



# Memorandum

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**To:** Henry Liu, PG&E

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**Subject:** Non-standard Disposition for the convection oven workpaper SWFS001-01

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## 1. Summary

Provided here is notification to all Program Administrators (PAs) that a statewide workpaper SWFS001-01 for commercial food services convection ovens requires revisions with resubmission by October 1, 2019 to facilitate the disposition review and approval cycle for 2020 implementation.

## 2. Background

Commercial convection ovens are one of the most widely used appliances in the food service industry. Many food service operations rely heavily on the versatility of ovens; operators can cook varieties of foods in large quantities with a single appliance. This product diversity means that ovens are utilized in almost any type of food service operation. These ovens cook food by forcing hot dry air over the surface of the food product. The rapidly moving hot air strips away the layer of cooler air next to the food and enables the food to absorb the heat energy.

Following are the two typical configurations of convection ovens:

- a. Half-Size Convection Oven: A convection oven that is capable of accommodating half-size sheet pans measuring 18 x 13 x 1-inch.
- b. Full-Size Convection Oven: A convection oven that is capable of accommodating standard full-size sheet pans measuring 18 x 26 x 1-inch.

Cooking energy efficiency represents the amount of energy absorbed by the food product compared to the total energy used by the oven during the cooking process. The idle energy rate represents the

energy used by the oven while it is maintaining or holding at a stabilized temperature. Energy efficient ovens have higher cooking efficiencies and lower idle energy rates as compared to standard ovens. Better insulation and better flue gas routing by means of heat exchangers and baffles provide the energy efficiency for convection ovens. Replacing atmospheric burners with infrared burners and configuring these ovens as direct fired are advancements that can also result in improve oven performance.

Convection oven performance is determined by the American Society for Testing and Materials (ASTM) Standard Test Method for the Performance of Convection Ovens (F1496).<sup>1</sup> The ASTM Standard Test Method is the industry standard for quantifying the energy consumption, efficiency, and cooking performance of convection ovens based on testing in an approved and qualified laboratory.

A 30% adjustment factor is currently applied to this measure, based on Decision 11-07-030, and comments in Attachment A, which stated “Energy Division believes that operating hours, food production rates and baseline efficiencies contribute to overly optimistic UES calculations and recommend a 30% reduction in UES values”.

### **3. Critical Review Issues**

Additional information and analysis are required to support the ex ante savings values in the statewide workpaper. The critical issues are:

- Accuracy of participant operating characteristics
- Industry standard practice baseline of convection oven equipment
- Equipment performance baseline and eligibility requirements
- Calculations and Alignment with Energy Star
- Investigate and resolve measure tracking data

#### **3.1. Determine accurate participant operating characteristics**

Decision 11-07-030 identified uncertainty in the operating hours and production rates of food used in calculating savings for this measure. Operating hours and product throughput, measured in pounds of food cooker per day, will vary widely between a high school and a high-volume fast food chain. The current workpaper assumes an average operating hours and production rates for all convection ovens based on FSTC databases and professional judgment that are not necessarily representative of the participant population.

Improved accuracy requires acquiring primary data through telephone surveys of a statistical sample of participants. The sample size should be adequate to attain 90/10 precision for each population segment of interest. The PAs may choose to use a single average value or may choose to define multiple segments (i.e. schools, high-volume fast foods), where each segment sample meets a similar precision target. The surveys should be designed to capture the convection oven annual production and operating profile

#### **3.2. Determine Industry Standard Practice Baseline**

Decision 11-07-030 identified uncertainty in the average efficiency of the normal replacement or new construction baseline. The current workpaper identifies the baseline as the average nominal efficiency

of a sample of economy-grade convection ovens based on FSTC's proprietary database. This baseline does not necessarily reflect standard purchasing practices which may include higher efficiency equipment as well as refurbished used equipment.

An industry standard practice study which consists of research elements<sup>1</sup> that entail measure prevalence, purchase requirements, alternative measures, applicable codes and standards, subject matter expert interviews and discussions with the CPUC, Program Administrator and Implementer, 3Ps, EM&V, evaluators, etc., should be adequate to define the mix of equipment serving the baseline.

#### **Update Equipment Performance Baselines and Eligibility Requirements**

The gas convection oven measure is supported by laboratory testing data contributed by the Food Service and Technology Center (FSTC)<sup>2</sup> and the Food Service Equipment Center (FSEC)<sup>3</sup>. This data source consists largely of program qualified units with limited testing data for baseline units. The workpaper SWFS001-01 source for key baseline characteristics is a proprietary database and data drawn from a sample of economy-grade equipment tested by the FSTC. These data appeared to be obtained from the *Commercial Cooking Appliance Technology Assessment* in 2002.

There is a need to evaluate the appropriateness of this legacy data source using a more recent set of data. The update process steps should include:

- Assemble all available testing data from the FSTC and FSEC for both 2002 (the source for this workpaper) and the most recently available data. Combine the data into a comprehensive database including useful parameters characterizing the ovens, including: – half-size versus full-size, cooking efficiency, gas versus electric, idle energy rate, preheat energy, cooking time per batch, production capacity, pan capacity, date of testing, oven size, temperature setting during cooking, and so forth. Compile the data in a spreadsheet to support analysis.

For each category summarize the sample size, minimum, maximum, median, average, and examine each sample for trends, and clusters or patterns.

Summarize the findings addressing gas (and electric) convection oven characteristics in a memo and submit with the revised workpaper including all the underlying data and analysis findings for inspection by reviewers.

- Assemble and review secondary sources that can contribute to knowledge surrounding the performance and the differential between program and base case equipment. The secondary resource shall include, but are not limited to:
  - California Energy Commission studies
  - California Energy Commission certified appliance database (for information on idle energy rates)

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<sup>1</sup> <http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5315>

<sup>2</sup> <https://fishnick.com/about/overview/> The FSTC has developed over 40 Standard Test Methods for evaluating commercial kitchen appliance and system performance. It is operated by Frontier Energy and funded by PG&E.

<sup>3</sup> <https://www.socalgas.com/for-your-business/education-and-training/food-service-equipment-center> The FSEC is a test kitchen operated by SCG.

- Energy Star sources

These resources and findings and conclusions should be summarized in a second memo that addresses any contradiction between testing-based findings/calculations noted above, and these other secondary sources.

- Reformulate baseline efficiencies and eligibility requirements

After gathering the primary and secondary data, the baseline efficiencies and eligibility requirements should be reformulated to:

- Identify any substantive distinctions in oven as a function of configuration.
- Use the results of the ISP research to select the mix of products constituting the standard practice baseline and any further market segmentation (for example, by building type)
- Revise eligibility efficiency thresholds consistent with program objectives.
- Revise implementation application data collection process as necessary to support measure configuration
- Documentation of data sources in support of baseline fryer characteristics/performance.

The findings and conclusions should be summarized in a third memo that addresses the final values and rational for the baseline and eligible measure requirements.

#### Alignment with Energy Star

For half-sized and full-sized convection ovens, Energy Star states that EE units have a cooking efficiency of 44%, while the workpaper says the EE units have a cooking efficiency of 45%. Additionally, the workpaper includes a term for preheat energy use, while the Energy Star calculator does not. However, there are no red flags surrounding workpaper and Energy Star alignment.

#### **3.1 Tracking Anomalies**

The workpaper includes calculations for both half-sized and full-sized convection ovens. However, the rebates offered only address full-sized units. This raises a question of whether the oven size is being properly tracked by half-sized versus full-sized gas convection ovens within the PY2017 claims.

#### **4. Direction**

Based on the critical review items, the IOUs are directed to conduct the indicated research, revise the workpaper, and resubmit for 2020 implementation. In order to ensure timely completion of the workpaper, the IOUs shall formulate and submit a workpaper workplan by January 31, 2019 with a schedule that results in a revised workpaper submission by October 1, 2019. The workplan will identify mutually agreed upon interim delivery dates for each work product so that these can be reviewed as the work is completed. The workplan should also include a stakeholder communications plan.

#### **4.1 Conduct a Survey of Past Participants to Determine Key Operating Parameters**

The PAs are directed to initiate and complete a study to determine key participant operating parameters consistent with the research outlined in Section 3. The PAs should coordinate the survey with the Ex Post Team's survey activities. The PAs shall offer the Ex Ante WP Team an opportunity to review interim work products including the study a scope of work, sample plan, survey instruments, and other pertinent details on proposed research activities.

#### **4.2 Conduct ISP research**

The PAs are directed to initiate and complete a study to determine industry standard practice for fryers with the research outlined in Section 3. The PAs shall offer the Ex Ante WP Team an opportunity to review interim work products including the study a scope of work, sample plan, survey instruments, and other pertinent details on proposed research activities.

#### **4.3 Revise Baseline and Eligibility Requirements**

The IOUs are directed to revise the baseline and eligibility requirements for convection ovens consistent with the findings and conclusions of the research outlined in Section 3.

The final workpaper submission should incorporate the data, findings, and conclusions from the memos and complete sets of source data as described in Section 3 of this disposition.

#### **4.4 Workpaper Calculations**

The PAs are directed to review and revise the parameters used in calculations for the baseline and eligible equipment.

The PAs are also directed to document the workpaper assumptions and inputs in the workpaper or in supporting calculation spreadsheets.

#### **4.5 Tracking Data Resolution**

The IOU are directed to acquire copies of invoices submitted with 2018 convection oven applications to verify the oven size (half-sized and full-sized convection ovens). The IOUs are directed to summarize their findings in a memo and submit prior to filing final 2018 savings claims. Any errors in reporting should be corrected in claims. If convection ovens are classified in error on a regular basis, the IOUs should identify a remediation plan in the memo.

#### **4.6 Stakeholder communication strategy**

The PAs shall propose a communication strategy for their stakeholders. This strategy should be comprehensive to ensure all information is timely and easily accessible. Lack of communication or delayed communication can have unintended market impacts that should be avoided.