**Memorandum**

**To:** Illinois TRM Technical Advisory Committee

**FROM:** Cheryl Jenkins and Sam Dent, VEIC

**subject:** Tier 2 Advanced Power Strip; Notice of Financially Vested Parties Non-Consensus Positions.

**date:** 1/25/2017

**CC:** Annette Beitel, SAG

# ****History of measure development****

In version 5.0 of the Illinois Technical Reference Manual, a new residential measure was developed: “Tier 2 Advanced Power Strip” (APS). This measure characterizes a type of power strip that, in addition to switching off loads from switched devices (e.g., speakers, amplifiers, game consoles) when a master device is switched off (e.g., the television), the power strip also controls “active” power loads, that is, they actively switch off power to devices when it is sensed that they are not being used.

The Tier 2 APS market is a relatively new and developing one, with a small but growing number of manufacturers entering the market. The products vary significantly in *how* active usage is sensed (e.g., by occupancy sensing, IR signals from a remote control, or some combination), the control algorithms used, and the length of time and the warnings provided before switching off loads. The different strategies appear to have significant impact both on the savings potential for the particular unit, and in the potential satisfaction in or persistence of their application.

There are challenges with evaluating the performance of the units. Two methodologies have emerged, one representing a pre/post metering exercise, where audio visual (AV) loads are metered without the APS and then metered again after the APS being installed. This methodology provides a direct estimate of kWh savings, but significant variance in pre- and post-customer behavior can significantly hamper the ability to isolate the effect of the APS. An alternative method, called the CalPlug Savings Verification System (SVS), was developed by the California Plug Load Research Center to mitigate this issue of variance. This method meters plug load usage and simulates the sensing and control strategy of the APS to calculate what the savings would have been if the APS had been actively operating. The disadvantage of this method is that, since the control does not actually turn off the devices, the interaction of the user’s behavior with the APS may not be fully accounted for.

In light of these issues, the TAC agreed that credible third-party evaluation results were critical to demonstrate savings and support program participation. In the absence of an independent rating body (e.g., ENERGY STAR), the TAC developed a system whereby manufacturers could submit independent test results for their product, the results would be reviewed by the TAC, and products would then be placed into a classification system (A-G) with deemed savings associated with each class. This methodology was approved and entered in to version 5.0 of the Illinois TRM, with a reference document developed and saved on the SharePoint site to document these classifications.

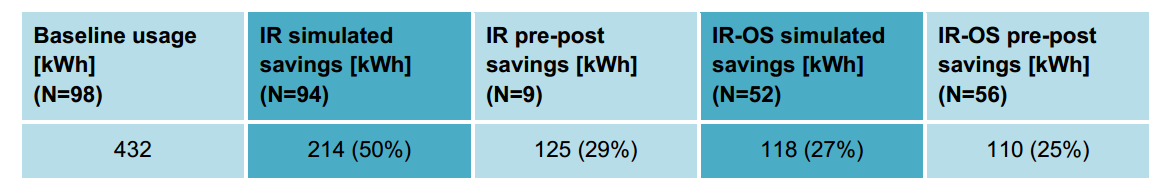
At the time of v5.0 release, only one manufacturer, Embertec, had performance data that was determined to be sufficient for classification. Within 2016, further data on a second manufacturer’s product, TrickleStar, allowed for its product to be classified. Throughout the TRM process (both for v5 and v6), both manufacturers have been very active participants in discussing this issue.

It should be noted that some TAC members have expressed some trepidation in the TAC performing this product classification process and having a TRM that provides different savings for different products. VEIC have acknowledged this and expressed a clear hope that at some stage in the future, when more products have entered the market, the measure can be divided along the lines of product *feature* (e.g., sensor strategy or control type) rather than by manufactured product. However, with only two products’ data currently available, we argue that this is not yet possible. Further, the application of varying savings for different products is certainly not unique to this measure – e.g., we have varying levels of savings for Clothes Washers dependent on if they are ENERGY STAR or ‘ENERGY STAR Most Efficient’ qualified, and Refrigerators are divided by ENERGY STAR and CEE Tier 2 rating. The TAC has developed this process to work in the absence of a similar independent body performing this rating system for APS.

# ****Proposed measure changes for v6****

Following the release of v5.0 and prior to beginning v6.0 development, a new report from AESC in California was released that pulled together two phases of a study, the first on the Embertec product (labelled below as “IR” – or infrared) and subsequently on the TrickleStar product (labelled below as “IR-OS” – or infrared and occupancy sensing)[[1]](#footnote-1).

The studies involved both testing methodologies, and the results are presented below:



The study also provided results from surveys given to the study participants to explore customers’ experiences with and the drivers of persistence of Tier 2 Advanced Power Strips.

Based on this study, in addition to providing support for TrickleStar’s product classification, VEIC proposed the following noteworthy changes to the v5 measure:

* Reduce the “Baseline Energy” variable, i.e., the assumed AV load prior to APS installation, from 600kWh to 432 kWh. This new figure came from the new aforementioned AESC study, and VEIC determined it was a more appropriate assumption since it accounted for a number of AV loads that are typically not controlled by the APS, while the New York study, which was the basis of the existing assumption, totaled all typical AV loads.
* Replace the single deemed In Service Rate assumption (0.7) with a product specific value (0.87 for TrickleStar’s product and 0.83 for Embertec’s). In addition to savings potential, the different control strategies and degree of ‘aggression’ in terms of how readily the APS turns off AV equipment is likely to affect such factors as ISR (and potentially lifetime or persistence). The AESC report provides our first indication of variances in ISR after adjustments in weighting based on the persistence sensitivity to demographics.

After submitting these proposed adjustments, VEIC received lengthy comments from both manufacturers (see Appendix for comments in full). Upon discussion it became increasingly clear that the two manufacturers were significantly opposed over a number of key issues (highlighted below), and that while the rest of the TAC were content with the changes, reaching consensus including these parties, both of whom have a significant financial interest in the outcome of the decisions, was not going to be possible.

VEIC consulted with the Illinois Program Administrators and non-financially interested parties within the Illinois SAG and TAC committees. All were in agreement that parties with financial interests to the outcome of a discussion should not alone be able to prevent consensus being reached on moving forward with a change, and that it was reasonable to hold additional discussions without the participation of said parties when appropriate.

With no other TAC member objections, these changes have been entered in to the version 6.0 of the TRM. This memo represents documentation of the key issues that prevented the financially vested parties reaching consensus.

# ****Key Non-Consensus Issues****

|  |  |  |
| --- | --- | --- |
| **Issue** | **TrickleStar Position** | **Embertec Position** |
| The use of performance classification bands over a single deemed savings for all APS. | Argue for single savings assumption of 212 kWh for all devices that meet minimum criteria laid out in TRM.   * Question validity of comparison of existing study results * Overly complex and burdensome process   Note: TrickleStar indicated they would not be able to reach consensus on this issue as currently drafted. | Process developed by TAC appropriately incentivizes industry innovation and does not penalize higher performing products. |
| Use of SVS savings results | Pre/post testing is best practice for evaluation.  SVS recording equipment was developed by manufacturer whose products are being tested (Embertec).  California Public Utility Commission has recommended use of pre/post testing only. | Disputes concerns over STS method, arguing that the flashing LED light and prior instructions to the participants mitigate significant impact. Argue that there are clear advantages and disadvantages of both methods and all data should be considered. |
| In Service Rate difference |  | Suggests significant sample variance (length of time installed, age and other demographic differences in surveyed population) exists between the two products and recommends adjustments to account for this. |
| Embertec’s classification (50% savings) | Fails reasonability test as it implies “half the time a television is on it is unengaged or non-active time”[[2]](#footnote-2) |  |

# ****APPENDIX: Submitted Comments in Full****

## TrickleStar submission for consideration of Errata (to v5.0) update

In the 28 Jan 2016 meeting of the California Technical Forum (CalTF), California Plug-Load Research Center (CalPlug) Director Michael Klopfer verbally confirmed that the simulated method of field testing has a known issue of overestimation of savings as applied to field testing of Tier 2 Advanced Power Strips.  This is reflected in the official CalTF notes at the top of page six (attached). You will also notice that on page two of those notes, VEIC is listed as a telephone attendee of the meeting.   
    
Then on February 11 of this year, CalTF staff led by Alejandra Mejia hosted a conference call to talk about Tier 2 Advanced Power Strips.  TrickleStar was on that conference call as was a representative from VEIC.  On that call, Alejandra Mejia asked Michael Klopfer from CalPlug if further research was needed to quantify the magnitude of the overestimation of savings issue related to the simulated field testing method as applied to Tier 2 Advanced Power Strips.  Mr. Klopfer again confirmed that the overestimation of savings issue was valid and that additional research was needed. Ms. Mejia asked CalPlug to create a scope of work for a research project to address this issue, and Mr. Klopfer agreed to create a scope of work for the CalTF.   
    
Both the California Technical Forum staff and CalPlug Director Michael Klopfer believer there is an issue with overestimation of savings with respect to the simulated testing method applied to Tier 2 Advanced Power Strips.  This is the error that was made – this same testing process was used in the work paper that our competitor submitted to IL-SAG to get a savings value for their product (Group B, 50% ERP).  This is also where I think VEIC should not be responsible for this mistake – because VEIC may not have connected the dots between the paper submitted to the IL-SAG by our competitor and the known problems with the simulated testing method as applied to Tier 2 Advanced Power Strips.  A represenative from VEIC was on the phone for both of those meetings, but probably only looking for the arrival date of new testing information.  I don’t think it’s reasonable to expect VEIC to understand all of the issues discussed and connect them to a paper that was submitted months earlier to the IL-SAG.   
  
The California Public Utility Commission recently provided guidance to Pacific Gas & Electric and San Diego Gas & Electric where they rejected energy savings data derived from the simulated testing method.  We expect San Diego Gas & Electric to issue a new work paper shortly, in which a lower, more conservative, and more relaible savings value is presented for Tier 2 Advacned Power Strips.   
    
Utility-sponsored work papers in California are not peer reviewed.  Likewise, there is no public comment option for California utility work papers.  As such, it is not hard to imagine that a mistake was made in the California work paper by San Diego Gas & Electric contractors.  Fortunately for the stakeholders in California, they discovered their mistake.  Unfortunately, VEIC did not connect the discovery of their mistake to the work paper submitted to the IL-SAG by our competitor.   
    
Therefore, a mistake was made in theIllinois TRM process. This informaiton was publically available before the finalization of Volume 2 Version 5.  We believe an eratta is justified, and that there was no fault by VEIC.   
  
We request that Illinois adopt one savigns value to represent the category of Tier 2 Advanced Power Strips.  This is the approach taken by WA, OR, ID, MT, UT, MN, PA, MI, MA, and soon to be CA.  No other jurisdiction in the country uses specfiic savings values for specific models of Tier 2 Advanced Power Strip.   
  
With the dissasebly of the class system currently in Version 5, we propose that IL move to a system similar to what is in place with the Pacific Northwest and the Northwest Regional Technical Forum. Specifically, manufactuers self-declare their product's compliance to published TRM criteria.  They then report their qualifying models to an administrator (VEIC), and the administrator (VEIC) keeps a list of qalifying products.  The administrator investigates compliance matters on thier own prerogative, and the administrator publishes the list of qualifying products.   
  
Under this system, Illinois can keep the field testing eligibility requirement.  Illinois can keep the existing product eligibility criteria already published in Version 5.    
  
The changes proposed are summarized as (1) elimiate the class system for energy savings, and (2) reject any field testing data derived from the simulated testing method.

## VEIC submitted comments on Errata

Author, Company and Date: Sam Dent, VEIC, 08/23/2016

Comment:

VEIC do not agree with this errata proposal for the following key reasons:

1. **Timing of relevant California Technical Forum meetings**

The crux of the argument being made is that prior to the finalization of the v5 TRM, it was stated during two California Technical Forum (CalTF) meetings that the Simulated Savings method (SVS) developed by CalPlug tends to overstate savings and that a VEIC representative was present on these calls and therefore should have rejected SVS informed results and used a single savings claim for all products. The dates of these two CalTF calls were 01/28/2016 and 02/11/2016. The “Almost Final Draft” of the v5 IL TRM was delivered to the TAC on 01/22/2016, prior to these calls, and the Final Draft on 02/11/2016. Therefore by 01/22, the TAC had reached consensus as to how this measure should be drafted. At this late stage in an update cycle we can only make minor edits since there is no longer available time for significant changes to be presented, reviewed and agreed by all TAC members. For this reason even if it had been determined such a significant change was appropriate, it was far too late in the process to be included. New information such as these discussions and anything derived from the Phase 2 report release (which we received on 3/14), should be considerations for revisions to v6.

1. **Differing interpretation of intent of Michael Klopfer (CalPlug) comments**

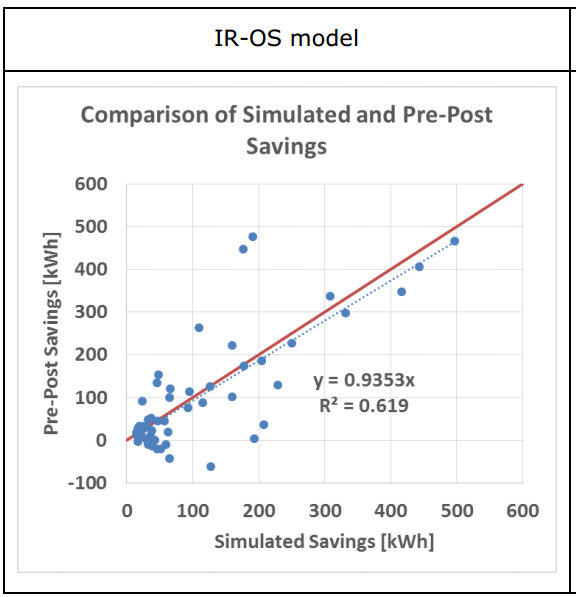
I, (Sam Dent of VEIC) was indeed listening to the conversations on the CalTF calls, and did hear discussion about the potential for the SVS method to overestimate savings, but I interpreted the intent of the comments very differently. I certainly did not hear any suggestion that this impact was significant enough that results from this methodology should simply be discarded. I heard that the magnitude of the potential overstatement is dependent on the study design and that although CalPlug were not involved in and couldn’t speak directly to the California studies, the presence of an appropriate warning would help mitigate the issue. Further I have heard significant discussion about the relative advantages and disadvantages and potential failings of *both* methodologies and certainly have not heard any consensus in the industry that suggests one is definitively better.

The concern is that the SVS method may not fully account for the user interaction with the unit since it does not actually turn anything off during the study period. Thus if a user was actively using the AV and chose to ignore the flashing warning light – once the simulation determines that the APS would have switched it off, it would be recording an illegitimate savings period. The magnitude of this concern cannot be evaluated in this particular study nor has it been in any other that I am aware. However participants were all fully aware they were participating in a study and were given instructions about what to do if they wanted to continue to watch the TV and the LED warning light was flashing at them (i.e. press any remote button). We therefore believe that any illegitimate savings event would only be due to intentional mis-action on the part of the participant and not happen by mistake and so we would expect it to be limited in its prevalence.

Since receiving this errata request, I have spoken to Michael Klopfer (CalPlug) who reiterated that while the SVS method does have the tendency to fail to the positive, the pre/post method can equally fail randomly (positive or negative) based on pre and post usage patterns.

1. **IR-OS (TrickleStar product) Results**

The Phase 2 results provide a relatively large sample set of both SVS and pre/post results for the IR-OS (TrickleStar) product allowing a reasonable comparison of the relative outcomes of the two methods. The results were 27% using the SVS method (n=52) and 25% for the pre/post method (n=56). These results are very similar and though the SVS method does result in a slightly higher value, it does not indicate a significant variance. The following chart from Figure 14, page 32 of the Phase 2 report indicates relatively strong agreement. Indeed any site above the red line indicates where the pre-post estimation method results in a *higher* estimate of savings than the SVS method. Since the pre/post is looking at activity during two separate time periods (‘baseline’ and ‘post’ periods), while the SVS is looking at savings in just one (‘baseline’) this appears to suggest that anything above the line (where pre/post is suggesting higher savings) must only be due to increases in usage during the ‘post’ period. These would potentially be considered overestimates of savings for pre/post and are quite significant in places. In addition, the pre-post method provides some sites with negative savings – which would represent additional erroneous results in the other direction.



Michael Klopfer has stated numerous times that with a large enough sample, he would expect a pre/post study to give a result similar to the SVS method. The IR-OS results above appear to support this claim. The IR (Embertec) results do not show good correlation between SVS and pre/post, however VEIC believe the pre/post results from Phase 1 are from far too small a sample size and have significant problems in terms of sample attributes that they should be taken with great caution.

1. **Same baseline set – SVS modeled for both – shows significant difference**

Even if one determined that the SVS derived data had issues with overclaiming, since the same baseline data was used to evaluate both products – one should still regard the relative performance of the products using this method as another indication of savings potential. This continues to indicate a significant difference in the products – 50% (IR) v 27% (IR-OS).

1. **Other jurisdiction decisions**

While consistency across borders is always preferred the fact that other jurisdictions have decided to apply a single savings factor for all APS Tier 2 product shouldn’t in and of itself dictate that IL should. Indeed when reading the notes from California it certainly has not seemed that it was a position held by many involved (see select quotes below from February 25th CalTF notes):

John Proctor—First, I’m not convinced that the difference in savings between the two products is not significant. Second, I don’t understand what cost considerations are preventing the utilities from pursuing two different values.

John Proctor—I don’t support the idea of sacrificing/averaging the savings value for administrative expedience. Why would we not strive to incent the products that maximize savings?

Spencer Lipp—I think it is completely the utility’s prerogative to choose to continue with or without the Cal TF process. Maybe we need some more information on the administrative costs as well, so we can more effectively judge if one measure is one or two. Because it did look like two measures to us, but clearly we didn’t have all the information.

Owen Howlett—I’m concerned that averaging the savings estimates creates a disincentive to invest in increasing the efficiency of existing products.

1. **Products are fundamentally different**

VEIC continue to believe that the relevant products are fundamentally different and due to those differences have legitimately variable savings potential and that the data that is available continues to support this variance.

Both the Embertec and TrickleStar products begin to count down after each IR event, however after 45 minutes (on default setting or 75 minutes) the TrickleStar product begins looking for occupancy motion and if either OS or IR activity is then sensed it resets the timer. The Embertec timer can be set to 60 (default) or 120 minutes, Tricklestar to 75 (default) or 135 minutes. It seems inevitable to us that the Embertec is going to turn the units off more (and therefore have more savings) since it has a more aggressive control strategy. Only if the user uses the remote for the last time and leaves the room within the first 45 minutes (and doesn’t return (or any other activity is detected)) will the Tricklestar product also turn the TV off at the end of the same countdown period (although even then in default mode the Embertec product would turn off 15 minutes sooner).

VEIC also believe that while each of the testing methodologies have advantages and disadvantages, we have not seen or heard evidence to suggest rejection of any particular method and consider that the variety of results more strongly suggests a significant difference than it does otherwise.

In conclusion, VEIC do not agree that errors were made in the v5 characterization, and even had the CalTF discussions been conclusive it would have been far too late to make a change. The v5 TRM was developed based on the best information at the time. We do believe there TAC should consider whether there are some appropriate minor changes based on the Phase 2 report that was released *subsequent to* the finalization of v5 (for example the ISR assumption), but since this is new information it should not constitute an errata.

## Embertec submitted comments on Errata request

**Response to the Illinois TAC   
on the   
ERRATA Request   
Submitted by Tricklestar   
for   
Tier 2 Advanced Power Strips**

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7. **A brief history of Tier 2 APS within the Illinois Technical Resource Manual**

In June 2015, Embertec and Tricklestar were requested by Annette Beitel to collaborate in the formulation of a testing and product evaluation/approval processes for the Tier 2 Advanced Power Strip category and its proposed inclusion into the Illinois TRM.

Detailed meeting notes were compiled at the time and are attached within the references section of this report.

Overall it was agreed by both vendors (in consultation with Anette Beitel), that Tier 2 Advanced Power Strip (APS) products should be assessed on their own merits due to differing control strategies and software playing important roles in device performance.

Both vendors proceeded in collaborating and compiling a draft Tier 2 APS measure for inclusion in the Illinois TRM on this basis and presented this to VEIC for review and presentation to the Illinois TAC, which commenced in August 2015.

During the review period of this new measure, a number of fundamental parameters were jointly agreed; these parameters made up the core foundation of this new measure which include but are not limited to:

1. **Ensuring all products deemed under the activity have independently proven energy savings via field trials in the targeted environments (residential/commercial)**
   * This is to ensure the category will stand up to rigorous assessment and validation of energy savings in the field post deployment.
2. **Ensuring Tier 2 APS energy savings will be assessed on a product by product basis and assigned to the suitable Energy Reduction Percentage (ERP) performance band (across increments of 5%).**
   * Due to varying control conditions which are both hardware and software dependent and will never be identical between vendors.
   * This approach will incentivise industry innovation, driving greater energy savings to rate payers as vendors compete to “build a better mouse trap”.
3. **Placing responsibility on product vendors to submit all relevant and independent IOU sponsored data on their individual technologies to the IL TRM for review and acceptance.**
   * Independent data will assist in ensuring confidence in the data presented

1. **Creating an evaluation structure that enables new vendor products to be included (specifically outlining their control features and independently proven energy savings) as and when they have been field tested to the satisfaction of the IL TRM.** 
   * This will ensure new technologies can be continually added easily and efficiently whilst also incentivising innovation in the market which drives additional energy savings.

It was further agreed and supported in discussion with Annette Beitel that vendors need to find a utility sponsor to field trial, collect and present data **on their own product to the ILL TAC**. This is important as it avoids vendor “mud-slinging”.

Again these fundamental principles and conduct guidelines were agreed by both product vendors in mid-2015.

During the course of the consultation period with the Illinois TAC between August and December of 2015, there were repeated requests for Tricklestar to provide available field trial data on the energy performance of their product. Embertec had submitted all their data prior to August 2015 to VEIC and the Illinois TAC.

Tricklestar data was requested in order to better understand whether variations in usage sensing, control processes and firmware would have an effect on energy saving performance. In addition to requested field trial data, Embertec continued to provide extensive data on its product including data not yet in the public domain.

Illinois TAC requests of Tricklestar (between August – December 2015) to provide their field trial data, or at the very least a “ball-park” figure on their energy savings shown from their field trial which had completed in California were not provided. It was stated on numerous occasions by Thad Carlson of Tricklestar that the data could not be shared due to “confidentiality” and no “ball-park figure” was provided upon request either.

At this same time, Thad Carlson requested that the performance bands that were previously agreed by both vendors and VEIC should be increased from increments of 5% to increments of 20%.

The effect of such a proposal, should it have been granted, was clear; this being that:

1. **Two different products with significant variation in energy saving performance would have a much higher chance of being categorized as saving the same amount of energy when if placed into wide (20% increment) performance bands, even though the data clearly demonstrated large variability.**
2. **It would act as a massive disincentive for vendors in this space where advancements in product design that would deliver additional energy savings would not be invested in, as only very large step changes in energy saving performance would be valued by larger incremental performance bands.**

This request from Thad Carlson was rejected by the Illinois TAC, and not supported by VEIC for the reasons stated above.

It should be noted that this request to increase the size of the performance bands occurred after performance data was available to Tricklestar on their product from the field trial in California. This is the same data that was requested by the Illinois TAC but not shared by Tricklestar due to stated “confidentiality”.

Had the request to increase the size of performance bands been granted, it would have likely favored lower energy saving Tier 2 APS vendors to the detriment of rate payers and innovation in this market.

1. **Overview of Embertec’s response to the Tricklestar ERRATA request**

As agreed between the vendors, each vendor would not present or critique the data on the other to the Illinois TAC as it was accepted that independent utility funded data would ensure robust evaluation had already occurred. Thus it was for Tricklestar to provide data on their product and Embertec did not present or critique Tricklestar data to the Illinois TAC, although it was in our interest to do so. It has not gone unnoticed that the same professional courtesy has not been forthcoming with this Tricklestar ERRATA request, which attempts to drag down the performance of their competitor to counter the lower performance of the Tricklestar product.

The final (and public) Emerging Technology Co-ordinating Council (ETCC) report on this field trial was available publicly from the ETCC website in February 2016. This report conducted a side by side evaluation of the Tricklestar and Embertec devices in the same households, across identical time periods and usage patterns with the following results:

* Tricklestar IR/Motion Sensing, Master/Slave Control Process
  + **27% Energy Reduction Percentage**
* Embertec IR, Masterless, True RMS Power Sensing Control Process
  + **50% Energy Reduction Percentage**

This data provides some useful insights on how variations in sensing, control and firmware design will significantly influence energy savings in targeted environments. This data can also provide guidance to existing and future vendors as to which features drive greater energy savings.

After millions of devices installed, countless independent field trials and many variations in sensing and control approaches tested in house over the last 12 years, Embertec is proud of the performance our technology has continually demonstrated and believe we have developed a successful mix of control, usage sensing and firmware code to deliver significant energy savings for all householders with our Audio Visual Tier 2 APS device.

As we experienced in the Australian market, eventually vendors converge on tried, tested and proven feature sets which lift the performance of the entire category; but only if they are required to validate performance and are evaluated against it.

We find it alarming that the ERRATA request seeks to remove the need for independent utility field trials to validate energy savings as a pre-requisite for inclusion in the Illinois TRM.

Furthermore, we find it very concerning that a vendor who originally supported the existing Illinois TRM in August 2015, then declined to provide data on their product throughout 2015 to the Illinois TAC when it was available, and is now seeking an ERRATA request where vendors “self-certify” their performance whilst requesting a removal of performance bands altogether.

Questions will no doubt be asked as to why the lower performing product vendor (Tricklestar) is attempting to change the very rules and guidelines (via their ERRATA request) that they not only agreed to in 2015 but helped formulate.

It should be noted that the PG&E field trial was the very first field trial conducted on the Tricklestar product. Had more detailed evaluation on the product design taken place internally, prior to having ratepayer funds used to evaluate this product publicly, the product design would likely have changed to deliver higher performance.

We now find ourselves with an ERRATA request to review and comment on, when perhaps the focus of any amendment should not be on the evaluation criteria and cataloguing of devices within the Illinois TRM based on their proven performance, but rather on updating product designs that have proven to deliver energy saving performance lower than what may have been anticipated by the vendor making the ERRATA request.

Upon review of the ERRATA request, it is clearly evident to Embertec and no doubt others familiar with the information referenced, that select data which the Illinois TAC should be aware of has either not been provided or misrepresented entirely.

This concealed information and biased representation of meetings and reports referenced seems to have occurred for the sole purpose of supporting an erroneous ERRATA request. In order to provide all information in a transparent manner, this document will quote sections of the ERRATA request provided by Tricklestar and provide supporting information to demonstrate that important information has either not been included or misrepresented entirely. The omission and misrepresentation of data could mislead a reader who is not aware of the full context of the discussions, meetings and data referenced by Tricklestar in their ERRATA request. We will seek to ensure total transparency for the benefit of all Illinois TAC members.

We hope that the culmination of this assessment will encourage all vendors the use their valuable resources to continually innovate and improve their product features and performance in the interests of delivering greater energy savings. This is surely preferable to the current attempts within this ERRATA request to lower all vendor participants to the lowest performance level demonstrated by one vendor alone, whilst attempting to restrict progress from all vendors in a market segment with much promise and opportunity.

1. **Comments in response to Tricklestar ERRATA overview**

Below are quotations from the ERRATA request presented by Tricklestar with responses from Embertec to provide clarity and full transparency on the statements quoted. We apologize for not correcting the spelling mistakes in the quotes provided from the Tricklestar ERRATA request. These errors were maintained to ensure reader confidence in the direct and accurate referencing by Embertec of the ERRATA request document from Tricklestar.

**Quote 1:** ***“…Director Michael Klopfer verbally confirmed that the simulated method of field testing has a known issue of overestimation of savings as applied to field testing of Tier 2 Advanced Power Strips.  This is reflected in the official CalTF notes at the top of page six (attached). You will also notice that on page two of those notes, VEIC is listed as a telephone attendee of the meeting.”***

Embertec was present during these referenced discussions. We can confirm that a VEIC representative was also an attendee. Unfortunately this is where the accuracy of this quote ends. Tricklestar has unfortunately neglected to provide a full representation of Michael Klopfer’s comments. Michael Klopfer clearly stated that there are a number of field trial methods available, all of which have their stated “pros and cons” based on their design and also their implementation. Michael Klopfer did not state that one method was better than another and also stated that the pre/post method suffered from both overestimation and underestimation in energy savings due to variability in usage which would influence energy savings which could not be metered using the pre/post field trial method.

It should be noted that CalPlug developed the simulation method to overcome the pre/post metering challenges as they pertained to the evaluation of Tier 2 APS devices. Readers would probably be perplexing as to why an employee of CalPlug would only comment on the potential challenges of one field trial method (especially when that method was developed by CalPlug to overcome challenges in pre/post metering) and not discuss it in the context of both field trial methods available.

To confirm and clarify, Michael Klopfer did not state or intimate that one field trial method was preferable to another, but rather he was clear to state that both methods had their “pros and cons”. Most importantly Michael Klopfer stated that the *implementation* of the field trial method, not only the method itself, would drive accuracy in the metered outcome. We believe it would be very valuable for Tricklestar to provide more information to the Illinois TAC on their implementation of the simulation mode field trial method in the PG&E field trial to ensure it properly conformed to the simulation method approach.

**Quote 2: *“…Alejandra Mejia asked Michael Klopfer from CalPlug if further research was needed to quantify the magnitude of the overestimation of savings issue related to the simulated field testing method as applied to Tier 2 Advanced Power Strips.  Mr. Klopfer again confirmed that the overestimation of savings issue was valid and that additional research was needed.”***

The way in which this is being presented is to suggest that Michael Klopfer stated it was a large issue. This is not what was intimated or stated by Michael Klopfer. Michael Klopfer simply stated that from a pure academic perspective it should be determined what the potential error value was and that it would be dependent on the implementation of the simulation method not simply the method itself.

It is important to note that the simulation method is still supported by CalPlug as addressing a number of measurement challenges with pre/post metering and the simulation method removed these variables associated with pre/post metering. The larger concern was around execution of the method, not the method itself.

**Quote 3: “*Both the California Technical Forum staff and CalPlug Director Michael Klopfer believer there is an issue with overestimation of savings with respect to the simulated testing method applied to Tier 2 Advanced Power Strips.  This is the error that was made – this same testing process was used in the work paper that our competitor submitted to IL-SAG to get a savings value for their product (Group B, 50% ERP).”***

As stated earlier, the execution of the simulation method not the method itself is what was of concern. The simulation method was developed to allow for faster and more robust evaluation with greater detail in the data collected due to the unmetered and numerous variables when using the pre/post method. There exists only one uncontrolled variable in the simulation method compared to the pre/post method which suffers from variability in AV usage hours, device usage (i.e. different devices at different times), household occupancy rates, TV scheduling, etc. None of these variables were metered in the pre/post method and they will never be identical from one period to the next and will therefore incorrectly influence energy savings. The simulation method removed all these variables.

It should be noted that if the simulation method was not preferred to pre/post metering (as intimated by Tricklestar) why then has it been used extensively in the evaluation of Tier 2 APS? The simulation method was supported by AESC, the CalTF, the 3 IOU’s in California and multiple IOU’s in the Northwest and Canada. It was deemed suitable for use in the most recent Californian field trials and also used in the most recently approved CPUC workpaper.

Furthermore it should be noted that Embertec and Tricklestar product underwent a side by side assessment in the same households using the exact same data inputs. The results were, as presented in the ETCC report, an Energy Reduction Percentage (ERP) of 27% for the Tricklestar device and 51% for the Embertec device.

This difference in performance was related directly to the difference in sensing technology, (motion sensing and master/slave control of the Tricklestar device) and computational / learning algorithm capabilities. Embertec has been developing its algorithms since 2004 and has extensive experience across the millions of units deployed worldwide. Embertec is not aware of any other Tier 2 APS vendor with even 10% of this experience and ongoing R&D opportunity which is critical for customer learnings and product improvement.

**Quote 4: “*A represenative from VEIC was on the phone for both of those meetings, but probably only looking for the arrival date of new testing information.  I don’t think it’s reasonable to expect VEIC to understand all of the issues discussed and connect them to a paper that was submitted months earlier to the IL-SAG.”***

The Illinois TAC discussed the different field trial methods during the development of the TRM document. It was initially proposed that the simulation method be adopted for field trial purposes due to the ability to remove the variables outlined when using pre/post metering method. Tricklestar requested that we not be prescriptive of the field trial method that is used but rather that vendors demonstrate that variables that influence energy savings be controlled, measured or removed wherever possible to have a reliable testing process and field trial data.

The outcome was that the Illinois TAC agreed to allow all field trial methods that are used by utilities in independent assessments of Tier 2 APS devices.

Now however, after all the data has been attained, Tricklestar is seeking for one field trial method only (which they were opposed to previously) and the removal of any data associated with independent, utility funded and executed field trials using data outside of pre/post metering. It should be noted that the simulation and pre/post field trial method was used for the Tricklestar product in their field trial across 50+ samples. This resulted in an Energy Reduction Percentage (ERP) of 27% and 25% respectively. This would suggest that either both field trial methods when statistically significant sample sizes are used are reliable or conversely they could both be unreliable given they rendered similar results.

The simulation method was the only method available to accurately compare side by side two different Tier 2 APS devices (Tricklestar and Embertec) with the results clearly evident in the ETCC report.

We contend that it is the relative performance of both these products which is motivating this errata request in seeking first the removal of the simulation field trial method approach and then requesting that there be only one performance level for the entire Tier 2 APS category.

The simulation method suffers from only one uncontrolled variable compared to the many uncontrolled variables when using the pre/post as discussed above. The Tricklestar argument to remove any data using the simulation method and only adopt pre/post data runs contrary to common sense, logic and prior discussions and agreements in the formulation of this Tier 2 APS measure.

The singular low performance level being requested by Tricklestar undermines the integrity of the category and fails to recognise products which deliver energy saving performance above that which was attained by Tricklestar in their field trial. This ERRATA request removes the focus of product cost effectiveness, which currently exists and is a core tenet of all energy efficiency programs for the benefit of all ratepayers.

**Quote 5: “*The California Public Utility Commission recently provided guidance to Pacific Gas & Electric and San Diego Gas & Electric where they rejected energy savings data derived from the simulated testing method.”***

This statement is again incorrect, simulation data has not been rejected by the California Public Utility Commission (CPUC) and this data continues to be a core foundation in the evaluation of products within this activity. In addition this same simulation data was and is currently approved by the CPUC in the current and only work paper approved by the CPUC for Tier 2 APS devices.

The CPUC has requested for ongoing data collection for products within this category to ensure energy saving levels can be assessed over time and increase the data set available for future evaluation. This is consistent with their approach for many other categories.

Embertec has supported this request through the development of auditable data logging capabilities within our own Tier 2 APS devices, which we have made available to all utility programs.

**Quote 6: “*We expect San Diego Gas & Electric to issue a new work paper shortly, in which a lower, more conservative, and more relaible savings value is presented for Tier 2 Advacned Power Strips.”***

Tricklestar is requesting Illinois take direction from other States and change the structure of the evaluation process in Illinois and lower the performance threshold to a level which devalues the performance of others based on a document they “expect”.

Data collection for the phase 2 field trial under which both Embertec and Tricklestar were evaluated completed in November of 2015. Since then an ETCC report has been published on the findings and did not recommend a single value across two different products. The ETCC report also highlighted large differences in energy saving performance and next to no difference in retention rates between the products.

There does not even exist a draft work paper update in California, and given the speed at which these processes typically run, even if a work paper update were to occur, it is confusing to Embertec how it can be claimed to take place “shortly” or given the data collected, how Tricklestar can assert with confidence that a “lower, more conservative” savings value would be adopted.

We understand that Tricklestar has been lobbying heavily for the adoption of one value for all Tier 2 APS devices and that this lobbying only commenced post their field trial data being made available to them.

We fail to understand how punishing other vendors for their tried, tested and proven designs is beneficial to the industry; although we do understand how it is beneficial to lower performing technologies. Such an approach is selfish, stifles innovation and supresses market investment to deliver more cost effective solutions within the category which is surely preferable to all market participants in the immediate and long term.

A measure which reduces all participants to the “lowest common denominator” places an entire focus on lowering product cost when all are tied to some artificial performance value. A category where energy savings are deemed identical, irrespective of their actual performance is dangerous as it leads to vendors focussing purely on lowering product cost.

Lowering the product cost leads to sacrifices in product quality. This in turn will lead to product failures that places customer safety at risk, as was the case recently in the [Sacramento Municipal Utility District](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjCi46S7NrOAhUK2WMKHQM6AZEQFggcMAA&url=https%3A%2F%2Fwww.smud.org%2F&usg=AFQjCNGqdARcLs4lU2gdrFRQiWbg2j3pFQ&sig2=ILBc2f39ZOlsWuFLcCYTKg&bvm=bv.129759880,d.cGc) (SMUD) territory.

In this instance a Tier 2 APS device overheated to the point of severely melting the plastic casing of the Tier 2 APS and damaging the surrounding area where the Tier 2 APS was installed in the home, before it was unplugged and avoided any further fire risk.

For complete transparency, in Embertec’s 12 year history and after deploying millions of Tier 2 APS devices worldwide, we have not had one single product failure incident resulting in a risk to customer safety. Furthermore it was **not** an Embertec product which suffered this catastrophic failure in a customer’s home.

When products are evaluated on their overall cost effectiveness (including their own energy savings) it allows a greater focus and investment in product design and quality control procedures to ensure there are no risks to householders and offices alike.

We now understand this 100% safety record within the Tier 2 APS category is unique to Embertec and we would welcome all market participants to place the same emphasis on robust product designs focussed on safety and advancing energy savings. Vendors who focus on lowering performance benchmarks and focussing on delivering the lowest cost product typically put safety and quality second, putting at risk the customer, the utility and the entire product category.

**Quote 7: *“Utility-sponsored work papers in California are not peer reviewed.  Likewise, there is no public comment option for California utility work papers.  As such, it is not hard to imagine that a mistake was made in the California work paper by San Diego Gas & Electric contractors”***

This statement is completely and knowingly incorrect. First it should be noted that Tricklestar provided extensive comments to the CalTF on the workpaper development making many unfounded inferences which were later disproved through the public comment and submission process facilitated by the CalTF and their representatives. To validate this point, these documents are available on the CalTF website.

During this submission process arguments presented by Tricklestar were reviewed by CalTF members and counter arguments presented by Embertec using all the data available demonstrated that the objections of Tricklestar were completely unfounded and unsupported by the data itself.

Furthermore and most importantly, the current approved work paper in California for Tier 2 APS **was** peer reviewed by the CalTF members and the CPUC in addition to the Californian IOU representatives who are also members of the CalTF. The CalTF reviewed the data from the phase 2 trial also and concluded that the two products demonstrated different levels of performance and that the gulf between the two in performance was so great that it would require two separate measures. This was stated at the CalTF in January and February of 2016 and referenced in the meeting notes available on the CalTF website.

Shortly after the January CalTF meeting, Tricklestar lobbied PG&E to have the CalTF removed from the peer review process for fear of a two measure approach to the category. This removal of the CalTF members to complete their evaluation (or peer review) work, as was the process followed for the phase 1 field trial and led to a CPUC approved work paper, has raised considerable questions as to independence in this phase 2 evaluation.

We find it interesting (but not surprising) that Tricklestar has neglected to provide Illinois TAC members with the most recent discussion points at the CalTF regarding the data on Tricklestar and Embertec product attained during the phase 2 field trial effort. This occurred during the February 2016 CalTF meeting.

Meeting notes from this February 2016 CalTF meeting provides a clear indication that the CalTF was in favour of 2 separate measures, a position supported by the data. They were also concerned that one energy saving value would stifle innovation. These were the very same foundational elements which led to the existing Illinois TRM approach for the inclusion of Tier 2 APS.

As per the February 2016 CalTF meeting notes, Mark Hardwick of Tricklestar was present for this meeting and listed as an attendee in the meeting notes and was aware of these discussions. Again it would have been preferable had the ERRATA request quoted all relevant and most importantly the most recent comments on the Tier 2 APS activity within California for complete transparency, as opposed to “cherry picking” statements to further a flawed narrative, which we can only assume was designed to mislead the Illinois TAC members.

A full excerpt from the February 2015 CalTF meeting notes on Tier 2 APS is provided below for absolute transparency on the position of the CalTF. It is clear given their comments that the CalTF would likely support the existing Illinois TRM approach to including and evaluating Tier 2 APS devices given their comments and concerns.

***VII. Update on Advanced Power Strips Workpaper Martin Vu, RMS Energy Consulting***

*John Proctor—First, I’m not convinced that the difference in savings between the two products is not significant. Second, I don’t understand what cost considerations are preventing the utilities from pursuing two different values.*

*Martin Vu — The costs considerations are administrative and program management-related.*

*John Proctor — I don’t support the idea of sacrificing/averaging the savings value for administrative expedience. Why would we not strive to incent the products that maximize savings?*

*Gary Fernstrom— If you do plan on going with a single value, I would urge you to use weighted averages based on market shares.*

*Spencer Lipp — I think it is completely the utility’s prerogative to choose to continue with or without the Cal TF process. Maybe we need some more information on the administrative costs as well, so we can more effectively judge if one measure is one or two. Because it did look like two measures to us, but clearly we didn’t have all the information.*

*Annette Beitel —The problem with that is that we’ve already received reminders from the PAC that technical rigor, no administrative expediency, should be our guiding goal.*

*Spencer Lipp — But isn’t that also the best technical answer that’s cost effective? Because we do not recommend extreme precision on other measures when the cost of that extra complexity outweighs the value.*

*Owen Howlett — I’m concerned that averaging the savings estimates creates a disincentive to invest in increasing the efficiency of existing products. Why would a company make that investment when they won’t be compensated for yielding higher savings?*

**Quote 8: “*We request that Illinois adopt one savigns value to represent the category of Tier 2 Advanced Power Strips.  This is the approach taken by WA, OR, ID, MT, UT, MN, PA, MI, MA, and soon to be CA.  No other jurisdiction in the country uses specfiic savings values for specific models of Tier 2 Advanced Power Strip.”***

This request runs contrary to the development of the work paper approach supported by Tricklestar prior to Tricklestar attaining their field trial data from California.

Most importantly however, Embertec finds this quoted statement grossly misleading at best. One savings value is not the approach taken by other jurisdictions but rather in each of the jurisdictions highlighted by Tricklestar only one vendor (Embertec) has provided field trial data on the numerous independent field trials conducted on our product. It would be unusual for there to be two savings values for the only vendor who has been forthcoming with data.

Given these jurisdictions have only received data from one vendor, they are only able to provide one energy saving value. Had other vendors been transparent in presenting their data to these regions, the significant gulf in energy savings between the vendor products would likely have resulted in positions similar to that of Illinois and the CalTF.

Each of the states mentioned in the quote above (except for California) are not aware that additional data on the Tricklestar Tier 2 APS device is available. Tricklestar has not submitted their sole field trial study to these other jurisdictions and it is not Embertec’s position to report on the performance of others. Tricklestar have instead attempted to convince these regulators that their product performs in an identical way to Embertec’s in order to claim the energy savings from the tested Embertec device. This conduct is questionable and or deceptive at best, especially in light of the performance data available for both technologies.

In addition, it is incorrect for Tricklestar to infer that the Illinois TRM supports *“specific savings values for specific models of Tier 2 Advanced Power Strips.”* This matter was discussed at the Illinois TAC meeting as a concern and hence the performance bands were recommended to avoid specific values on a product by product basis.

Illinois does not adopt a specific savings value on a product by product basis, but rather and as agreed by all vendors and the ILL TAC, performance bands were adopted as the best method to quantify performance categories within 5% ERP increments. Products which demonstrate performance within a suitable margin of error of one another will, under the existing measure description, attain an identical performance value. This approach supports innovation and avoids the ability for one vendor to claim the performance of another, as is currently being attempted in many other jurisdictions across the country by Tricklestar.

In those regions where Tricklestar has been unable to “ride on the performance coat tails” of their competitor, they have instead focussed their efforts on reducing the overall performance of the category to the level of savings they demonstrated in their own field trial. At present, no regulatory authority has supported this view.

We again contend that vendors should focus their efforts on improving their products performance. This would be beneficial to both the vendor and the category as a whole, should the engineering capacity exist within the vendor’s organisation to achieve such an outcome.

**Quote 9:** ***“With the dissasebly of the class system currently in Version 5, we propose that IL move to a system similar to what is in place with the Pacific Northwest and the Northwest Regional Technical Forum. Specifically, manufactuers self-declare their product's compliance to published TRM criteria.  They then report their qualifying models to an administrator (VEIC), and the administrator (VEIC) keeps a list of qalifying products.  The administrator investigates compliance matters on thier own prerogative, and the administrator publishes the list of qualifying products.”***

The Pacific-Northwest is currently using data from one Tier 2 APS vendor only (Embertec) as the other vendor has not circulated their field trial results from California to the Northwest RTF, as is the case with most other regions. Again we are concerned that the above quoted representation of “the facts” could be designed to misinform the Illinois TAC.

What is being requested by Tricklestar is an approach which punishes one vendors validated design and energy saving performance due to the performance of another vendors device. This runs contrary to the promotion of advancing cost effectiveness through ongoing technology innovation driving energy savings.

In addition, the process recommended by Tricklestar places the responsibility of ensuring energy saving levels for Tier 2 APS vendors who “self-declare” entirely on VEIC. In other words any vendor can state that they meet the published TRM criteria for Tier 2 APS without any validation of this compliance or any data to support their energy saving claims. Again, this runs contrary to Tricklestars original position in August of 2015.

As mentioned earlier, such an outcome will lead to vendors simply trying to meet the stated TRM criteria as cheaply as possible with no regard for actual energy savings and likely sacrificing product safety and functionality.

It should be noted that Tier 1 APS in California originally took a similar “self-declaration” approach. This resulted in a raft of untested and unproven Tier 1 APS devices being deployed within utility programs. Upon an independent evaluation in California, it was determined that energy saving values were not as previously claimed (~100kWh per annum) but much lower. In California the energy saving levels for Tier 1 APS were thus determined to be 25 kWh per year.

It is perhaps of little surprise that the CalTF has undertaken a robust assessment of vendor products which has resulted in an approved CPUC workpaper detailing an ERP of 50% for the Infra-red, True RMS power sensing and masterless control Tier 2 APS device.

At present we have seen that an IR sensing, masterless control AV APS delivers an ERP of 50%, whereas in the same identical field trial environment, time frame, and usage levels, an IR + motion sensing, master/slave APS, with lower firmware capacity delivers an ERP of 27%.

These two data points will assist market participants in narrowing down the feature sets that will drive energy savings once more data from additional products can be collected and presented to the ILL TAC.

1. **Comments in response to Tricklestars proposed changes to existing measures**

Below is an embedded file comprising of the original ERRATA request from Tricklestar with included comments from Embertec. The comments from Embertec are focussed on their proposed amendments to the existing Tier 2 APS measure documentation. Comments in response to their overview section have been provided in section 3 of this document.

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1. **Potential updates to the existing Tier 2 APS measure**

**Potential for ISR Adjustment:**

Data from the February ETCC report on Tier 2 APS devices found an 84% persistence rate across both products. (Page 47 of the February 2016 ETCC Tier 2 APS final report)

This data is a better representation of the products that are likely to be used in Illinois than the 70% retention rate data from Australia which was based on both Tier 1 and Tier 2 APS devices.

Embertec requests that the Illinois TAC consider the ISR to be amended from 70% to 84% with this latest information which only became available after Version 5 of the TRM was finalized.

**Requirement for vendors to provide product safety and quality control information:**

In light of recent events in California where the failure of a Tier 2 APS device compromised customer safety, it would be advisable for Tier 2 APS vendors to provide information on their quality control measures and inform the Illinois TAC of any product failures resulting in risk to customer safety. Risk to customer safety should be characterized as any product failure event where the Tier 2 APS device fails to the point of physical damage to the Tier 2 APS device itself or its surrounding environment.

Records of Tier 2 APS product failures should be made public and available to the Illinois TAC in the interests of understanding any product failures to determine if proactive steps can be taken to provide additional testing or vendor product specification requirements to ensure future customer safety risks do not occur.

Both Embertec and Tricklestar have already been requested by SMUD to compile safety records and details on QC procedures in July/August of this year. This information has been provided to SMUD by both vendors and is ready for circulation to the Illinois TAC should it be requested.

Embertec supports any steps which will mitigate risk to customer safety and ensures the integrity of this newly approved product category. Detailed knowledge of product failures, their cause and effect will assist in informing vendors of additional safety measures that should be implemented in addition to providing a basis for future product specification updates within the Illinois TRM, in the interests of full disclosure and product safety.

1. **References**

* **CalTF February 2016 Meetings Notes**

<http://static1.squarespace.com/static/53c96e16e4b003bdba4f4fee/t/56d0ee5b2b8dde6611c2f18e/1456533085494/February+Notes_Final.pdf>

* **Embertec, Tricklestar and Annette Beitel Discussion Notes on Tier 2 APS inclusion within the Illinois TRM**

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* **ETCC report**

<http://www.etcc-ca.com/reports/energy-savings-tier-2-advanced-power-strips-residential-av-systems>

## TrickleStar submitted comments on v6 proposed changes

Tier 2 Advanced Power Strips (APS) – Residential Audio Visual

**On Methodology**

This edit to the draft proposed work paper for Tier 2 Advanced Power Strips proposes a change from a complex system of tired savings based on brand to a simplified system that offers a single savings of 212 kWh with the kW savings adjusted for the Illinois coincidence factor of .8 or .019kW for all devices that meet the minimum criteria laid out the in the Illinois Technical Reference Manual. The reasons for proposing this change are summarized in the points below and described in more detail in this section. These are:

1. The approach currently proposed uses non comparable results to compare savings for different devices
2. The current proposal relies in part on a propriety simulation methodology that is counter to best practices in third party evaluation which would be run as a true pre/post test with adequate sample sizes and rigor. In addition the simulation is problematic because:
   1. It was developed by the manufacturer whose products was being tested
   2. The data that was used to feed the simulation model was uploaded directly to that manufacturers server before it was provided to the research contractor to do the analysis
   3. The sample size for the simulation was not sizable enough to meet standard evaluation rigor and included a sample of participants that was not randomized and instead included sponsoring utility employees
3. The approach currently proposed is overly complex and burdensome given how simple any programs with Tier 2 APSs will be, especially in early years and in advance of any third party evaluations efforts.

Tier 2 advanced power strips are in a rapid stage of research. Studies within the utility and energy efficiency industry continue to be explored with a primary goal of determining the savings for these devices. At present, there are at least five manufacturers of advanced power strips, although only two currently offer Tier 2 options. With the increasing adoption of the technology this can be expected to increase. Savings studies to date have focused primarily on two makes/models of advanced power strips and have sought to understand consumer use patterns, and controlled versus active viewing time both in controlled (the device tracks when it would have shut the system down but does not) and active (the device is allowed to shut the system down) configurations.

Currently there is only one work paper on saving for Tier 2 advanced power strips (APS) that has been accepted at a statewide level and this is the San Diego Gas and Electric (SDG&E) work paper WPSDGEREHE0004 revision .3. This paper, vetted by the California Technical Forum (CAL TF) (<http://www.caltf.org/>) and submitted to the California Public Utility Commission (CPUC) was informed by resreach efforts conducted by AESC[[3]](#footnote-3)published in a paper entitled “Tier 2 Advanced Power Strips in Residential and Commercial Applications”. It is this research and subsequent SDG&E work paper that served as a reference for both WPSDGEREHE0004 revision .3 and the recent Tier 2 APS Illinois TRM draft work paper. This paper which was approved In August 2015 by the California Public Utilities Commission (CPUC) provides a deemed savings of 212 kWh and .019 kW per device. It is important to note that papers is being revised by SDG&E to reflect additional testing and field data. The CPUC has advised SDG&E that the final savings number should be based only on the results of pre/post data testing.

The SDG&E work paper brings in two very different study approaches each focusing on distinct models of Tier 2 APSs to develop an average savings for any Tier 2 APS (versus the more complex tired approach being proposed in IL) that meet a minimum criteria which is outlined in the white paper. While neither of the studies referenced in the SDG&E work paper provide rigor that would be deemed appropriate for evaluation, developing a blended savings estimate based on the two studies provides a reasonable options absent properly designed and rigors evaluation. The method offers utilities a simple approach to estimate savings absent full third party EM&V while at the same time limiting savings, impact and persistence risk, in either direction (too high or too low), for Tier 2 APS devices that might be included in California programs.

The approach currently proposed in Illinois is in direct contrast to this. Instead of recognizing that the savings impact from any Tier 2 APS program in the early years is likely to be small and therefor any deemed savings approach should be kept as straight forward as possible, the current proposal offers 8 tiers of savings levels a Tier 2 APS might fall into, despite there being only two viable models in the market today and an as limited number of third party studies on savings for Tier 2 APSs, that in some cases relying on significantly different study approaches to establish those savings levels or tiers. These are described in greater detail below. Approach One provided customers with a modified power strip that was installed such that it did not turn off any devices when its control condition was met (when it believed the system is not in use), but instead indicates to the user its intention to go into shut down mode by flashing a “conspicuous” LED. If the user wished to stop the LED, they did so by engaging their remote control. If the user did not indicate via usage of the remote control that they intended to continue to engage with their TV, the system went into savings logging mode, and logged the continuing power draw data (while continuing to flash the LED indefinitely). Essentially, the study design asked the participant to react to the LED as if it was controlling their system, but to continue operating their system as normal (e.g. keep it on if they would not have turned it off prior to or at the moment of the LED signal). The participant is in essence asked to simulate their expected behavior (keeping the TV on despite no engagement) so that the system can log potential savings.

There are a number of problems with the simulation-based methodology, but the largest one relates to user behavior. Given that this type of test utilizes no pre-period data, it fails to adjust for the difference in user behaviors between a standard or no power strip situation and an advanced power strip, this could be further exacerbated by instructions that came along with the installation of the logging device and assumptions that people would either a) ignore a flashing LED, b) not modify behavior based on instructions that appeared to ask them to leave the system on when the flashing began and c) that the logger itself wouldn’t modify behavior that was not compared to a pre-installation baseline.

The second study approach used a pre-post analysis which looked at usage patterns before and after installation of a Tier 2 APS and which accounted for any modifications in behavior that occur with a Tier 2 APS is installed in a home. While the study referenced in WPSDGEREHE0004 revision .3 did not include a randomized control group which would be optimal it did monitor consumption pre installation of the Tier 2 APSs and post installation of Tier 2 APSs. In this case the daily usage was compared for a pre-installation period to usage in a post-installation period, and the difference is assumed to be the real energy savings. It should be noted in this case the sample was relatively small and would not meet the rigor expected in third party evaluations.

Given two very different approaches were used it is not at all surprising that significant discrepancies were seen in savings between the pre-post and the simulated method 134 kWh and 234 kWh (with non-overlapping confidence intervals) respectively.

While the simulated method could be duplicated for other brands or technologies the testing machine was developed by and proprietary to one manufacturer and was set up such that the data gathered from those devices was uploaded to the manufacturer servers before being handed over to a third party research firm to conduct the analysis. A pre-post methodology would be preferred in any third party evaluation approach for this technology[[4]](#footnote-4). Additionally any third party evaluation would never be established such that the manufacturer, whose product is being tested, had ownership of the data before it went to the third party research firm for analysis. This is a questionable chain-of –custody at best.

While there were significant short comings in the studies that informed the savings in the SDG&E paper, the decision to recommend a sub-tiered savings scheme within the current version of the IL TRM draft for Tier 2 Advanced Power Strip seems to have been done with the intent of acknowledging the different savings levels seen in the two methodologies but in absence of a stringent look at how varied the testing methodologies were. In essence it is comparing them as though they were apples to apples when in fact they are apples to oranges. In short the proposed approach relies on the foundational assumption that the field testing methodologies and resulting data are comparable.  It is important to note here that not only are the study methodologies vastly different, so are other key elements of the studies as outlined on table 1 below:

**Table 1: Summary of Differences in Study Methodologies**

| **Issue** | **Phase 1 - Embertec** | **Phase 2 - TrickleStar** |
| --- | --- | --- |
| Sample | Friends & family of utility company | General population from three utility service area zip codes |
| Testing Hardware | Proprietary device designed and manufactured by the vendor whose product was tested, the “SVS unit” | 3rd party measurement device – Hobo data logger by Onset UX120-018 |
| Testing Methodology | Log Mode Evaluation (42 samples) & Pre/post metered (9 samples) | Pre/post metered (56 samples) & Log Mode Evaluation (52 samples) |
| Average number of controlled AV devices | 3.6 (average of all sites), 3.8 (pre-post sites only) | 3.4 (average of all sites) |
| Installation of tested devices | Contractor assisted by vendor | No involvement by vendor |
| Data retrieval | Transmitted to vendor servers | No involvement by vendor |
| Monitoring period | Average of 16 days | 14 to 28 days |
| Results agreement between testing methodologies | No | Yes |

Moreover, the current tired approach which estimates savings as high as 50% for Product Class A seem to fail the reasonability test.  This level of savings would assume that half the time a television is on it is unengaged or non-active time or put another way that the Tier 2 APS unit consistently cuts the average time a TV is on in all homes in half from an average of 5.3 hours per day to 2.515 hours per day. This level of savings which is estimated from the simulated testing would be significant and exciting were it not so dramatically different from the pre/post studies which stand as industry best practices for a reason as they are the best most rigorous analysis Approach available for behavior enabled technologies.

Given the lack of individual rigor in either study approach and all the uncertainty around what the real savings will be for Tier 2 advanced power strips we recommend that rather than implementing a complex scheme that requires devices be managed at 8 different levels that until such time as there is a true third party evaluation using pre/post methodologies that Illinois implement the CA approach. The use of a single blended deemed savings approach which while conservative limits risk of over or understating key variables like savings and persistence. It also simplifies the management by making it possible for utilities to pilot programs without having to rely on a third party to determine which tier a product falls into.

Additionally, the amount of time spent managing this approach, debating these savings and

There are a few other points worth considering in this debate:

* At present any program run in Illinois with tier 2 advanced power strips is likely to be in the form of a pilot or small in scale, the complexity of the saving approach should not outpace the simplicity or proportion to overall savings the tier 2 devise will represent in the state.
* Manufacturer-specific savings submissions are risky as they may limit the market, and while not a significant issue now, will create unneeded program complexity in the future. There is, in fact, no precedent for brand specific TRM specifications in other technologies. Finally a brand-specific approach presents the potential to limit the adoption of new and possibly better or less expensive brands into the utility program portfolio and potentially opens the door for the IL-SAG to have to approve savings at a brand-by-brand level for any number of products, an approach that would be inefficient at best.

In light of this we propose the following edits to the technical sections of the TRM to reflect a single deemed savings for Tier 2 APS in line with the approach proposed by SDG&E and approved by the CAL TF as outlined below.

## Embertec submitted comments on v6 proposed changes

Embertec Submission

Illinois Statewide   
Technical Reference Manual  
5.2.2 Tier 2 Advanced Power Strips (APS)

Residential Audio Visual

Proposed   
Technical Reference Manual   
Updates

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8. **Overview of Embertec’s position on VEIC’s proposed TRM update for section 5.2.2 Tier 2 Advanced Power Strips (APS) – Residential Audio Visual**

Overall, Embertec would like to thank the Vermont Energy Investment Corporation (VEIC) for their time and consideration in updating section 5.2.2 within the Illinois Technical Resource Manual (TRM). Embertec supports the direction VEIC has taken in this latest update to section 5.2.2.

Tier 2 Advanced Power Strips is a relatively new and evolving category with many variations in   
product design and performance. We commend VEIC in formulating and presenting and   
support the Technical Advisory Committee (TAC) for adopting an evaluation process that utilizes   
all available evaluation data and assesses vendor products based on actual metered performance.   
  
This approach incentivises industry innovation to deliver further advanced in energy efficiency within this technology category. Through incentivising innovation and improvements in energy efficiency performance, utility energy efficiency programs and ratepayers alike will be better served and better placed to meet increasing energy efficiency goals, especially in the area of addressing plug load.

Embertec has reviewed the proposed VEIC amendments and would like to outline areas within these amendments which would benefit from either additional detail around evaluation processes, and/or request slight amendments which are supported by a closer inspection of existing data/reports that have been submitted to VEIC and the TAC. The data and reports that will be referenced are currently referenced by VEIC in the current proposed update for section 5.2.2.

In addition to presenting this information to further support the steps taken by VEIC in this proposed amendment to section 5.2.2, we would also like to highlight the importance of evaluating both Tier 1 and Tier 2 APS technologies in a uniform way and the importance of this.

1. **Safety and Quality Control**

Embertec was recently informed of a product safety issue within the Tier 2 APS category which occurred in Sacramento earlier this year (2016). For clarity, this product failure which led to a significant householder fire risk was **not** related to an Embertec product. However the utility deploying these Tier 2 APS products requested that Embertec and the other Tier 2 APS vendor both submit detailed information on any product failures each company had with their products. This information was compiled by both vendors and provided to the utility.

To ensure utilities in Illinois are fully informed on product performance beyond energy saving levels alone, Embertec proposed that all Tier 2 APS vendors provide product safety and quality control information also. As this product safety and quality control documentation had already been compiled and provided by both vendors, and in the interest of total transparency; Embertec suggested that the TRM should also require this same information (to be detailed in the Safety and Longevity section) to be provided to utilities in Illinois. At the very least this information should be made available for inspection upon request from any Illinois utility.

VEIC stated that they ***“believe the current specifications written here are adequate and do not believe it necessary to provide any more requirements in the TRM. The programs themselves will need to ensure they are comfortable with any product installed.”[[5]](#footnote-5)***

Although Embertec would prefer a more thorough approach outlined within the TRM to ensure product safety, we accept the position of VEIC that utilities will request this information prior to program deployment. To support a potential utility request for this information, Embertec believes it would be valuable to include language within the TRM that places a requirement on Tier 2 APS vendors to provide product failure and quality control documentation to utilities upon request. This ensures Tier 2 APS vendors are well aware that this information could be requested of them within Illinois and assists utilities in ensuring this information is provided if requested.

Proposed Language under section “Safety & Longevity”: ***“Tier 2 APS vendors will compile and provide product failure records and quality control documentation upon request from Illinois utilities.”***

1. **Tier 2 APS Variability in Retention Performance**

Embertec supports the inclusion of product retention data as a performance metric for Tier 2 APS devices as outlined by VEIC. To ensure retention data in vendor products are reliable, a number of parameters should be clearly defined and agreed to ensure an appropriate “apples to apples” comparison of retention rates between vendor products.

Embertec recommends VEIC and the TAC include the following data requirements for retention data to be considered by the TAC:

* Minimum Sample Size (100)
  + A valid sample should be considered as one where the device has been deployed in a target environment for an agreed minimum time period, whereby the householder has confirmed either product retention or removal. Non-response to retention/removal information should not be considered as a retained or removed product and cannot constitute a user sample.
* Minimum Installation Duration (4 months)
  + The longer a Tier 2 APS device is installed the more user interaction is allowed to take place driving greater certainty around product retention.
  + All products should be assessed after a similar minimum installed duration to ensure no retention assessment bias between products.
  + The Emerging Technologies Co-Ordinating Council (ETCC) Tier 2 APS report highlighted that differences in product installation duration would drive retention rates of Tier 2 APS products.
* Agreed demographic breakdown within the retention sample set and normalisation of said sample
  + The ETCC Tier 2 APS report highlighted that different demographics had varying responses to and retention rates of Tier 2 APS devices.
  + Direction should be provided on the approximate percentage breakdown by householder demographic type for respondents to retention assessment evaluation to ensure removal of any sample bias.
  + Slight variations in demographic sample bias against targeted breakdowns can then easily be normalised to ensure sample bias is removed.

The ETCC report can provide some guidance as to the manner in which “demographics groups” should be characterised to capture variability in user acceptance of Tier 2 APS technologies.

1. **Proposed Change to Baseline Energy Value**

Embertec supports the use of best available and robust data in all evaluations on Tier 2 APS and the target regions they are deployed in. At present the best available data is sourced from California and in the absence of baseline energy usage data from Illinois, Embertec agrees that the data within the ETCC report is the best source of baseline energy usage for Illinois at this time.

As previously presented by both Tier 2 APS vendors to the TAC in August of 2016, the ability to collect baseline energy usage information via the Tier 2 APS device is either available today (as is the case with Embertec) or claimed to be available before the end of 2016 by the other vendor.

As it is no doubt preferable to utilize Illinois data wherever possible, Embertec proposes that VEIC and the TAC consider updating the energy usage baseline as soon as data on baseline energy usage has been attained within Illinois. As Illinois weather in comparison to San Diego is significantly colder, (especially during the winter months), it is expected that TV viewing and baseline energy usage will be higher than that of San Diego. Embertec requests that the TAC provide an undertaking to update baseline energy usage values as and when this data becomes available.

Energy usage baselines will continually fluctuate over time as new technologies and the number of devices in the home will also vary over time. Through the ongoing deployment of Tier 2 APS with metering capabilities, this baseline energy usage can easily and cheaply be monitored throughout energy efficiency program deployment of communication enabled Tier 2 APS products.

1. **Proposed In Service Rate Calculations as a Product Specific Function (version 6.0)**

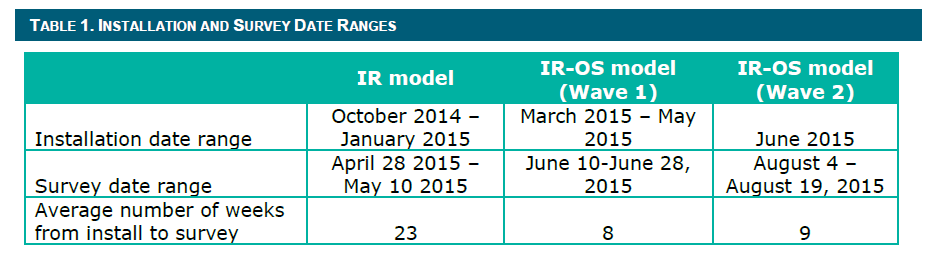
Embertec supports the inclusion of product specific In Service Rate (ISR) values as detailed within the proposed updated ***“Classification of Tier 2 Advanced Power Strip Products in to Performance Bands for use with v6.0 of Illinois TRM”[[6]](#footnote-6)****.* However for the purpose of removing sample bias in the values which have been proposed, we would like to highlight the following information contained within the ETCC report (AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems).

As discussed earlier in this document, variations in household demographics and time between installation and survey will create sample bias in retention assessment outcomes. ***“Other drivers that appear to affect persistence include: age or retiree status of respondent (fewer retired respondents still had the Tier 2 APS installed at the time of the survey) and time between installation and survey (persistence decreased as the length of time between installation and survey increased).”[[7]](#footnote-7)***

Furthermore ETCC states that ***“These surveys were completed approximately 14 to 29 weeks after the IR model power strip was installed and 3 to 13 weeks after the IR-OS model power strip was installed.”[[8]](#footnote-8)***

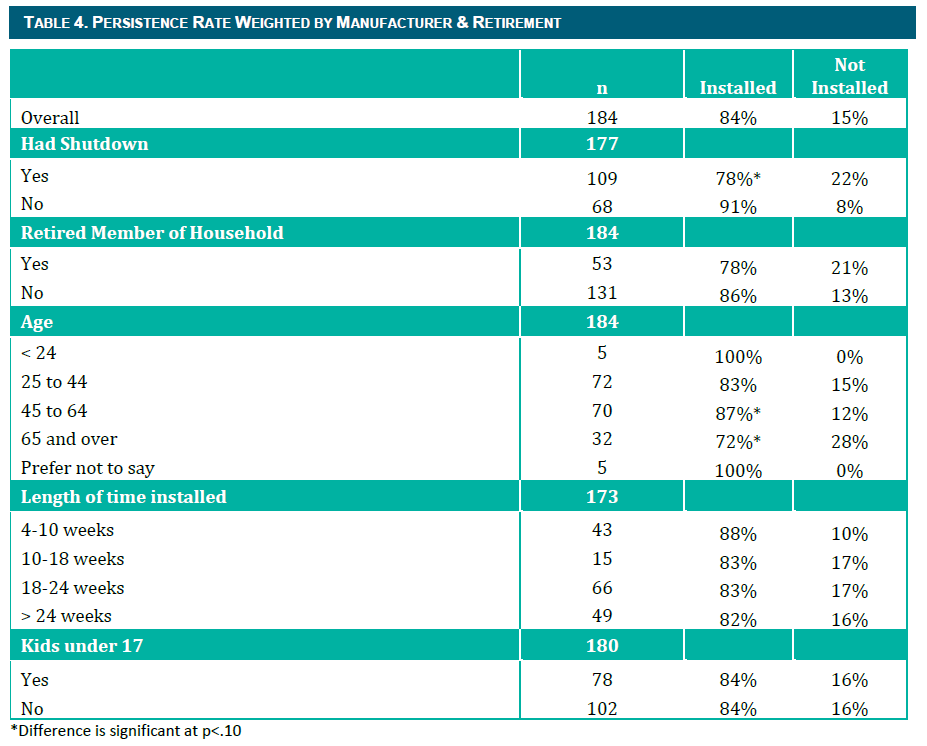
The ETCC report then goes on to state that, ***“Other drivers that that appear to affect persistence include: age or retiree status of respondent (fewer retired respondents still had the Tier 2 APS installed at the time of the survey) and time between installation and survey (persistence decreased as the length of time between installation and survey increased)”.[[9]](#footnote-9)***

Table 1 of the ETCC report highlighted the variation in the average number of weeks from install to survey between the two technology types. This is shown below.

[[10]](#footnote-10)

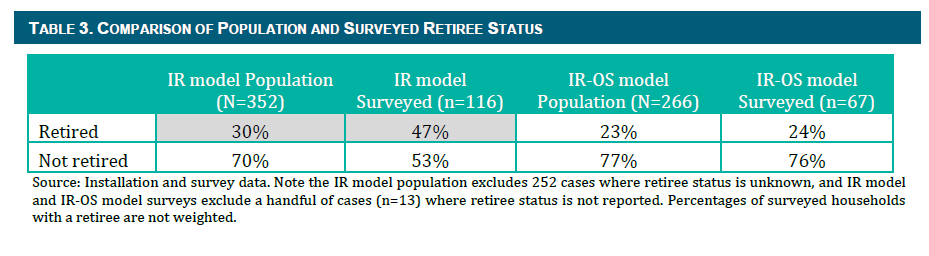
It should be noted that the “IR model” refers to the Embertec device and the IR-OS model refers to the Tricklestar device. The Embertec (IR model) device was installed for nearly 3 times the duration (23 weeks compared to 8-9 weeks) before the survey took place when compared to the Tricklestar (IR-OS model) device.

Fortunately the ETCC report also assessed how variation in install time before a survey affected the retention rate as depicted on page 7.

[[11]](#footnote-11)

What is important to note in Table 4 from the ETCC report is the drop off in retention between 10 weeks and 18 weeks (5%) and then the stabilisation in retention after the 18 week period. This supports the requirement to look at retention rates after a minimum of 4 month for Tier 2 APS devices. It also highlights that adopting retention rate figures after only 8-9 weeks is premature and introduces retention evaluation bias when assessing another Tier 2 APS device after 23 weeks.

Furthermore it should be noted that this data table highlights the significant reduction in retention for the 65 and over demographic when compared to all other demographics. It is this 65 and over demographic which was over represented in the IR device retention assessment.

[[12]](#footnote-12)

AESC clearly outlines that retiree’s had a much lower retention rate and retirees were over represented in terms of the retention survey conducted on both products by almost 2 times; “*Households with retired members tend to have a lower persistence rate as do households that have had the Tier 2 APS installed for longer periods of time.”[[13]](#footnote-13)* In addition the report states that “Percentages of surveyed households with a retiree are not weighted”.[[14]](#footnote-14)

Given this information and in an effort to ensure the majority of sample set bias can be removed when assessing vendor ISR rates, Embertec recommends one of the following outcomes being adopted:

* 1. Apply a 5% reduction in retention rate for the IR-OS device (to 82%) to account for its limited installation period of 8-9 weeks and consider a further retention value reduction to account for under representation of retirees when compared to the IR device, or;
  2. Increase the retention rate by 3% for the IR device (86%) to account for over representation of retirees in the retention sample, as retirees are recognised to reduce retention and the IR device had almost double the number of retirees in its sample. In addition consideration to reduce the retention rate for the IR-OS device should also be done to account for the short installation period of 8-9 weeks and ensure sample set bias removal.[[15]](#footnote-15)

1. **Consistency in Plug-load Management Device Assessment (Tier 1 & Tier 2 APS)**

The Tier 2 APS category has undergone rigorous field trial and data assessment which Embertec fully supports. However as one technology category (Tier 2 APS) is and has undergone significant field trial evaluation and data assessment, the same should be done for the Tier 1 APS category.

The energy saving performance of Tier 1 APS are influenced by the same changes in baseline energy usage values in the Audio Visual (AV) environment. Given the performance differences of the two technology types and the evolution of the energy usage of AV equipment over time, it would be reasonable to surmise that Tier 1 APS energy savings have been more affected by energy usage changes in the AV device sector than Tier 2 APS.

Tier 1 APS predominantly address passive standby energy wastage and do not address the energy used by the “master device”, typically the television. There has been significant advancement and reduction in passive energy usage of AV equipment over the years, however a steady increase in TV screen sizes and newer high definition televisions (4k TV’s) have increased the wasteful energy consumption of televisions that Tier 2 APS devices alone target.

To date Tier 1 APS have largely only undergone desktop research/calculations on energy savings with little in field data to support the energy saving values claimed today.

The best available data that VEIC has proposed to adopt in terms of Tier 2 APS energy savings has been sourced from California. It should be noted that Tier 1 APS in California are deemed to deliver annual energy savings of 25 kWh, which is less than a quarter of what is currently being claimed for Tier 1 APS in Illinois.

Embertec contends that technologies addressing plug load (in this instance Tier 1 and Tier 2 APS) should undergo the same level of evaluation and proof of energy savings as one another. Requiring one technology category only to assess its energy savings, unfairly punishes innovation and incentivises the market to deploy less cost effective solutions (Tier 1 APS) in real terms simply because the barrier for energy saving validation is considerably lower with a strong likelihood that it is overstated.

In the first instance Embertec proposes that the energy savings for Tier 1 APS products should be de-rated based on the same approach that has currently been proposed for Tier 2 APS. This being through the reduction of baseline energy usage from 600 kWh to 432 kWh. This would necessitate a 28% reduction in Tier 1 APS deemed savings in Illinois from current values as a first step. Beyond this, and given the existing Tier 1 APS data being used in the Illinois TRM is quite outdated, Tier 1 APS should be required to undergo actual field metering in line with that which Tier 2 APS technologies undergo to ensure energy savings are not being over claimed within utility programs.

1. **References**

**** ** **

## Additional example of manufacturer opposing contentions (from v5.0 discussions)

**MEMO**

**Date:** October 9, 2015

**Submitted by:** Thad Carlson, Director, Market Development, TrickleStar

**Subject:** Comments on the Tier 2 Audio Visual (AV) & Information Technology (IT) Advanced Power Strips (APS) For Residential (AV Tier 2 APS) & Commercial/Industrial (IT Tier 2 APS) Applications

This memo is submitted in response to the *Tier 2 Audio Visual (AV) & Information Technology (IT) Advanced Power Strips (APS) For Residential (AV Tier 2 APS) & Commercial/Industrial (IT Tier 2 APS) Applications* work paper submitted to the Illinois SAG on October 1, 2015. Based on review of the work paper, we have provided comments in six discussion categories each of which are outlined below using a comment, discussion and recommendation approach. While we fully support the inclusion of the Tier 2 Advanced Power Strip into the IL-TRM, we believe the paper that is the subject of this memo is overreaching and includes specifications and recommendations that are frankly outside the purview of the TRM process.

**Comment 1:** The paper is overreaching with its suggestion that long-standing industry best practices in technology evaluation, measurement and verification (EM&V) are “chance, not science”.

**Discussion:** The energy efficiency industry has a long-standing history and has made deep investments in working collaboratively to identify and document best practices for EM&V. Best practices in EM&V are primarily outlined in two universally accepted sources, the International Performance, Measurement and Verification Protocols (IPMVP), which is commonly used as a guiding doctrine for determining appropriate approach used by the evaluators of many of the Illinois programs, and the Department of Energy (DOE) Uniform Methods Protocol (UMP), which provides specific guidance on evaluation approaches by program or measure type, and which is designed to ensure common measurement approach and best practices in energy efficiency program EM&V. Both sources, while without specific reference to APSs, indicate that pre/post methodologies are a preferred method for determining the energy savings for technologies within energy efficiency programs. Specifically both the IPMVP and the UMP provide examples for lighting controls (the device most like an APS included in the manuals) that specifically state the preference for pre/post metering protocols for determining measure level savings.

In addition to the guidelines outlined in the UMP and IPMVP, the Northwest Regional Technical Forum (RTF) has recently established an aligning decision describing the appropriate rigor for Tier 2 devices via a unanimous approval (19 for, 1 abstained vote) in their document entitled “Proposed RTF Research Plan: Residential Advanced Power Strips, IR Sensing Units for Home Applications”. In this, they clearly sate that “research is needed because the RTF is not aware of any existing studies that provide sufficient rigor for proven UES values for this measure. Most currently-published savings figures are based on assumptions about APS-induced changes in appliance run-times unobserved. The RTF’s judgment is that these assumptions have not been adequately tested with empirical data.”

Unobserved/simulation based studies are a valid research approach and can be part of a well-planned research strategy. That noted the submitted paper counters decades of vetted thought in the industry by suggesting pre/post metering is “chance, not science”. Certainly if a study is poorly designed (poor sampling, too short a testing period, etc.) the results of a pre/post metering study can lack the rigor needed to place confidence in the results, but it is cavalier to suggest that one poorly designed study warrants throwing out an entire approach. It is also ill-informed to suggest that “log mode only” studies, that do not measure the impact of human interaction with the technology in its native state, can accurately replicate the savings that will be achieved by a device whose savings is inextricably intertwined with the behavior of the user in response to the controlling event (e.g. when the system is shut down, does it get turned back on? Do users change the controlled time from 60 minutes to 90 or 120 min.?).

In short, “log mode only” studies, the kind being positioned by Embertec in the October 1st paper as the only appropriate methodology for assessing savings in behavior enabled devices like the APS, do not meet the industry standard for expected level of rigor in measurement and verification. In fact, only a pre/post study would provide the rigor needed to, with any level of confidence, determine the energy savings achievable within the APS product category.

Further, while it certainly would be beneficial for product manufacturers to be able to set the protocol for how their technology is evaluated for energy savings, this clearly would not be in the best interest of publically funded programs. It is the role of the industry to coalesce around what approach will provide the needed rigor to justify program expenditures on technologies, not the product manufacturers themselves.

**Recommendation:** It is our view that the place for academic discussion around the appropriate measurement protocols for the industry in not in a TRM work paper, and that the discussion of the appropriateness of industry best practices in EM&V should be removed from the work paper for Tier 2 APSs. If a discussion around appropriate EM&V methodology is included, then a full dialog that references both the IPMVP and the UMP recommended approaches for controlling or behavior enabled devises should also be included. If the argument is that the IPMVP and UMP are not proving appropriate guidance and rigor for the technology, then significant evidence for supporting usurping these two industry standard manuals in favor of alternative approaches should be clearly laid out and the support documented.

**Comment 2:** There are numerous studies completed or underway that should be considered in determining savings for Tier 2 APS in Illinois.

**Discussion:** Tier 2 advanced power strips are in a rapid stage of research. Numerous studies within the utility and energy efficiency industry have recently been completed (several of which are referenced in the work paper) or are underway to determine the savings for these devices. Savings studies to date have focused primarily on two makes/models of advanced power strips and have sought to understand consumer use patterns, controlled versus active viewing time both in controlled (the device tracks when it would have shut the system down but does not) and active (the device is allowed to shut the system down) configurations. Studies vary in terms of the savings range for these devices, but the current white paper submitted by San Diego Gas & Electric (SDG&E) to the California Technical Forum and approved by the California Public Utilities Commission (CPUC) provides a deemed savings of 212 kWh and .0313 kW per device. This study was limited to 42 households and was conducted over a period of 15.83 days. SDG&E has indicated that there will be additional site results available in November, which may lead to an adjustment in this initial number. These savings are bolstered by a very small study completed by AESC, which included a small sample of 9 sites with actual pre-controlled and post-controlled metering (4 sites had controlled state simulation, meaning the device captured when equipment would have turned off but did not actually control the equipment meaning behavioral influence was not captured), and found 234 kWh per year. The SDG&E paper, communications on that paper provided by the CPUC, and the companion AESC paper have already been provided as attachments to the October 1, 2015 submittal by Embertec.

There are a number of other studies under way in the U.S. and a myriad of other discussions occurring in relation to the technology. As noted above, there is an active study currently being finalized by Sand Diego Gas and Electric (SDG&E) which will have findings available in November. The other two are in the planning process by Energy Trust of Oregon and are slated to be completed by the end of Q1 2016. It is critical to call out the importance of robust and true pre-post metering in accurately assessing the savings for APSs. While the AESC study referenced in the October 1 submittal to the IL-TRM did do pre-post metering, the sample was very small and should be taken in that context a point that was also made by the CPUC in their comments on this same SDG&E work paper.

**Recommendation:** The Il-SAG TRM working group should monitor the results of the pending SDG&E study results and ensure they update and/or level set any proposed savings against these findings. Expected in November, this should allow for ample time to consider these findings in the final Tier 2 APS specification for inclusions in the V5.0 IL TRM. Findings from the Energy Trust of Oregon study should also be monitored for consideration in future TRM updates.

**Comment 3:** On page seven of the submitted document, it is noted that the Tier 2 APS can address the water energy nexus.

**Discussion:** Tier 2 APS devices are not able to control water using technologies, as such they should not be noted as having an impact on the energy use associated with water heating, pumping or treatment.

**Recommendation:** Remove the reference to the water energy nexus.

**Comment 4:** Comfort features should not be part of products specification, and including those deviates from standard practice in developing product specifications in the in industry.

**Discussion:** The role of the TRM is not to serve as a gatekeeper for one brand, make or model but rather to determine the base expectations needed for a product to qualify under an energy efficiency program. Whether using ENERGY STAR® or other criteria, the focus is typically on energy savings, core performance expectations (life), and product quality (warranty, UL Certification, etc.). Features related to the personal preference of the potential end users such as color temperature in lighting, front vs. top loading in clothes washers, cycle end alarm signals in dishwashers, are typically not under the purview of the TRM and unnecessarily seem to limit the specification to an or a small handful of individual manufacturers for reasons unrelated to energy savings or product quality standards.

**Recommendation:** Remove any non-energy/non-warranty, comfort requirements from the specification.

**Comment 5:** Manufacturer-specific savings submissions limit the market, and while not a significant issue now, will create unneeded program complexity in the future.

**Discussion:** There are currently five manufacturers of Tier 2 APSs Bits Limited, Embertec, TrickleStar, Enmetric and CyberPower with more makes on the horizon. Establishing brand-specific savings risks creating complications for utilities who want to offer their ratepayers choices in their APS or who are looking for price competition for either their customers or in their procurement for programs like Direct Install that may include an APS. There appears be no precedent for brand specific TRM specifications, an approach if undertaken that could open the door for a myriad of product manufacturers to come forth and provide claim that specific feature of their brand warrants an alternative savings. This brand-specific approach presents the potential to limit the adoption of new and possibly better or less expensive brands into the utility program portfolio and potentially opens the door for the IL-SAG to have to approve savings at a brand-by-brand level for any number of products, an approach that would be inefficient at best.

**Recommendation:** Ensure the specification is written so that it is brand agnostic, and so that qualification under the TRM is focused on the features that deliver the energy saving and, where appropriate, any safety and warranty requirements needed.

**Comment 6:** The reference to commercial Tier 2 APS devices should be removed as there is no industry consensus on what constitutes a commercial Tier 2 APS device and the robustness of the study quoted as the source for energy savings is not adequate. Further the industrial sector is an entirely different than commercial and should be handled independently from a commercial specification.

**Discussion:** The study cited as the source of the savings for the commercial application in the October 1 work paper is based on a single study conducted in a an office setting and computer lab at the University of Irvine in California measuring 51 desktop PCs for a period of 12.8 days. The study did not use the IPMVP preferred approach of pre/post metering. It is unrealistic to think that this type of highly controlled study can simulate the savings that would be seen in real world commercial environments where things like the configuration of technology, technology type, IT system administrator needs around back-up, recovery and maintenance and the myriad of potential data security requirements can have a significant impact on how IT equipment is used and can be controlled. Further, given the sensitivity of the IT environment, it is risky to rollout a measure at commercial scale that has not been more carefully vetted for use in commercial environments. It should also be noted that there has been no testing of APSs in industrial settings.

**Recommendation:** While it is clear that APS devices could have an impact on the energy use in IT system configurations, the proposed specification and savings should not be included in the IL-TRM until there is more robust primary research on the technologies used in the commercial and the industrial environment.

1. AESCl, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems”, February 2016. Available on the SharePoint site [here](http://portal.veic.org/projects/illinoistrm/Shared%20Documents/TRM%20Reference%20Documents/Residential/5.2%20Consumer%20Electronics%20End%20Use/5.2.2%20Tier%202%20Advanced%20Power%20Strips%20-%20Residential%20AV/160310%20-%20Tier_2_aps_final_report_et13pge1441.pdf). [↑](#footnote-ref-1)
2. VEIC disputes this claim. The results include both standby savings associated with switching off periphery devices after the master device is switched off, and savings associated with ‘active’ switch off of devices when sensed the AV is not being used. For example, the Phase 2 AESC study simulated results (page 29) indicated 87 kWh of standby savings with an additional 25kWh for active savings for TrickleStar’s product and 111kWh for Embertec’s product. [↑](#footnote-ref-2)
3. AESC PAPER LINK HERE [↑](#footnote-ref-3)
4. The Northwest Regional technical Forum (RTF) has been having extensive discussions on Tier 2 APSs and has an official position on Tier 2 devices via a unanimous approval (19 for, 1 abstained vote) for their document entitled “Proposed RTF Research Plan: Residential Advanced Power Strips, IR Sensing Units for Home Applications” which states that “research is needed because the RTF is not aware of any existing studies that provide sufficient rigor for proven UES values for this measure. Most currently published savings figures are based on assumptions about APS-induces changes in appliance run-times in observed. The RTF’s judgment is that these assumptions have not been adequately tested with empirical data.” In short simulated studies do not provide the same level of rigor as true pre-post studies would provide. [↑](#footnote-ref-4)
5. Illinois Statewide Technical Reference Manual – 5.2.2 Tier 2 Advanced Power Strips (APS) – Residential Audio Visual – Draft Update [↑](#footnote-ref-5)
6. Classification of Tier 2 Advanced Power Strip Products in to Performance Bands for use with v6.0 of Illinois TRM [↑](#footnote-ref-6)
7. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 47 [↑](#footnote-ref-7)
8. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 48 [↑](#footnote-ref-8)
9. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 49 [↑](#footnote-ref-9)
10. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 50 [↑](#footnote-ref-10)
11. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 54 [↑](#footnote-ref-11)
12. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 52 [↑](#footnote-ref-12)
13. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 54 [↑](#footnote-ref-13)
14. AESC, Inc, “Energy Savings of Tier 2 Advanced Power Strips in Residential AC Systems. Page 52 [↑](#footnote-ref-14)
15. Calculation metrics are available upon request. [↑](#footnote-ref-15)