. Trico has proposed a two-tier inclining rate block structure for residential Members that reduces the energy (volumetric) charge to $0.1176/kWh for the first 800-kWh, with the rate increasing to $0.1276/kWh for usage over 800-kWh.[10]

Q. What is the effectiveness of this two-tiered inclined block rate for the TRICO proposed split rates?

A. Given the proposed two-tier charge rate, the bill reduction for low-kWh-consuming members is not particularly significant. **Exhibit RBH-1** shows the spreadsheet output for two test cases.

The first TRICO-proposed case (Case 1 in Exhibit RBH-1) with a Basic Service Charge of $20.00/month compares the member bills based on their monthly consumption using the two-tier inclined block rate with the simple fixed volumetric rate. It is noted that for the customer consuming 292-kWh/month (25% of TRICO residential members consume that or less per month) the bill saving is just $0.93.

The second case (Case 2 in Exhibit RBH-1) considers a Basic Service Charge of $10.00/month and again compares the member bills based on their monthly consumption using the two-tier inclined block rate with the simple fixed volumetric rate. The specific volumetric charge rates in this case were adjusted to achieve the average bill (I.e. $121.11/month). Again, it is noted that for the customer consuming 292-kWh/month (25% of TRICO residential members consume that or less per month) the bill savings is just $0.95.

Q. What can be concluded from these two cases?

A. Two conclusions can be made. First, neither of cases considered above saves the low-consuming member much (less than $1.00/month at a 292-kWh/month consumption rate) by implementing a two-tiered inclined block rate. Secondly, however, there is a significant reduction that the low-consuming member realizes ($6.50/month at a 292-kWh/month consumption rate) when the Basic Service Charge is $10.00/month, rather than $20.00/month.[11]

[10] Docket # E-01461A-15-0363, TRICO Application (October 23, 2015) – Volume 2 of 2 – Schedule H-4.0.

[11] Note again, the volumetric rate ($/kWh) was increased in conjunction with the $10.00/month basic service charge in order to assure that the average customer bill was still $121.11/month, to assure that the desired annual revenues could be realized.

7.0. Peak Demand Charges

Q. What is a Peak Demand Charge?

A. A Peak Demand Charge is based on a customer's Peak Demand, which is the maximum energy used (in kWh) in a defined time interval (most typically, 15 minutes, 30 minutes or one hour) during a given billing month. The major residential contributors to peak demand are the high power drawing loads (kW), for example, air conditioners, clothes dryers, washing machines, dishwashers, furnace blowers, and hair dryers. Each of these power draws, or combinations of them, may be on for tens of minutes, or more, during the defined time interval used to determine Peak Demand.

Q. Are Peak Demand Charges Fair and Transparent?

A. The utilization of a Peak Demand Charge is far from transparent. Customers generally have a reasonable idea of how to "control" their bill based on kWh numbers. However, even if peak Power Demand (kW) might be understood, it is not clear how to manage that number as it relates to their bill.

Q. Has TRICO proposed a Peak Demand Charge?

A. Yes. For residential members TRICO has proposed a demand rate of $2/month for the first 2-kW of usage with a minimum of 2-kW and $0.0/month for peak demand above 2-kW. The stated objective of this introductory type charge rate (I.e. $/kW) is to allow members to get familiar with this new form of charging for TRICO service.[12]

Q. Is the TRICO introductory peak demand charge a fair way to inform members about this type of charge rate?

A. No. As it is presently formatted, it is effectively a constant $4.00/month fixed charge which, as discussed above, has the effect of having low-kWh consumption members subsidize the high-consuming members.

If TRICO, however, wants to educate members about the possibility of the introduction of a future real peak demand charge and the resulting implications to member bills, then their present proposal to include the peak demand (kW) that each member required in a given month and the resulting cost implication based on a $/kW charge rate could be useful for the future evaluation regarding of this form of charging rate.

Q. **What are the likely implications of a Peak Demand Charge to TRICO members with differing monthly kWh-consumption requirements?**

A. It is most likely that the Peak Demand Charge is a regressive charge. TRICO will presumably be collecting monthly Peak Demand data (kW) that will allow it to be compared to Consumption data (kWh) - similar to what is provided on the Schedule H-5.0 Form - which, for the purposes of analysis, will be essential in assessing the impact of peak demand charges on all residential members.

[12] Docket # E-01461A-15-0363, TRICO Amendment to Application (May 4, 2016), Hedrick Testimony, page 3.

Q. Are there other billing means that can be employed to address system peak demand concerns?

A. Yes. A well-designed residential Time of Use (TOU) billing option provides customers the opportunity to impact their bill based on a TOU rate schedule. This billing mechanism can be employed by the customer to effectively "manage" peak demand times to favorably impact (i.e. reduce) the system peak demands of the utility.

8.0. Beyond Net Metering……Net Billing

Q. Why is it necessary to get Beyond Net Metering?

A. It is clearly time to address the shortcomings of the current net metering policy (A.A.C. R14-2-2306) which defines a value accounting method for DG (distributed generation) solar PV. Generally, the criticism of the present policy relates to a question of fairness: are the residential PV array owners (DG customers) covered by this policy "paying their fair share"? What TRICO has proposed in their pending rate case essentially dismantles current net metering policy.

Q. Do you agree that it is time to eliminate net metering?

A. Yes. A plan for moving beyond net metering with a new value accounting method for DG solar PV is appropriate at this time.

Q. Is the Present TRICO proposal for moving forward fair and appropriate?

A. No. The value accounting method they propose to be applied to future DG customers (i.e. those who submit a completed application for interconnection to TRICO Electric's grid facilities after February 28, 2015) is far from fair and appropriate.

Q. What is required to move forward in a fair and transparent way?

A. What is needed is *a new value accounting method* that fairly addresses the issues. What is proposed below (call it *Net Billing*) builds on the qualitative features of what TRICO has submitted, but takes into account a more balanced evaluation of the value of DG solar-generated electricity produced by the DG customer.

Q. What are the building blocks for Net Billing?

A. In order to ensure fairness for applications for residential DG arrays after February 28,, 2015, a new value accounting method is required. Any value accounting method for accommodating residential DG will include the following elements:

<u>Imported Electricity</u> is Electricity *delivered* by the Utility *to* the residential DG.

<u>Self-Consumed Electricity</u> is Solar PV Electricity generated by the residential solar PV Distributed Generator (DG) and *directly consumed* on the DG site.

<u>Exported Electricity</u> is Solar PV Electricity generated by the residential DG and *received* by the Utility.

Q. What is the value proposition for each of these accounting elements?

A. The cost and value accounting for each of these elements are:

<u>Imported Electricity</u> has an associated cost.
<u>Self-Consumed Electricity</u> has value *only* to the DG.
<u>Exported Electricity</u> has an associated value.

Q. What is Imported Electricity?

A. In the *Net Billing* value accounting method, the *imported electricity cost rate* would be the same one that applies to all non-DG residential customers. It is important to note that a residential DG array site, designed to produce the annual total consumption of electricity for that site, typically provides 70% of that site's solar-generated electricity *to* the utility (and correspondingly, purchases 70% of the electricity it consumes on an annual basis from that utility). This implies that with the *net billing* the DG customer is paying the same fee rate, like all other non-solar residential customers, on 70% of what the customer annually consumed before having the residential PV solar array. This is illustrated in Figure 4.

In Figure 4[13] each filled square corresponds to the percent (on the vertical axis) of electricity that is *imported* based on the corresponding percent of the annual kWh consumption that is produced by the residential DG array (on the horizontal axis). The down-pointing arrow in the figure indicates that for a DG array designed to produce 100% of the annual consumption of electricity at the site of the DG array, 70% of the of the total array annual output must still be *imported* from the utility.

Referring to Figure 4, it is noted that over a fairly broad range (60-150%) of the total annual consumption provided for by the DG solar array, that the DG array site still requires the acquisition of 70% of its annual consumption from the utility (i.e. the filled squares are hovering close to 70% value on the vertical axis).

Note using Figure 4 that even for a DG system designed to produce 80% of a member's annual kWh consumption, the member is still purchasing 70% of that annual consumption from the utility. Similarly, Figure 4 indicates that a DG system designed to produce 120% of a member's annual kWh-consumption still purchases close to 70% of their annual consumption from the utility.

[13] Data for Figure 3 gathered from local DG homeowners and provided by local utility.

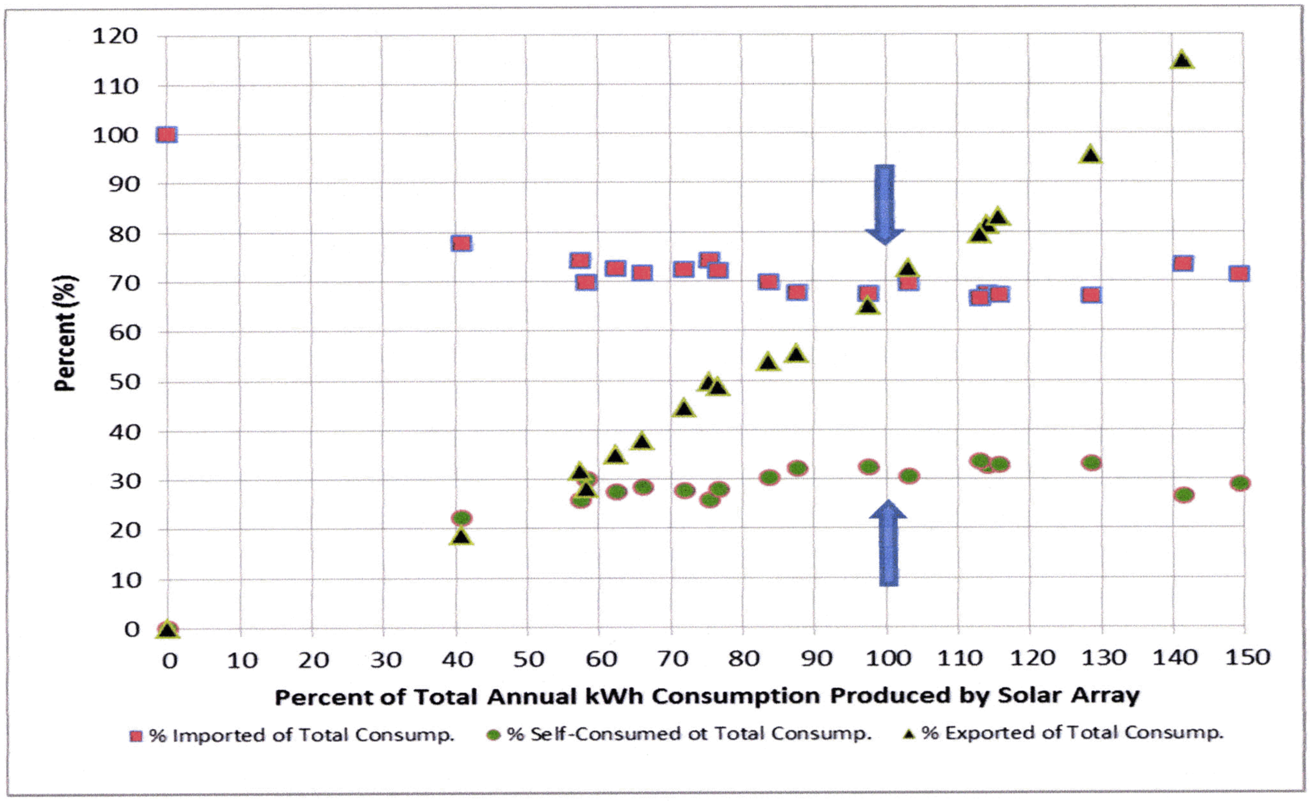

Figure 4

Q. What is Self-Consumed Electricity?

A. DG customers by virtue of their *self-consumed electricity* are no longer requiring some percentage of the electricity they formerly consumed and that was provided by the utility. In Figure 4 each filled circle corresponds to the percent of *self-consumed* electricity (on the vertical axis) that occurs based on the percent of total annual consumption produced by the DG solar array (on the horizontal axis).

The up-pointing arrow in Figure 4 indicates that for a DG array designed to produce 100% of the annual consumption of electricity at the site of the DG array (horizontal axis), 30% of the of the total array annual output is self-consumed (on the vertical-axis). These DG customers, by virtue of their *self-consumed electricity,* are no longer using 30% of what they formerly consumed, and that was provided by the utility. In this regard this 30% savings for DG customers is not unlike the savings that are realized by any customer employing LED or CFL lighting instead of incandescent bulbs, or that they realize with the acquisition of a more energy efficient air-conditioner, refrigerator, clothes dryer, washing machine or dishwasher.

Q. What about Exported Electricity?

A. The issue then reduces to making a fair determination of the value of the *exported electricity.* In Figure 4 each filled triangle corresponds to the per cent (on the vertical axis) of electricity that is *exported* based on the corresponding percent of the annual kWh consumption that is produced by the DG array (on the horizontal axis). Note, that for a DG array designed to produce 100% of the annual consumption of electricity at the site of the DG array (horizontal axis), 70% of the total array annual output is exported to the utility (vertical axis).

Q. What does TRICO propose compensating a residential DG member for their exported energy?

A. TRICO proposes employing the Avoided Cost Rate. This rate would compensate the DG owners for any excess energy their DG system produces and *exports* to TRICO with bill credits at the avoided cost rate, currently $.0.03667/kWh for TRICO[14].

Q. What is an avoided cost rate?

A. It is the price that the utility would have paid if it had to produce the energy itself or bought it. It is the cost the utility would pay if they did not buy the energy from the renewable energy provider.

Q. Why is this rate not fair?

A. Basically, it is because the electricity that is being exported from the DG site is being delivered to others, either with whom they share a step-down transformer, or others in the nearby distribution network. In that regard, the electricity from DG site is not using any of the energy transmission or generation facilities.

Q. TRICO has a 227-kW Community Solar Array sited at their headquarters and attached to their distribution network, are they expected to compensate the energy generator, and transmission line operator for their "lost fixed costs"?

A. Good question.

Q. What would be a better method to credit the Solar PV owner for the electricity they export.

A. A more fair and transparent method is to track the annual cost at each step along the way from the delivery of fuel (coal, natural gas or sunlight) through electricity generation, then subsequent transmission and distribution. These annual itemized costs can be used to determine the volumetric cost rate ($/kWh) at each step based on the planned total annual volumetric production of electricity. This approach will yield an itemized cost rate (in $/kWh) each for generation, transmission and distribution. Thus, alternative electricity generators can be compensated for their delivery of electricity based on what parts of the total delivery system they are displacing: for utility scale solar, only the generation charge; for DG, both the generation charge and the transmission charge.

Q. Is there additional information for consideration regarding this way of valuing the electricity from DG customers?

A. Yes. In the testimony of David Hedrick[15] he includes as Exhibit DWH-13 a December, 2014 article in the *Electricity Journal* entitled "Valuation of Distributed Solar: A Qualitative View".[16] On page 39 of that article the authors indicate: "Of course, it is true that DG, absent any adverse, indirect effect it might have on the operations of the high-voltage grid, does not incur any transmission costs in bringing its energy to market".

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[14] Docket # E-01461A-15-0363, TRICO Application (October 23, 2015) – Volume 1 of 2, page 4.

[15] Docket # E-01461A-15-0363, TRICO Application (October 23, 2015)–Volume 1 of 2, Pre-Filed Testimony of David Hedrick, page 23.

[16] 1040-6190/C 2014 Elsevier Inc. All rights reserved., http://dx.doi.org/10.1016/j.tej.2014.11.005

Q. Are there existing cost rate numbers ($/kWh) available for the price of generation, transmission and distribution?

A. Yes. TRICO has provided a breakdown of costs into generation, transmission and distribution charges based on a volumetric accounting.[17] In this particular case, the indicated energy component of the generation cost rate is $0.03757/kWh, the fixed power and transmission rate is $0.04543/kWh and distribution rate is $0.0386/kWh. Thus, for net billing, the DG customer would pay $0.1216/kWh (the sum of the three individual volumetric rates) to the utility for the *imported* electricity. For electricity *exported to* the utility the DG customer would be credited $0.0830/kWh (the avoided cost that the utility would have to pay for generation and transmission costs were it not for DG electricity). The DG customer would not be credited $0.03860/kWh (the distribution charge) to reflect the fact that the DG customer is using the distribution network to deliver its *exported* electricity.

9.0. Impact of Rate Design on Solar-PV Distributed Generation

Q. What are the impacts that rate design has on the economic considerations for installing a residential solar PV array after February 28, 2015

A. There is a fairly significant effect over the range of rate schedules discussed in the above testimony (re: net metering, net billing and TRICO's proposed rate).

Q. Can you illustrate the effect?

A. Yes. **Exhibit RBH-2** presents a spreadsheet that calculates the monthly bill for a residential member that consumes 830-kWhs per month: in one case without any solar, and in the other with a 4.7-kW residential solar PV array designed to provide 80% of the member's annual kWh-consumption.[18] The spreadsheet provides the comparison of those bills for three different billing rate schedules: Net metering, Net Billing, and the TRICO proposed rate for members who install PV solar after February 28, 2015.

The INPUTS section of the top of the spreadsheet presented in **Exhibit RBH-2** indicates the assumptions employed to calculate the billing results indicated in the OUTPUT section of the spreadsheet.

Table 1 shows a summary of the salient features of those calculated results.

	Net Metering		Net Billing		TRICO Proposal	
Basic Service Charge ($/mo.)	$20.00	$10.00	$20.00	$10.00	$20.00	$10.00
Monthly Bill – no solar PV ($/mo.)	$130.41	$130.41	$130.41	$130.41	$130.41	$130.41
Monthly Bill – with solar PV ($/mo.)	$46.67	$37.74	$65.47	$56.54	$84.73	$81.47
Monthly Savings ($/month)	$83.74	$92.67	$64.94	73.87	$45.68	48.94
Simple Pay Back Time (years)	10.4	9.4	13.4	11.8	19.1	17.8

TABLE 1

[17] TRICO Docket E-01461A-15-0363, October 23, 2015, Volume 1 – Karen Cathers Testimony, page 4.
[18] The spreadsheet calculation assumes an installed price rate of $3.35/Watt for the residential array and a 30% Federal Tax Credit.

Q. What is a simple payback time?

A. The simple payback time (in years) for the cases shown in Table 1 is calculated by dividing the PV System Cost, including the Federal Tax Credit, by the monthly savings ($/month) and dividing by twelve.

There are other, presumably more rigorous, methods for determining investment payback, however, for the first order comparison of rate schedules, the simple payback time is quite suitable.

Q. What are the implications of the simple payback times calculations provided in Table 1?

A. The approximately 10-year simple payback time that applies to the net metering case indicated in Table 1 clearly has been an acceptable payback time that has in the past encouraged TRICO members to make the investment in a residential solar PV array. On the other hand, however, the 18 or 19 year payback time, which would be the consequence of the TRICO proposed rate structure for residential solar PV, is likely to discourage many, if not all, members from making a residential solar PV investment. Whereas, the payback time of 12 to 13 years realized with net billing is higher than with net metering, it is likely still in the range that will still attract member acquisition of a residential PV array.

10.0 Recovering Costs to TRICO associated with Residential Solar PV Arrays

10.1 PV arrays installed and/or approved before March 1, 2015

Q. What are the costs that TRICO claims to be incurring based on the residential solar PV arrays that were installed (or approved) before March 1, 2015?

A. These costs, identified as "lost fixed costs", reflect all costs incurred by the generation, transmission and distribution facilities for electricity delivered to the TRICO member other than the purchased power energy cost (i.e. the cost of the fuel to be consumed in order to generate the electricity).

Exhibit DWH-8 provides the key volumetric numbers that are used to justify the discussion related to fixed charges.[19] Per DWH-8, the existing volumetric rate for the "fixed" charges are $0.049412/kWh and $0.040954/kWh for fixed generation/ transmission and distribution costs, respectively. The sum of these two fixed cost items is $0.090395/kWh (see below). The variable cost, $0.0.030795/kWh is the cost of purchasing the fuel to be consumed in order to generate the electricity.

Q. How does TRICO use these numbers to determine Lost Fixed Costs?

A. First, the total kWhs produced annually by the number (1262) of residential solar PV arrays in place before March 1, 2015 is determined. It is assumed that the average system size is 6.51 kW , producing an estimated average of 922-kWh/month, leading to an annual kWh production of 1262 x 922 x 12 = 13,962,768 kWh/year. The calculated lost fixed costs are then determined to be 13,962,768 (kWh/yr) x $0.090395/kWh (see above) = $1,262,164/year.

[19] TRICO Docket E-01461A-15-0363, October 23, 2015, Volume 1 – David Hedrick Testimony, Exhibit DWH-8

Q. What does Hedrick propose to address this "loss" post February 28, 2015?

A. He proposes in DWH-8 to reduce the "PV System kWh compensated at Full Retail" from 922-kWh/month to 397-kWh/month. The choice of this monthly production rate seems somewhat arbitrary and an artificial way to reduce the fixed cost to $581,285/year.

Q. Is there a fairer and more transparent way to determine lost fixed costs for these systems?

A. Yes. The fairer and more appropriate approach to assess "lost revenues" has been described above. It is a consequence of utilizing the Net Billing approach. On the one hand, it is fair and transparent for the DG owner to be credited for the energy they *export* to the utility based on the parts of the total delivery system (generation and transmission) they are displacing, and on the other, charged for the portion of the delivery system (i.e. the distribution network) they are using to deliver their exported electricity.

Q. Based on this approach, what would the yearly "lost revenues" be?

A. The total number of kWh produced annually by the 1262 systems is as above 1262 x 922 x **0.7** x 12 = 9,773,937-kWh/year.[20] The calculated lost costs are then 9,773,937 (kWh/yr) x $0.040954/kWh (see above) = $400,282/year

Q. Are there ways that these lost revenues can be collected moving forward?

A. One possibility would be to determine a "stranded cost" type of surcharge that would generate the desired annual revenue. Based on an annual residential consumption of 385,101,448 kWh/year, a surcharge rate $0.00104/kWh charge rate could be applied to the monthly bill. Alternatively, funds derived from the recent revival of an ACC Renewable Energy Surcharge rate of $ 0.00238/kWh could be used to offset these "lost revenues".

Q. Are there ways that "lost revenues" can be collected for residential solar PV arrays that were installed before March 1, 2015?

A. Possibly. It is estimated that the "lost revenues" for the 1262 residential solar PV systems that were installed between 2005 and 2015 generated "lost revenues" (based on the DG owners need to pay a TRICO for using it distribution network during those years) of $1.1 M$. A customer billing surcharge of $0.00285/kWh applied to the monthly bill would retire that "loss" in one year.

10.2 PV arrays installed after February 28, 2015

Q. What are the lost revenue costs that TRICO claims to be incurring based on the residential solar PV arrays that are installed after February 28, 2015?

A. According to TRICO these losses are again tied to all costs incurred by the generation, transmission and distribution facilities for electricity delivered to the TRICO member other than the purchased power energy cost (i.e. the cost of the fuel to be consumed in order to generate the electricity). Again as previously discussed, the fairer and more appropriate approach to assess "lost revenues" has been described above. It is a consequence of utilizing the Net Billing approach. On the one hand, it is fair and transparent for the DG owner to be credited for the energy they *export* to the utility based on the parts of the total delivery system

[20] Only 70% of the solar PV electricity being generated is exported to the utility – the remainder is self-consumed.

(generation and transmission) they are displacing, and on the other, charged for the portion of the delivery system (i.e. the distribution network) they are using to deliver their exported electricity.

Q. In summary then, with Net Billing there are no "lost revenues" resulting from residential solar PV systems installed after February 28, 2015, is that correct?

A. Yes.

11.0 Other Considerations

11.1 Solar Renewable Energy Credits

Q. How could SRECs (Solar Renewable Energy Credits) play a role in the TRICO billing/revenue process?

A. In principle, in the case that a residential solar PV array is owned by the homeowner (HOO), it would be possible for TRICO to buy these SRECs, and sell them in a broader SREC marketplace.

Q. What is the value of an SREC in the marketplace?

A. It varies, but typically is greater than $0.01/kWh. Accordingly, TRICO could contract with HOOs to purchase their SRECs at, say, $0.005/kWh and subsequently sell them into the broader SREC market place.

Q. How many SRECs are produced by a residential solar PV array?

A. It is the entire solar-generated electricity output of the residential array; it makes no difference whether that output is self-consumed by the HOO, or exported by the HOO to TRICO.

Q. Can TRICO directly measure that output?

A. Yes. They are in the process of installing their own meters to measure the output of the generation on all new and existing PV systems.[21]

Q. What effect would the $0.005/kWh SREC credit from TRICO have on simple payback time for a residential HOO solar PV array member?

A. **Exhibit RBH-3** shows the spreadsheet that includes a $0.005/kWh SREC credit applied to the Net Billing case. Note that the simple payback time drops to 11.3 years for a basic service charge of $10.00/month, and 12.7 years for a basic service charge of $20.00/month.

11.2 Third Party Owned (TPO) Residential solar PV systems

Q. How will the proposed net billing accounting affect the TPO marketplace (i.e. leasing of solar PV array by homeowner)?

A. The TPOs will still benefit from the SRECs that their residential installations generate. However, the monthly contract amount the TPOs receive from the home occupants will need to be reduced to off-set the fact that the home occupants will now, with Net Billing, be paying TRICO directly for the electricity that they

[21] TRICO, Inc. REST Plan for Calendar Year 2016, A.A.C. R14-2-1814, July 1, 2015, page 6.

import from TRICO. Although it will make the numbers more challenging for the TPOs, it is likely that the business people involved will be savvy enough to continue contributing to the growth of residentially located solar PV arrays.

12.0 Conclusions

1. The Bottom-Line Accounting Method is a way to generate the key parameters that can be used to create a fair and transparent rate design.
2. Basic Service Charges have a role in rate design, but because they are regressive must be limited to cover only *direct* fixed costs.
3. The TRICO proposed Two-Tier Inclined Block rate, when added to a Basic Service Charge, does very little to off-set the subsidy that low kWh-consuming members are providing to the high kWh-consuming members.
4. Peak Demand Charges might be understood by customers, but it is likely that it will not be clear how to "control" that number as it relates to their bill.
5. It will be valuable, as TRICO intends, to collect Peak Demand data for the purposes of analysis and appropriateness as a future billing component.
6. Net Metering is no longer an effective and fair method for valuing residential solar PV DG.
7. Net Billing, as a replacement to Net Metering, is a fair and transparent method for valuing solar PV DG.
8. Volumetric rate data, required to implement Net Billing, are already available.
9. The rate proposed by TRICO to compensate post-February 28, 2015 solar PV DG installations for their exported electricity will, due to the long payback time for such an investment, essentially preclude any new residential installations.
10. The implementation of Net Billing for post-February 28, 2015 solar PV DG installations will still make them a viable choice with a reasonable payback time.
11. For pre-March 1, 2015 solar PV residential installation "lost revenues" from the past (pre-March 1, 2015) and going forward (post- February 28, 2015) can be recovered utilizing short-term $/kWh surcharges on all member bills.
12. With Net Billing there are no "lost revenues" for post-February 28, 2015 solar PV residential DG installations.
13. Since TRICO has their own meters to measure the output of the generation on all PV systems, it will be possible for them to buy SRECs generated by post-February 28, 2015 home-owner owned solar PV arrays, and sell them in the broader SREC marketplace, thus generating additional revenues for both the participating member and TRICO.

13.0 Recommendations

1. Use Bottom-Line Accounting Method to generate key parameters to create a rate design.
2. Reject $20.00/month Basic Service Charge; consider reducing to $10.00/month from present 15.00/month charge.
3. If TRICO wants to employ a Two-Tier Inclined Block Design, a lower break point (e.g.500-kWh) and an increased difference between the lower and higher ($/kWh) rates should be considered.
4. Reject the "constant" Peak Demand charge.
5. Collect the Peak Demand data, and report potential billing implications on a monthly basis to members based on a possible Peak Demand Charge.
6. Eliminate Net Metering.
7. Reject the TRICO proposal for compensating post-February 28, 2015 residential solar PV DG for their exported electricity at the avoided cost rate.
8. Employ Net Billing as the way to fairly and transparently value residential solar PV DG.
9. Consider implementing a fixed duration monthly surcharge to cover "lost revenues" generated by residential solar PV arrays installed/approve prior to March 1, 2015.
10. Consider ways that SRECs can be utilized to mutually benefit TRICO and homeowner-owner solar PV members.

Q. Does this conclude your testimony?

A. Yes.

Exhibit RBH-1

TRICO Billing - based on rates

INPUTS

Charges	Units	Case 1 TRICO Proposal Inclined Block	Case 1 TRICO Proposal Straight	Case 2 TRICO Proposal Inclined Block	Case 2 TRICO Proposal Straight
Basic Service Charge	($/Month)	20.00	20.00	10.00	10.00
Energy Charge - tier 1 <limit	($/kWh)	0.1176	0.1208	0.1295	0.13275
Inclining Rate Block Limit	(kWh)	800	0	800	0
Energy Charge - tier 2 >limit	($/kWh)	0.1276	0.1208	0.1395	0.13275

OUTPUTS

	kWh Consumed	Case 1 Monthly Bill (Inclined Block)	Case 1 Monthly Bill (Straight)	Case 2 Monthly Bill (Inclined Block)	Case 2 Monthly Bill (Straight)
	0	20.00	20.00	10.00	10.00
	100	31.76	32.08	22.95	23.28
	200	43.52	44.16	35.90	36.55
25% of Members use less than:	292	54.34	55.27	47.81	48.76
	300	55.28	56.24	48.85	49.83
	400	67.04	68.32	61.80	63.10
	500	78.80	80.40	74.75	76.38
	600	90.56	92.48	87.70	89.65
Median	607	91.38	93.33	88.61	90.58
	700	102.32	104.56	100.65	102.93
	800	114.08	116.64	113.60	116.20
Average	837	118.80	121.11	118.76	121.11
	862	121.99	124.13	122.25	124.43
	900	126.84	128.72	127.55	129.48
22% of Members use more than:	1000	139.60	140.80	141.50	142.75
	1100	152.36	152.88	155.45	156.03
	1200	165.12	164.96	169.40	169.30
	1300	177.88	177.04	183.35	182.58
	1400	190.64	189.12	197.30	195.85
	1500	203.40	201.20	211.25	209.13
	1600	216.16	213.28	225.20	222.40
	1700	228.92	225.36	239.15	235.68
	1800	241.68	237.44	253.10	248.95
	1900	254.44	249.52	267.05	262.23
	2000	267.20	261.60	281.00	275.50

Exhibit RBH-2

TRICO Billing Calculation

INPUTS		**Net Metering**		**Net Billing**		**TRICO DOCKET**	
Charges	**Units**						
Basic Service Charge	($/Month)	20.00	10.00	20.00	10.00	20.00	10.00
Energy Charge - delivered [A] tier 1 <limit	($/kWh)	0.11760	0.12965	0.11760	0.12965	0.11760	0.12965
Inclining Rate Block Limit	(kWh)	800	800	800	800	800	800
Energy Charge - delivered [A] tier 2 >limit	($/kWh)	0.12760	0.13965	0.12760	0.13965	0.12760	0.13965
Energy Credit - received [B]	($/kWh)	0.11760	0.12965	0.07760	0.08965	0.03662	0.03662
Electrcity Supply - Data							
Imported [A]	(kWh/mo.)	585	585	585	585	585	585
Exported [B]	(kWh/mo.)	425	425	425	425	425	425
Solar PV [S]	(kWh/mo.)	670	670	670	670	670	670
Other							
Energy per Power for year	(kWh/kW-yr)	1800	1800	1800	1800	1800	1800
DG Array Cost Rate	($/W)	3.35	3.35	3.35	3.35	3.35	3.35
"Municipal" Tax Rate	(%)	10.60	10.60	10.60	10.60	10.60	10.60
Federal Tax Credit	(%)	30	30	30	30	30	30
OUTPUTS							
Electrcity Supply/Consumption							
Total Consumption at DG Site	(kWh/mo.)	830	830	830	830	830	830
% of Total Consumption from Solar	(%)	80.7	80.7	80.7	80.7	80.7	80.7
% of Total Consumption that is imported	(%)	70.5	70.5	70.5	70.5	70.5	70.5
% of Solar Generated that is self-consumed	(%)	29.5	29.5	29.5	29.5	29.5	29.5
Monthly Bill							
Without Solar							
Basic Charge	($/mo.)	20.00	10.00	20.00	10.00	20.00	10.00
Net Energy Charge - tier 1	($/mo.)	94.08	103.72	94.08	103.72	94.08	103.72
Net Energy Charge - tier 2	($/mo.)	3.83	4.19	3.83	4.19	3.83	4.19
Total Charges	($/mo.)	117.91	117.91	117.91	117.91	117.91	117.91
Taxes	($/mo.)	12.50	12.50	12.50	12.50	12.50	12.50
TOTAL Bill	($/mo.)	130.41	130.41	130.41	130.41	130.41	130.41
With Solar							
Basic Charge	($/mo.)	20.00	10.00	20.00	10.00	20.00	10.00
Net Energy Charge - tier 1	($/mo.)	18.82	20.74	35.82	37.74	53.23	60.28
Net Energy Charge - tier 2	($/mo.)	0.00	0.00	0.00	0.00	0.00	0.00
Bi-Directional Meter Charge	($/mo.)	3.38	3.38	3.38	3.38	3.38	3.38
Total Charges	($/mo.)	42.20	34.12	59.20	51.12	76.61	73.66
Taxes	($/mo.)	4.47	3.62	6.27	5.42	8.12	7.81
TOTAL Bill	($/mo.)	46.67	37.74	65.47	56.54	84.73	81.47
Bill Savings	($/mo.)	83.74	92.67	64.94	73.86	45.67	48.94
PV							
PV System Size	(kW)	4.47	4.47	4.47	4.47	4.47	4.47
PV System Cost (including FTC)	($)	10,474	10,474	10,474	10,474	10,474	10,474
Time for Simple Payback	(years)	10.4	9.4	13.4	11.8	19.1	17.8

Note 1: The **Charges INPUTS** for the $10.00 Basic Service Charge Case are adjusted to make the TOTALl Bill without Solar be the same for all cases.

Note 2: The entry for the Energy Credit Received for the Net Billing Case is set at 0.04-$/kWh less than the energy charge rate and represents the "payment" by the DG owner to TRICO for the use of TRICO's Distribution Network.

Exhibit RBH-3

TRICO Billing Calculation

INPUTS		Net Metering		Net Billing		TRICO DOCKET	
Charges	**Units**						
Basic Service Charge	($/Month)	20.00	10.00	20.00	10.00	20.00	10.00
Energy Charge - delivered [A] tier 1 < limit	($/kWh)	0.11760	0.12965	0.11760	0.12965	0.11760	0.12965
Inclining Rate Block Limit	(kWh)	800	800	800	800	800	800
Energy Charge - delivered [A] tier 2 > limit	($/kWh)	0.12760	0.13965	0.12760	0.13965	0.12760	0.13965
Energy Credit - received [B]	($/kWh)	0.11760	0.12965	0.07760	0.08965	0.03662	0.03662
SREC Credit	($/kWh)			0.00500	0.00500		
Electrcity Supply - Data							
Imported [A]	(kWh/mo.)	585	585	585	585	585	585
Exported [B]	(kWh/mo.)	425	425	425	425	425	425
Solar PV [S]	(kWh/mo.)	670	670	670	670	670	670
Other							
Energy per Power for year	(kWh/kW-yr)	1800	1800	1800	1800	1800	1800
DG Array Cost Rate	($/W)	3.35	3.35	3.35	3.35	3.35	3.35
"Municipal" Tax Rate	(%)	10.60	10.60	10.60	10.60	10.60	10.60
Federal Tax Credit	(%)	30	30	30	30	30	30
OUTPUTS							
Electrcity Supply/Consumption							
Total Consumption at DG Site	(kWh/mo.)	830	830	830	830	830	830
% of Total Consumption from Solar	(%)	80.7	80.7	80.7	80.7	80.7	80.7
% of Total Consumption that is imported	(%)	70.5	70.5	70.5	70.5	70.5	70.5
% of Solar Generated that is self-consumed	(%)	29.5	29.5	29.5	29.5	29.5	29.5
Monthly Bill							
Without Solar							
Basic Charge	($/mo.)	20.00	10.00	20.00	10.00	20.00	10.00
Net Energy Charge - tier 1	($/mo.)	94.08	103.72	94.08	103.72	94.08	103.72
Net Energy Charge - tier 2	($/mo.)	3.83	4.19	3.83	4.19	3.83	4.19
Total Charges	($/mo.)	117.91	117.91	117.91	117.91	117.91	117.91
Taxes	($/mo.)	12.50	12.50	12.50	12.50	12.50	12.50
TOTAL Bill	($/mo.)	130.41	130.41	130.41	130.41	130.41	130.41
With Solar							
Basic Charge	($/mo.)	20.00	10.00	20.00	10.00	20.00	10.00
Net Energy Charge - tier 1	($/mo.)	18.82	20.74	35.82	37.74	53.23	60.28
Net Energy Charge - tier 2	($/mo.)	0.00	0.00	0.00	0.00	0.00	0.00
SREC Credit	$/mo.)			-3.35	-3.35		
Bi-Directional Meter Charge	($/mo.)	3.38	3.38	3.38	3.38	3.38	3.38
Total Charges	($/mo.)	42.20	34.12	55.85	47.77	76.61	73.66
Taxes	($/mo.)	4.47	3.62	5.92	5.06	8.12	7.81
TOTAL Bill	($/mo.)	46.67	37.74	61.77	52.84	84.73	81.47
Bill Savings	($/mo.)	83.74	92.67	68.64	77.57	45.67	48.94
PV							
PV System Size	(kW)	4.47	4.47	4.47	4.47	4.47	4.47
PV System Cost (including FTC)	($)	10,474	10,474	10,474	10,474	10,474	10,474
Time for Simple Payback	(years)	10.4	9.4	12.7	11.3	19.1	17.8

Note 1: The **Charges INPUTS** for the $10.00 Basic Service Charge Case are adjusted to make the TOTALl Bill without Solar be the same for all cases.
Note 2: The entry for the Energy Credit Received for the Net Billing Case is set at 0.04-$/kWh less than the energy charge rate and represents