**Work Paper Abstract**

**LED Menu Boards**

**Revision # 0**

**California Technical Forum**

**WP Abstract Prepared by: Yun Han, SCE**

**LED Menu Board**

***Abstract***

|  |
| --- |
| WP Abstract Tracking Log |
|  | **Date Issued** | **Due By** | **Version** | **Author****(last name)** |
| Circulated to TF Members |  |  |  |  |
| Cal TF summarizes comments |  |  |  |  |
| Abstract presented at Meeting; consensus decision-marking |  |  |  |  |
| Cal TF finalizes abstract; prepares comparison exhibit of non-consensus items |  |  |  |  |
| Abstract to TF Subcommittee |  |  |  |  |
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**Table 1.** Work Paper Abstract Snapshot

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| --- |
| Work Paper Abstract Snapshot |
| Item | **Details** | **Notes** |
| Measure name | LED Menu Board |  |
| Measure description | Retrofit Linear Fluorescent w/LEDs | The LED would be a string of LED modules. The linear fluorescent baseline is expected to be T12s and T8s. |
| Sector (Res/Non-Res) | Non-Res |  |
| Subsector (e.g. Ag) | Restaurant – Fast Food |  |
| Program(s) | Midstream |  |
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# Measure Description

The measure is an LED Menu Board replacing Linear Fluorescent Menu Board. The building type will be focused only in Restaurant – Fast Food where majority of the internally illuminated menu boards exist.

# Key Terms

LED, Menu Board, Linear Fluorescent, Fast Food

# Program Implementation Method

The delivery method will be Mid-stream Programs – Midstream Incentive. The install type will be Retrofit (RET), Replace on Burnout (ROB), and New (NEW). Sales data will be collected to show SCE’s influence of customers retiring their existing menu boards early. See “LED Back-Lit Menu Board Trial Program Plan Draft - 2014-06-09.docx” for more information.

# Mixed Baseline

Currently, based on calls with the sign industry, the baseline is linear fluorescent.

Title 24 2013 mandates that internally illuminated signs have a maximum allowed lighting power that is the product of the illuminated sign area and 12 Watts per square foot. (Section 140.8(a)).

There is a Title 20 2014 standard for LED drivers to be sold in CA. (Section 1605.1 (u)). If a product is already sold in CA, it is assumed to be T20 compliant.

# Measure Summary

Provide measure summary details. If measure delivery is not consistent statewide, include columns for each market delivery approach.

**Table 2.** Measure Summary

|  |  |
| --- | --- |
| **Characteristic** | **Measure** |
| Baseline Technology or Mix | Linear Fluorescent |
| Measure Technology | LED |
| Measure Application Type | Retrofit (RET), Replace on Burnout (ROB), New (NEW) |
| Delivery Mechanism | Midstream |
| Impacted Markets | Commercial |
| Relevant Codes and Standards | T24 (Section 140.8 (a)), T20 (Section 1605.1 (u)) |

# Estimated Size of Offer (Number of Participants)

For the Midstream pilot, 125 customers are planned to be participating. We do not know the total savings from measures yet. See “LED Back-Lit Menu Board Trial Program Plan Draft - 2014-06-09.docx” for more information.

# Estimated Impact of the Measure on Statewide Energy Efficiency Savings.

# According to the 2002 Economic Census of California, there are 66,568 food service establishments in California. Assuming each store has 4 menu boards, totaling 8 feet wide and 2 feet long with 2 – 8ft T8 lamps (16 ft2, F82ILL – 2x8’ T8 lamps – 109 Watts) totals to 6.8 W/ft2. Applying a conservative savings of 40%, savings come out to 2.7 W/ft2. With a 10% market penetration, total savings is almost 287 kW and 1 GWh.

# Applicable DEER

The Non-CFL interactive effects will be used from DEER. D.12-05-015, Attachment A, page 9
clarified which interactive effects should be used for LED lighting measures. The DEER team proposed disposition includes that all LED lighting measures that replace linear fluorescent or HID lighting fixtures are to use the HVAC interactive effects for the Non-CFL lighting type.

DEER operating hours may be used. The trial will measure the operating hours of the menu board and determine if it operates longer than the actual store hours. Then, the logged hours will be used for the workpaper. Also, a separate measure may be created for 8,760 hour operation depending on results of the logged data.

# Proposed Measure Parameter Data and Sources

**Table 3.** Proposed Measure Parameter Data and Sources

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Parameter** | **Data**  | **Source Description[[1]](#footnote-1)** | **Modification of DEER or reason for not using DEER** | **Confidence Level** **(High, Medium, Low)** |
| Savings – kWh | 2.7x1.0936x4380 = 13 kWh/ft2 | Pilot study, to conclude end of August 2014 | Measure not in DEER | Medium |
| Savings – kW | 0.0027x1.2229 = 0.0033 kW/ft2 | Pilot study, to conclude end of August 2014 | Measure not in DEER | Medium |
| Savings – therm | -0.06649 therm/ft2 | Pilot study kWh results\* DEER impacts | DEER | High |
| EUL or RUL | EUL = 50000/4843 = 10yrsRUL = 20000/4843 / 3 = 1.4yrsEUL-RUL = 8.6yrs | DEER (WP reference – 50k hrs LED, 20k hrs Linear Fluorescent lamp – based on retrofit, not a full fixture replacement) |  | High |
| MC or IMC | w/ft2 | Pilot study | Measure not in DEER | Medium |
| NTG | 0.7 | DEER default for measures <2yrs |  | High |

# Commission Staff Review and Feedback

**Table 3.** Commission Staff Feedback on Proposed Data and Sources

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Parameter** | **Date Sent to Staff** | **Date Staff Responded** | **Commission Staff Comment** |
| Savings – kWh |  |  |  |
| Savings – kW |  |  |  |
| Savings – therm |  |  |  |
| EUL or RUL |  |  |  |
| MC or IMC |  |  |  |
| NTG |  |  |  |

# Cal TF Comments on Proposed Measure Parameter Data and Sources

*Cal TF comments on proposed data and sources. Do data represent best available data? If not, what are alternate data/sources that should be considered?*

**Table 5.** Cal TF Comments on Measure Parameter Data and Sources

|  |  |  |
| --- | --- | --- |
| **Measure Parameter** | **Cal TF Comments on****Proposed Data/Source** | **Cal TF Recommendation(s) on Alternate Sources to Consider** |
| Savings – kWh |  |  |
| Savings – kW |  |  |
| Savings – therm |  |  |
| EUL or RUL |  |  |
| MC or IMC |  |  |
| NTG |  |  |

# Proposed Measure Parameter Methodology Sources

**Table 6.** Proposed Measure Parameter Methodology and Sources

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Parameter** | **Methodology** | **Source Description[[2]](#footnote-2)** | **Modification of DEER or reason for not using DEER** | **Confidence Level** **(High, Medium, Low)** |
| Savings – kWh | Hours x IE x W/ft2 | Pilot study, to conclude end of August 2014 | Measure not in DEER | Medium |
| Savings – kW | kW/ft2(base)-kW/ft2(measure) | Pilot study, to conclude end of August 2014 | Measure not in DEER | Medium |
| Savings – therm | kWh x Therms interactive effects | Pilot study kWh results \* DEER impacts | DEER | High |
| EUL or RUL | DEER | DEER |  | High |
| MC or IMC | Collected during the trial through invoices$/ft2 | Pilot study, to conclude end of August 2014 | Measure not in DEER | Medium |
| NTG | DEER | DEER default |  | High |

# Cal TF Comments on Proposed Measure Parameter Methodology and Sources

**Table 7.** Cal TF Comments on Measure Parameter Methodology and Sources

|  |  |  |
| --- | --- | --- |
| **Measure Parameter** | **Cal TF Comments on****Proposed Data/Source** | **Cal TF Recommendation(s) on Alternate Sources to Consider** |
| Savings – kWh |  |  |
| Savings – kW |  |  |
| Savings – therm |  |  |
| EUL or RUL |  |  |
| MC or IMC |  |  |
| NTG |  |  |

# Questions for CPUC Staff on Applicability of DEER Values, Methods, Tools, Data, Etc.

SCE had a call with Kevin Madison (CPUC consultant) on 5/22/14 at 10AM regarding the data to be gathered and the energy savings methodology. This includes measuring the menu board size, existing and new wattage, cost, logging operating hours, and creating a measure using W/ft2 as the common unit. See attachment “List of Inputs Needed” in appendix A.

# Additional Research Needed

Midstream Pilot will be collecting the necessary data to complete the WP using 125 customers. Additional research needed would be collecting customer data of ALL Fast Food Restaurants in the CA IOU territory and any other businesses with internally illuminated menu boards.

# Applicable EM&V

The EM&V for logging operating hours hasn’t started yet.

#  Workpaper Development

1. Yun Han/SCE – Has been collaborating with internal groups (Lighting Transformation and New Product Development & Launch) and also with ED on drafting this new WP. This abstract will be posted on 6/13/14.

2. Draft the LED Menu Board WP with data gathered from the Midstream Pilot.

3. WP Budget – N/A

# Appendix A – Sources



1. Provide a link to source or embed source in Appendix A of this document. [↑](#footnote-ref-1)
2. Provide a link to source or embed source in Appendix A of this document. [↑](#footnote-ref-2)