TO: CPUC Staff

From: Annette Beitel, Cal TF Staff
Martin Vu, TF Member and Consultant to SDG&E

Re: Analysis of EULs for Residential Tier 2 Power Strips (WP WPSDGEREHE0004.0)

Date: June 9, 2015

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## I. Overview and Background

SDG&E seeks approval of its Residential Tier 2 Power Strip measure. Cal TF reviewed the workpaper. The workpaper developer addressed Cal TF's comments, then SDG&E submitted it to Commission staff for approval. The outstanding substantive issue needing resolution is the appropriate Effective Useful Life (EUL). This memo describes the communications with staff about the workpaper ("Procedural Background"), applicable regulatory guidance from the Commission, data and analysis collected on plug load EULs, then concludes with a recommendation and request.

## II. Procedural Background

The following timeline lists interactions between SDG&E (workpaper sponsor), Cal TF staff, and Commission staff on review of the Tier II Advanced Power Strip workpaper:

- June 16, 2014 – Cal TF staff provides abstract to Commission staff for review/comment:
  - Proposed EUL – 8 years (See Section 9, p. 7). Source: DEER 2014 EUL Table EUL ID: Plug-OccSens.
  - Specific Question to staff on EUL (See Section 14, p. 10): Can the EUL of 8 years be acceptable considering that occupancy sensing plug load technologies receive a EUL of 8 years?
- April 3, 2015 – After final review from the Cal TF, SDG&E uploaded into Workpaper Archive (WPA) the Tier 2 Advanced Power Strip workpaper.
- April 17, 2015 – Commission Ex Ante Team uploaded their preliminary review to the website.[1]

[1] The preliminary review rejected the WP for three reasons: 1. it did not pass the narrative task; 2. the ex ante data format task, and 3. supporting documentation was not provided. (Cal Plug report and the SDG&E ET study).

- April 21, 2015 – Follow-up meeting with Kevin Madison requested by SDG&E to understand the preliminary review.
    - K. Madison comments during meeting regarding additional research on EULs:
        - "[t]he EUL is one issue that needs more work to do and research on."
        - "Perhaps previous research on plug strips would be a good place to start to estimate an EUL if available."
        - "As an alternative an interim approved EUL value of 8 years may be used until a research study can help inform of a better EUL value. PAs should move forward to commission those studies and revise the WP once information is made available."
    - However, the cover note to meeting notes indicates that SDG&E would only make "minor revisions to WP" such that SDG&E would re-submit without revising 8 year EUL. 5/28 e-mail from M. Vu to K. Madison states that SDG&E would leave 8 year EUL, then commission a customer persistence study and modify later.
    - Meeting notes indicate all other issues were addressed except EUL.
    - April 22, 2015 - Meeting notes sent to Katie Wu, Jeff Hirsch, and K. Madison, and request that if anything incorrect, modify. No response.
- April 28th, 2015 – SDG&E re-uploads the workpaper to the WPA website.
    - In the revised workpaper uploaded to WPA, SDG&E included additional information requested: SDG&E ET study and CalPlug report, and sought to address all requests contained in the preliminary review.
- May 21, 2015 – 25 days after SDG&E uploaded the revised WP to WPA, K. Madison uploaded a file.
    - SDG&E checked the file, and it appears that the file that K. Madison uploaded was the same file that SDG&E had uploaded on April 21st.
    - SDG&E (M. Vu) - M. Vu reached out to K. Madison by e-mail on May 21, May 22, and May 28th to try to get feedback prior to the 5/28 Cal TF meeting. M. Vu also placed several calls to K. Madison.
    - During the Cal TF meeting (May 28th), K. Madison responds with the ex ante team's continued concerns about the EUL.
- May 28th E-mail exchange between Martin Vu and K. Madison

Kevin e-mail:

> "This is where we are struggling. We were specific in our preliminary review that you needed to address the issues of determining EUL and GSIA. The research you provided from Australia (I believe) indicated some fraction of the units were removed in the first year. Early removals, as I pointed out in our follow up call, are more appropriately included in the EUL determination, not the GSIA. The preliminary review stated that the proposed DEER EUL of 8 years was not appropriate for this technology. We asked for additional analysis to address these concerns, and it appears nothing was revised in the final workpaper on this topic."

M. Vu Response: Stated that SDG&E thought they could use 8 year EUL, then follow-up with a customer persistence study.

- June 2, 2015 – Pete Ford e-mail to K. Madison asking whether 28% removal should be in EUL or GSIA, and stating opinion that it should be included in GSIA.

- June 4, 2015 – P. Ford had conversation with Jeff Hirsch about whether 28% removal should be in EUL or GSIA.
    - No resolution. J. Hirsch to respond within week.
- June 5, 2015 – M. Vu had conversation with J. Hirsch and received clarification on EUL vs. GSIA (Installation Rate)[2]
    - EUL is not the end of the product's technical life rather EUL is the product's persistent ability to survive and continue operating.
    - Installation Rate occurs when products are bought *but not installed* at the time the M&V teams do their evaluation where they can't verify the installation
- June 10, 2015 – SDG&E teleconference with J. Hirsch, Kevin Madison, others. Action items are:
    - Updating the language in the measure eligibility section of the workpaper to require that all Tier 2 APS products must comply with the 2013 California Fire Code Section 605.4. - Completed
    - Providing a copy of CALTF staff research on EULs in other jurisdictions. (attached here) - Completed
    - Providing Kevin with a distribution of different electronics or plug loads within each power strip in the SDG&E trial – Follow-up still needed (forthcoming week of June 15 – June 19)
    - Drafting up an example of the where the definitions of EUL and Installation Rate (GSIA) are unclear in the workpaper and for program implementation - Completed (June 10, 2015 e-mail from M. Vu to CPUC ex ante team).

## III. Applicable Regulatory Guidance

The Commission has established policy standards that govern non-DEER workpaper review. Two such standards that are particularly applicable here include[3]:

- Use of best available information
- Utilities and Energy Division must work together to finalize ex ante values in a timely manner.

An ALJ ruling set forth deadlines to help insure that ex ante values are finalized in a timely manner.[4] Specifically, once utilities respond to information raised in the preliminary review, ED is required to render a decision within 25 days and provide comments.

At issue here is the Effective Useful Life (EUL) for power strips, and whether early removal (in the first year) should be included in the EUL or Installation Rate. The Commission defined EUL and Installation Rate in the Policy Manual:

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[2] In the conversation, staff raised an additional concern that the measure eligibility criteria only allows one vendor (TrickleStar). This is incorrect – other vendors just need to test product to demonstrate savings and they could be eligible as well. Furthermore, as this issue was not raised in the Preliminary Review, it should not impede workpaper approval.

[3] D. 11-07-030, p. 9.

[4] A.08-07-021, ALJ Ruling regarding non-DEER Measure Ex Ante Values, p. 7 (11 18, 2009).

Effective Useful Life: An estimate of the median number of years that the measures installed under a program are still in place and operable.

Installation Rate: Installation rate is the ratio of the number of verified installations of a measure divided by the number of claimed installations rebated.

- **NOTE**: Based on oral guidance from staff, it appears that subsequent product removal should be included in the EUL, and that the installation rate captures only products that were not installed in the first place.

## IV. Further Analysis of the EUL Issue

Below is a summary of the analysis on EUL, including additional information as requested by staff in the preliminary review.

### DEER Value

DEER does not contain an EUL for residential smart strips. Thus, the workpaper developer proposed using the commercial plug load EUL for commercial occupancy sensor smart strips.[5]

### Cal TF Input

Cal TF approved a **EUL of 8 years** with an installation rate reduction of 28%, based on the Victoria, Australia study appended to the Cal TF workpaper.

- NOTE: However, Cal TF seeks clear "bright line" guidance on when measure removal should be included in the EUL versus the GSIA. Cal TF understood the installation rate to include the 28% product removal based on the definition of "Installation Rate" contained in the Policy Manual.

If the product removal should instead be included in the EUL, then the Cal TF-approved EUL value would be 8 years minus the 28% product removal rate, or **5.76 years**.[6] Based on more recent information not available at the time of the Cal TF meeting, the Cal TF may have adopted this modified **EUL of 5.36 years[7].**

[5] Source: DEER 2014 EUL Table EUL ID: Plug-OccSens.

[6] Subsequent to the Cal TF meeting, Cal TF staff identified a more recent Australian study from a different Australian territory (the Australian Capital Territory (ACT) that indicated a product removal rate of 33%. Based on the Commission's directive to use "Best Available Information," had this study been available the Cal TF may have elected to use the 33% product removal rate instead of a 28% product removal rate, yielding an **EUL of 5.36**.

[7] ACT Government by Jacobs Consulting, Energy Efficiency Improvement Scheme Review: Final Report p. 7 (13 August 2014).

Plug Load EUL Data

California Data:

- The 2004-2005 DEER Update Study written by ITRON referenced a 2000 CALMAC Report that referenced commercial power strips having an EUL of 10 years. The study-determined EUL did include persistence.[8]

- In 2008, the ex ante review team decided to change the EUL value down from 10 years to 8 years because they felt power strips were similar to lighting controls, which had an EUL of 8 years.

    - NOTE: We are not able to locate any data or studies to support a reduction of the plug load EUL from 10 to 8 years. Thus, it appears that the 10 year EUL is more robust.

- Since then, no studies have been conducted in California to determine the EUL of power strips.

Other Data:

The workpaper developer, Martin Vu, located a reference to an Australian study that assessed:

- Australian Study (Victoria) – 28% removal rate, with 88% of that removal in first three months, the remainder thereafter. [9]

Subsequent to the Cal TF meeting, after Commission staff consultants requested further analysis on EULs, Cal TF staff located one additional Australian study (2014) on persistence (see footnote 6). The study found a customer removal rate of 33%.

Plug Lead Measure Lives in Other Jurisdictions

Cal TF staff has collected all Technical Reference Manuals (over 20) from other jurisdictions that are publically available, and some that are not publically available. After Commission staff consultants asked for more analysis on APS EULs, Cal TF staff reviewed all manuals for EULs/measures lives for both commercial and residential smart strips. The research was to identify studies done in other jurisdictions on smart strip measure lives, and also values adopted by other jurisdictions for smart strip measure lives.

The adopted measure lives range from **4 to 10 years** (See Attachment A)

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[8] Itron, 2004 – 2005 Database for Energy Efficiency Resources Update Study: Final Report, p. 7 – 14 (December 2005).

[9] The study results are reported in a Powerpoint appended to the Cal TF workpaper. Despite extensive web research, the original study has not been located.

Cal TF notes the following when considering results of the research:

- EUL/measure life definition may vary across jurisdictions.
- Values are reported both for residential and commercial smart strips. Actual EULs may vary between the residential and commercial sectors, as Commission staff consultants have already noted.
- Values are reported primarily for "Tier 1" power strips, rather than "Tier 2" power strips. It is possible that customer acceptance may be different for Tier 1 and Tier 2 power strips as they have different performance characteristics.
- Cal TF staff did not find very persuasive data on smart strip measure lives. Several jurisdictions cited the same source[10] that was based on professional opinion rather than data. Nonetheless, most TRMs do have a stakeholder and commission vetting processes, so the adopted values do represent the "best professional judgment" across a range of technical experts throughout the country.

V. Conclusion: Recommendation

SDG&E has done extensive work and due diligence to meet its regulatory obligation to identify "best available information" to support its proposed EUL for residential power strips, as follows:

1. SDG&E proposed using a DEER value (8 years) from a DEER measure that is most similar to the Tier 2 residential proposed measure.

2. It hired an independent consultant, Martin Vu, to research studies on savings, EULs, and other measure parameters, then to develop the workpaper, to ensure it had identified "best available information."

3. It sought Cal TF review and approval of values at the abstract and workpaper stage.[11] Based on Cal TF input, savings were downward adjusted to be more conservative.

4. Research was done on values used by all other jurisdictions that have publically available values.

5. It has sought CPUC staff input on the correct EUL to use for residential Tier 2 Power Strips starting in June of 2014.

[10] David Rogers, PowerSmart Engineering "Smart Strip Electric Savings Usability, p. 22 (October 2008).

[11] Cal TF discussed the abstract in June 2014. It discussed the workpaper in January and February, 2015. Information and meeting notes can be found on www.CalTF.org.

SDG&E does not see any other steps it can take to identify additional information on smart strip EULs. Given staff's feedback, and SDG&E's desire to move forward with the measure, SDG&E proposes the following course of action:

1. **EUL Measure Life – 5 years.** The proposed measure life is calculated as follows:

- 8 year measure life in DEER (despite data from 2005 DEER Final Report (Itron Study – fn 8 that indicates EUL is 10 years)
- 33% Product removal rate (2014 Australian Study – fn 6)
- Results in 5.36 year measure life, rounded down to 5 year EUL.

2. Commission a Customer Persistence/Customer Acceptance Study at end of first year[12], as follows:

- Web/phone-based survey
- Customers asked if measure removed, when removed, and if removed, why removed.
- For customers who did not remove, ask if they intend to remove the measure in the future.

VI. Requests

Request #1: Commission staff approve workpaper with ID WPSDGEREHE0004[13] with an EUL of 5 years.

SDG&E will conduct, after the first year of program operation, a customer persistence/acceptance study that will provide an estimate of the number of measures that are still installed and operating after one year, customer feedback on measure performance, and whether the customer intends to continue using the measure in the future. Upon completion of SDG&E's study, Cal TF will reevaluate this EUL of 5 years for residential Tier 2 advanced power strip to determine if it needs to be updated.

Request #2:

Cal TF appreciates the distinction made by the ex ante consultants between "EUL" and "GSIA" and agrees with the clarification for "EUL." Based on this, Cal TF and SDG&E recommend that the following update to the definition of "EUL" currently in the EE Policy Manual be updated to

[12] Depending on IOU funding, a second year may be appropriate to collect persistence data as well. Additionally, because the ET study did reference 9 homes that were post monitored and showed measured savings less than the SDG&E field trial, the IOUs may need to also do some post monitoring simultaneously with the persistence study to address this concern of overestimation of energy savings in the trial using log mode versus actual human interface in active mode.

[13] WPSDGEREHE0004 was uploaded by SDG&E on April 28, 2015 to https://deeresources.info/.

clearly define EUL.[14] We recommend that the EUL definition found in the *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management Program*[15] be substituted as it embodies clearly what the EUL is.

> Current Definition:
>
> **Effective Useful Life (EUL)**
> An estimate of the median number of years that the measures installed under the program are still in place and operable.
>
> Proposed Definition:
>
> **Effective Useful Life (EUL)**
> An estimate of the number of years that a picve of equipment will operate if properly maintained, adjusted for early removal that would have occurred in the absence of the utility program.

The recommended definition includes early removal as discussed with the ex ante consultants and clarifies the meaning of EUL.

Should the Commission Staff consider the recommended update to the EUL definition, it is imperative that the ex post verification of "installed" measures methodology also be modified to ensure that these early removals already accounted for in the EUL would not be double counted.

[14] Energy Efficiency Policy Manual V5 Appendix B, page 49.
[15] Adopted by D.98-03-063 and revised March 1998.