

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO

PROCEEDING NO. 16AL-0048E

IN THE MATTER OF ADVICE LETTER NO. 1712 FILED BY PUBLIC SERVICE COMPANY OF COLORADO TO REVISE ELECTRIC BASE RATES AND CHANGES TO TARIFF SHEETS AND REPLACE PUC NO. 7 WITH PUC NO. 8 TO BECOME EFFECTIVE FEBRUARY 25, 2016.

PROCEEDING NO. 16A-0055E

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR APPROVAL OF ITS SOLAR*CONNECT PROGRAM.

PROCEEDING NO. 16A-0139E

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR APPROVAL OF ITS 2017-2019 RENEWABLE ENERGY COMPLIANCE PLAN.

**OPENING TESTIMONY OF R. THOMAS BEACH ON BEHALF OF
SOLAR ENERGY INDUSTRIES ASSOCIATION**

Date Filed: September 2, 2016

1 **I. INTRODUCTION AND QUALIFICATIONS**

3 **Q1: Please state for the record your name, position, and business address.**

4 A1: My name is R. Thomas Beach. I am principal consultant of the consulting firm
5 Crossborder Energy. My business address is 2560 Ninth Street, Suite 213A, Berkeley,
6 California 94710.

8 **Q2: Have you previously submitted testimony in one of these consolidated dockets?**

9 A2: Yes, I have. On June 6, 2016, SEIA served the parties to Docket No. 16AL-0048E
10 (Phase II of the PSCo General Rate Case) with the *Answer Testimony and Exhibits of R.*
11 *Thomas Beach on behalf of the Solar Energy Industries Association.* My experience and
12 qualifications are described in that testimony and in my *curriculum vitae* (CV), which
13 was attached as Exhibit RTB-1 to that testimony.

15 **Q3: On whose behalf are you testifying today?**

16 A3: I am appearing on behalf of SEIA. SEIA is the national trade association of the United
17 States solar industry. Through advocacy and education, SEIA and its 1,000 member
18 companies work to make solar energy a mainstream and significant energy source by
19 expanding markets, removing market barriers, strengthening the industry, and educating
20 the public on the benefits of solar energy. SEIA's members have a strong interest in the
21 adoption and implementation of innovative, forward-looking policies and programs that
22 will accelerate the development of solar photovoltaic (PV) generation. The views
23 contained in this testimony represent the position of SEIA as an organization, but not

1 necessarily the views of any particular member with respect to any issue.

2
3 **II. PURPOSE OF TESTIMONY**
4

5 **Q4: What is the purpose of your testimony?**

6 A4: My testimony provides detailed support for two aspects of the comprehensive
7 settlement agreement (Settlement), submitted by a broad coalition of parties to
8 these consolidated dockets on August 15, 2016, that address issues which have not
9 been discussed in detail in the testimony to date in this docket, but that arose during the
10 settlement discussions:

- 11 1. A key feature of the Settlement is a move to much greater use of more complex
12 TOU rates for small customers, such as the new RE-TOU and RD-TOU rates for
13 residential customers. In developing, discussing, and modeling these rates, the
14 Settlement parties recognized that these more complex rates require clarification
15 and new details of the exact treatment under the Commission's net metering rules
16 of the excess energy the solar systems will produce in some months. Section V.B
17 of the Settlement provides these details.
- 18 2. The Settlement retains the SPV-TOU rate applicable to medium commercial
19 customers who install solar facilities, but makes one important change to the
20 design of this rate, for future SPV-TOU customers. This change is the addition of
21 a time-dependent demand charge to recover 25% of capacity-related generation
22 and transmission (G&T) costs. In the present SPV-TOU rate, 100% of G&T costs
23 are recovered through volumetric TOU charges; in the new SPV-TOU design,

1 these charges will recover only 75% of these costs. It is difficult for solar
2 customers to avoid demand charges; as a result, this rate design change will
3 reduce the bill savings that prospective SPV-TOU customers will realize from
4 their solar investments. In recognition of this impact, and of the increased risks
5 from this new rate design element, the Solar*Rewards incentive for medium
6 commercial customers was increased in the Settlement by 0.75 cents per kWh.
7 This testimony supports the reasonableness of this provision.

8
9 **Q5: Please provide a summary of your testimony.**

10
11 **A5:** In general, SEIA submits that the proposed Settlement represents a comprehensive,
12 balanced, and reasonable resolution to the complex issues in these consolidated dockets.
13 Most important, the Settlement charts an equitable way forward on the design of PSCo's
14 electric rates. In particular, the agreement provides small customers with several
15 new options for cost-based, time-sensitive rate designs, including rate designs that
16 will further encourage and enable customers to choose new demand-side
17 technologies, including distributed solar generation, load-management
18 technologies, and on-site storage.

19
20 This testimony discusses the reasonableness of two specific issues addressed in the
21 Settlement that were not discussed in the direct testimony of the parties to these
22 dockets. The first is the treatment of the excess energy that solar customers will
23 produce in some months, particularly under the new, more complex time-of-use
24 (TOU) rate designs proposed in the Settlement for small customers, such as the
25 new RE-TOU rate for residential customers. Section V.B of the Settlement
26 provides the details on the treatment of excess energy under these new rates. This
27 testimony explains how these provisions are consistent with state law and the

Commission's rules, and generally provide that excess energy will be used to offset future consumption on a one-for-one basis, with due consideration for the fact that, under TOU rates, the value of a kWh of energy will vary depending on when it is produced or consumed. The approach to excess energy adopted in the Settlement also continues to provide net metering customers with two options for the treatment of excess energy, with the customer able to choose either a Roll Over approach or a Cash Out option.

The second issue concerns the SPV-TOU rate applicable to medium commercial customers who install solar facilities. The Settlement retains this rate, but makes one important change to the design of this rate for future SPV-TOU customers – adding a time-dependent demand charge to recover 25% of capacity-related generation and transmission (G&T) costs. In comparison to the present SPV-TOU rate in which 100% of G&T costs are recovered through volumetric TOU charges, the new SPV-TOU design will reduce the bill savings that prospective SPV-TOU customers can realize from their solar investments. To offset this impact, the Settlement increases the Solar*Rewards incentive for medium commercial customers by 0.75 cents per kWh. My testimony explains that this trade-off is a reasonable way to maintain the economics of solar investments by medium commercial customers.

III. EXCESS ENERGY CREDITING PROVISIONS

Q6: Please discuss why Section V.B of the Settlement includes new, more detailed provisions for the crediting of monthly excess energy under net metering.

A6: Existing law (C.R.S. §40-2-124(1)(e)(I)(B)) allows a customer to make a one-time election of one of two methods that the utility can use to credit monthly excess energy

1 from the customer's solar facility. The two approaches are (1) the Roll Over option
2 whereby monthly excess energy is rolled over from month-to-month in perpetuity until it
3 is used, or (2) the Cash Out option in which any excess energy remaining at the end of an
4 annual period is cashed out at the Average Hourly Incremental Costs (AHIC) for the past
5 year. With the Settlement's adoption of significantly more complex TOU rates for
6 residential customers, the parties recognized that important new details needed to be
7 developed concerning how each of these approaches will work in the future under the
8 new TOU rates.

9
10 **Q7: How will the Roll Over option work?**

11 A7: The parties recognized that the use of more complex TOU structures means that excess
12 energy will have different value depending on the time period in which it is produced. In
13 addition, the Roll Over option requires some means to value excess energy each month,
14 on an ongoing basis, as there is no valuation at the end of each annual period.
15 Accordingly, under this option, each month the excess energy in each TOU period will be
16 converted into a dollar credit by multiplying the kWh of excess energy in each TOU
17 period by the total energy rate for that TOU period (including the base energy rate and all
18 applicable riders assessed on a per kWh basis). The total credits across all TOU periods
19 will be summed, and the total credit will be applied to offset the customer's bill for
20 electric consumption, excluding only the fixed monthly Service & Facilities (S&F)
21 charge. Any credit remaining will be carried over, in dollars, to offset the next or future
22 months' bills. This practice will apply to those schedules with TOU energy rates,
23 including RE-TOU for residential customers and SPV-TOU for medium commercial.

1 For schedules that do not have TOU energy charges (Schedules R, C, SG, LG and TG),
2 the dollar credit will be determined by multiplying the excess energy by the customer's
3 prevailing energy rate. Again, this credit can offset other portions of the customer's bill,
4 except for the S&F charge, with any remaining dollar credit carried over to offset future
5 months' bills.

6
7 **Q8: Why is this elaboration of the Roll Over option reasonable?**

8 A8: The new details for valuing excess energy by TOU period are necessary to confront the
9 fact that, under TOU rates, a kWh of energy will have a different value depending on
10 when in the day it is produced or consumed. The Settlement's new elaboration of the
11 Roll Over method deals with this new complexity by valuing excess energy in dollars
12 based on the total energy rate applicable to the TOU period in which each kWh of excess
13 energy is produced. These dollar credits can be summed across TOU periods, to
14 accommodate the fact that some months may have excess energy in more than one TOU
15 period. In addition, if a dollar credit is carried over to a subsequent month, these dollars
16 can be used to offset consumption accurately in multiple TOU periods. This allows a
17 dollar's worth of excess energy to be offset accurately, on a one-for-one basis, with a
18 dollar's worth of electric consumption, despite the use of rates that value energy
19 differently by time of day. This Roll Over approach results in an accurate, ongoing
20 valuation of excess energy in each month, which is appropriate for the Roll Over method
21 because there is no year-end valuation under this option.

1 **Q9: Are you aware of other state that uses this method to implement net metering in**
2 **conjunction with the widespread use of TOU rates?**

3 A9: Yes. California uses the rollover of excess energy credits on a dollar basis as the basis
4 for its implementation of net metering under TOU rates.¹ California has adopted
5 mandatory TOU rates for commercial customers, and is moving toward the use of TOU
6 rates as the default rate structure for residential customers.² Pacific Gas & Electric,
7 which has the most net metering customers of any U.S. utility, has achieved a high
8 penetration of residential solar customers on TOU rates (over 30%) using the rollover of
9 excess energy credits on a dollar basis. I am not aware of any problems with customer
10 acceptance of this approach; indeed, at my home I personally have been a satisfied net
11 metering customer of PG&E on a TOU rate for the past 13 years.

12
13 **Q10: Please discuss the Settlement's provisions for the Cash Out method.**

14 A10: The Settlement's Cash Out approach adapts for TOU rates the present netting of excess
15 energy on a kWh basis, with a cash-out of any remaining excess kWh at the end of the
16 year at the AHIC price. This option provides that any excess energy from one month can
17 be carried over as kWh to the next month and applied in the first instance to the same
18 TOU period in which the excess energy was generated and then sequentially to lower
19 value TOU periods. For example, in the subsequent month, the excess kWhs generated
20 in the most valuable TOU period (i.e. on-peak) will be applied first to kWh consumption
21 in the on-peak period, then to kWh consumption in the next most valuable period
22 (shoulder), and so on. This sequencing or "cascading" of the kWh offset from most

¹ See Pacific Gas & Electric's (PG&E) NEM tariff, at Sheets 8-9, Special Conditions 2(b) and 2(f), available at http://www.pge.com/notes/rates/tariffs/tm2/pdf/ELEC_SCHEDS_NEM.pdf.

² See California Public Utilities Commission Decision No. 15-07-001 (issued July 3, 2015).

1 valuable to least valuable attempts to preserve the time value of generation, because the
2 on-peak is the period in which excess energy is most likely, particularly in the spring
3 months of the winter season (April and May) and in the four summer months (June-
4 September). Based on our modeling of residential solar customers, this approach will
5 somewhat undervalue excess energy because some excess on-peak kWh will be used to
6 offset less valuable shoulder or off-peak usage, and some excess shoulder generation will
7 offset off-peak usage. Nonetheless, this is a reasonably accurate approach for applying a
8 one-for-one kWh offset of excess energy to the new circumstance of the use of TOU rates
9 in which kWhs have different value depending on time of day. Finally, this option
10 retains the present provision for an annual cash-out at the AHIC price for any excess
11 kWh remaining at the end of the year.

12
13 **Q11: Do you believe that the Excess Energy provisions of the Settlement reasonably**
14 **implement C.R.S. §40-2-124(1)(e)(I)(B)?**

15 A11: Yes. The adoption of new, more complex TOU rates for residential customers raises the
16 issue of how to adapt the Roll Over and Cash Out options to the greater complexity of
17 TOU rates with multiple TOU periods. The Settlement's proposed Roll Over and Cash
18 Out options are reasonable ways to accurately track the value of excess energy by TOU
19 period, and thus to adapt these options to the new, more complicated TOU rate designs.

20
21 **Q12: In your judgment, does the Settlement comply with Commission Rule 3664(b)'s**
22 **requirement that monthly excess energy generation must be credited against a**
23 **customer's next monthly bill on a "one-for-one basis"?**

1 A12: Yes. The Roll Over option credits excess generation against the customer's bill on a one-
2 for-one basis in terms of dollar value. The Cash Out option credits excess generation on
3 a one-for-one basis in terms of kWh, with an effort for TOU rates to match kWh of equal
4 value in the crediting process.

5
6 **IV. INCREASE IN THE INCENTIVE FOR MEDIUM COMMERCIAL**
7

8 **Q13: Please describe the SPV-TOU rate.**

9 A13: The SPV-TOU rate is available to commercial customers interconnected at secondary
10 voltages who install solar and who participate in the Solar*Rewards (S*R) Medium
11 program. The SPV-TOU rate is not available to a commercial customer unable or
12 unwilling to participate in the S*R Medium program. The design of the current SPV-
13 TOU features TOU energy charges in place of demand charges to recover generation and
14 transmission costs.

15
16 **Q14: What were parties' proposals related to the SPV-TOU rate in this case?**

17 A14: PSCo proposed to close the SPVTOU schedule to new customers on January 1, 2017, and
18 also to close the STOU, RTOU, and TTOU rates that also collect capacity-related G&T
19 costs through TOU energy rates. SEIA and a number of other parties opposed the closure
20 of these rates; without them, solar customers, particularly those unable or unwilling to
21 participate in the S*R Medium program, would have no available rate based principally
22 on time-dependent charges. Further, PSCo's rate design should be moving in the
23 direction of more targeted, cost-based, time-of-use rates, not away from this goal. PSCo

1 argued that an on-peak demand charge to cover generation and transmission costs
2 provides a “better price signal” for such customers than an on-peak volumetric TOU
3 rate.³ In response, my opening testimony discusses how volumetric TOU rate are a more
4 cost-based means to recover capacity-related generation and transmission costs from
5 solar customers.⁴
6

7 **Q15: How did the Settlement resolve this issue?**

8 A15: The Settlement adopts the compromise of keeping SPV-TOU open, with a change in its
9 rate design. The new rate design will recover 75% of capacity-related G&T costs
10 through TOU energy rates, instead of the 100% recovery in TOU rates in the present
11 SPV-TOU structure. The remaining 25% of capacity-related G&T costs will be collected
12 through an on-peak demand charge. This clearly represents a compromise between the
13 positions of PSCo and the solar parties on the design of the SPV-TOU rate, and maintains
14 the availability of a rate for commercial solar customers that is based principally on cost-
15 based TOU energy rates. The new SPV-TOU rate will apply only prospectively, to new
16 SPV-TOU customers, such that the solar investments of existing SPV-TOU customers
17 will not be harmed by the change in rate design.
18

19 **Q16: The Settlement provides for an additional Solar*Rewards incentive of 0.75 cents per**
20 **kWh for Medium commercial customers who install solar and take service under**
21 **the SPV-TOU rate. This additional incentive is included in the table on page 58 of**
22 **the Settlement, in comparison to PSCo’s original proposal for the incentives for**

³ Docket No. 16AL-0048E (Phase II), PSCo, Brockett Direct Testimony, at p. 99 of 112; also pp. 98 to 101 of 112.

⁴ Docket No. 16AL-0048E (Phase II), SEIA, Beach Answer Testimony, at pp. 12-18, 22-25 and 35-36.

1 **Medium solar customers. Why is this additional incentive reasonable?**

2 A16: Because demand charges are more difficult for solar customers to avoid, the new G&T
3 demand charge in the SPV-TOU rate will reduce the bill savings available to Medium
4 commercial customers who install solar and take service under the SPV-TOU rate. PSCo
5 and SEIA calculated the impacts of this rate design change on Medium commercial
6 customers who might install solar under both the current and the Settlement's SPV-TOU
7 rate designs. PSCo's modeling used the load profile of an average SG customer who
8 installs solar to serve 50% of their annual load. SEIA modeled the individual impacts of
9 the new rate design on 45 separate commercial customers installing a range of solar
10 system sizes from 30% to 90% of the customer's annual load. SEIA's results supported a
11 higher incentive than PSCo's, because the load profiles of the individual customers were
12 more variable than the averaged profile that PSCo used, resulting in larger impacts from
13 the new demand charge. Further, the introduction of a demand charge element into the
14 SPV-TOU rate presents a new complication and a new risk for customers contemplating
15 a solar investment. An increased incentive is necessary to compensate for this greater
16 uncertainty and risk. In the end, the parties agreed on an enhanced incentive of 0.75
17 cents per kWh, as a compromise result that is well within the range of possible added
18 incentives that the parties modeled.

19
20 **Q17: Does this conclude your prepared opening testimony in this matter?**

21 A17: Yes.

CERTIFICATE OF SERVICE

I hereby certify that on this 2nd day of September, 2016, a true and correct copy of the foregoing **OPENING TESTIMONY OF R. THOMAS BEACH ON BEHALF OF SOLAR ENERGY INDUSTRIES ASSOCIATION** in PUC Docket Nos. 16AL-0048E/16A-0055E/16A-0139E was sent via electronic mail to the following:

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