

Secondhand Equipment, Firsthand Impact: Reassessing Energy Efficiency Standards in Small Food Businesses

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ABSTRACT

Industry standard practice (ISP) studies establish baselines for energy efficiency program performance, savings calculations, program participation, and an accounting of providing value on ratepayer dollars. ISP studies sometimes find that typical purchased equipment is more efficient than standards require. However, it is rare for the reverse to be true; that an ISP study's results are less efficient than specified standards for new equipment. In particular, the restaurant industry has a robust market for used cooking equipment that could make adopting new equipment baselines unreasonable. This paper seeks to understand the restaurant industry's used equipment market and how this equipment should be reflected in the baseline assumptions.

The paper combines primary research from two studies in two Northeastern states across electric and gas utility territories. The study results were based on customer surveys, distributor interviews, secondary research, and implementer engagement. Examined equipment includes commercial fryers, ovens, steam cookers, commercial dishwashers, gas fireplaces, and more. As energy efficiency standards tighten, the gap between high-efficiency, rebate-eligible equipment and widely-used secondary market equipment grows. This research presents results based on a weighted baseline that incorporates both new and used equipment market data to support more effective and equitable program outcomes. The paper will show that the influence of the secondary market has, in fact, reduced the ISP efficiency levels below that of current standards for fryers and convection ovens but not for steam cookers. This finding represents a potentially significant change from the ISP the authors found prior to the initiation of research.

Introduction

The objectives of this paper are to share the research and primary data collection results to better understand industry standard practice for commercial kitchen equipment. The paper draws primarily on data from 159 customer surveys and 11 distributor interviews conducted during 2022 and 2023. Researchers collected information on a wide range of commercial kitchen equipment purchasing practices to understand the full scope of customer equipment purchasing practices and distributor used-equipment market share. Critical data collection topics included decision-making priorities, most recent purchases of specific pieces of equipment, knowledge of energy efficiency programs, and equipment model information to assess the potential impact of the used equipment market. Survey and interview data was leveraged with current ENERGY STAR® standards and state-specific appliance energy efficiency standards to comprehensively compare the results to documented energy efficiency baseline assumptions.

The paper presents results by equipment type comparing used-equipment results among state-specific appliance energy efficiency standards to highlight differences between the primary data collection and state standards. Equipment includes electric and gas-fueled equipment in

support of electric and gas energy efficiency programs. In addition, the results provide recommended baseline equipment efficiency, idle energy rate, and in some cases other assumptions, such as preheat energy and pounds of food cooked per day based on the used-equipment penetration results. The paper also draws on secondary data to provide context and further support for the research findings.

Methods

This section of the paper describes the DNV team's targeted measures, procedures for data collection and analysis, and comparisons with the current baseline standards.

Targeted Measures

The tables in this paper present data on a variety of electric and gas commercial kitchen equipment. In general, targeted measures were reviewed based on secondary research on other jurisdiction Technical Reference Manuals (TRMs) and through utility working groups to collaborate with program implementers, discuss market barriers, inform the survey instrument design, the finalize the targeted measures. The list of targeted measures are shown below:

- Full Size Convection Oven; Electric and Gas
- Combination Oven; Electric and Gas, including convection mode and steam mode
- Fryers; Electric and Gas, including standard and large vat types
- Steam Cookers; Electric and Gas
- Low-Temperature and High-Temperature Commercial Dishwashers; Electric, including undercounter; door type; single tank conveyor; multi-tank conveyor; and pot, pan, and utensil dishwasher types

Secondary Research and Implementer Engagement

To support the development of final surveys, measure lists, and study goals, the research team engaged with stakeholders and implementers through secondary research. Other state's TRMs, vendor tools, and ENERGY STAR Food Service Calculators were a major driver of secondary research on baseline definitions and savings calculations. Analysts also reviewed program administrator (PA) implementer materials such as tracking data, calculators to estimate savings, and review program eligibility requirements with vendor and evaluation staff. Using this research, the team prepared materials for working group meetings and a webinar to orient both internal implementation staff and external implementation contractors to circulate program eligibility requirements, tracking limitations, savings assumptions, and analysis limitations.

The key objective of this task was to understand how all of these sources (appliance standard, vendor tools, ENERGY STAR[®] calculators, other TRMs) impact baseline parameters and therefore estimated energy savings. This analysis was critical to collaborate with program staff impacts on baselines against the new state-specific appliance standards with the secondary research context. Additionally, the research team reviewed Food Service Technology Center (FSTC) calculators to review other savings calculations parameters for potential inclusion in the study. This sensitivity analysis was shared with stakeholders to review parameters such as operating hours per day, operating days per year, and pounds of food cooked assumptions.

Efficiency level and idle energy rate were determined to be the prioritized measures for the study based on stakeholder approval because they are the main drivers of savings. An example of this analysis is shared in Table 1.

Table 1. ISP Comparison Data

Equipment Size/Category	Appliance Standard		Baseline Parameters from Vendor Tool ¹
	Recommended Baseline	Recommended Baseline Parameters	
Electric Fryer, Standard Vat	ENERGY STAR, Commercial Fryers, Version 2.0	Cooking efficiency: 80% Idle energy rate: 1.0 kW	Cooking efficiency: 78% Idle energy rate: 1.1 kW
Electric Fryer, Large Vat	ENERGY STAR, Commercial Fryers, Version 2.0	Cooking efficiency: 80% Idle energy rate: 1.1 kW	
Gas Fryer, Standard Vat	ENERGY STAR, Commercial Fryers, Version 2.0	Cooking efficiency: 50% Idle energy rate: 9,000 Btu/hr	Cooking efficiency: 43% Idle energy rate: 11,500 Btu/hr
Gas Fryer, Large Vat	ENERGY STAR, Commercial Fryers, Version 2.0	Cooking efficiency: 50% Idle energy rate: 12,000 Btu/hr	Cooking efficiency: 43% Idle energy rate: 12,000 Btu/hr

Source: DNV, October 27, 2022.

Data Collection

The studies in both jurisdictions followed similar methodology. After receiving feedback on the interim results from the secondary research findings, the DNV research team developed detailed end-user and distributor surveys to target measures of interest, understand customer-specific upgrade practices, quantify age and model of existing equipment, and collect data on prevalence of new versus used equipment in the market. The primary objective of the end user survey was to understand the extent to which used equipment is being sold in the market and to what extent it should be included in the ISP baseline. To do this, the survey captured data on decision-making practices for different types of food service owners and operators. The primary objective of the distributor interviews was to understand the impact of the appliance standards on the used-equipment market and serve as a data check on the customer survey responses. This tandem approach helped the research team corroborate data and have confidence in results.

The end-user survey began by developing a sample frame of customers that are likely to use the targeted commercial kitchen equipment, primarily food service business. Data from ZoomInfo and Restaurant Email List databases were purchased to create the sample frame. Among the data received with email and phone contact information, the team reached out to 8,064 end-users and received 159 survey responses achieving roughly a 2% response rate. To help increase end-user survey participation, a \$25 gift card incentive was offered upon the

¹ Sourced from ENERGY STAR® Calculator for Commercial Food Service (CFS) products. The vendor tool had not yet adopted the new appliance standards at the time of review.

completion of a web or phone survey. The survey was open for roughly a week and a half. The results are provided in Table 2.

Table 2. Summary of end-user survey activity

Sample Frame	Surveys Completed	Response Rate
8,064	159	2.0%

Source: DNV, October 27, 2022, and November 3, 2023.

All end-user respondents were asked generally about their equipment purchasing behaviors in addition to specific equipment details for any recently purchased equipment. After identifying the correct respondent to best speak to the facility's kitchen equipment, key questions to drive the analysis are shared below:

- Have you purchased any of the following equipment in the past 5 years? Select all that apply. [All targeted measures listed]
- Do you plan to purchase any of the listed equipment in the next 5 years?
- Does your company or organization have any regulations on formal requirements about purchasing commercial kitchen equipment?
- When you purchase commercial kitchen equipment, do you ever consider purchasing used equipment?
- On a scale from 1 to 5 with 1 being not at all likely and 5 being extremely likely, when you purchase [insert equipment] in the future, how likely are you to purchase used equipment?
- On a scale from 1 to 5 with 1 being not at all familiar and 5 being extremely familiar, how familiar are you with the new Appliance Standards that set energy efficiency standards for appliances, including commercial kitchen equipment, sold starting in 2023?
- When you purchased [insert measure] was it new or used at the time of purchase?
- Is this [insert measure] ENERGY STAR® certified?
- What year was this [insert measure] manufactured?
- We would like to confirm the [insert measure] type and efficiency. To do this, please provide the manufacturer and model number of your [insert measure] found on the equipment nameplate or manual.

In addition to end-user surveys, the research team wanted to better understand the seller market of commercial food service equipment and conducted interviews with distributors. In collaboration with the food service implementation vendor for midstream and point-of-sale programs, the research team was able to interview a much higher percentage of distributors when compared to the end-user survey response rate. The distributor interview results are provided in Table 3.

Table 3. Summary of distributor interview activity

Sample Frame	Surveys Completed	Response Rate
31	11	35.5%

Source: DNV, October 27, 2022, and November 3, 2023.

Like the end-user surveys, all distributors were asked about their equipment selling behaviors in addition to specific equipment details for any recently purchased equipment. After

identifying the respondent most knowledgeable of commercial food service equipment, the following questions were used to drive the analysis:

- Do you sell used kitchen equipment?
- How many end-users typically purchase new vs. used commercial kitchen equipment?
- Who is typically buying used equipment?
- What is the main reason someone would purchase new versus old equipment?
- Can you tell me roughly the percent of your sales that are used versus new kitchen equipment?
- Is the used equipment you sell typically ENERGY STAR® certified?
- What is the key factor that influences end-users' decision to purchase specific commercial kitchen equipment models?
- How much do you think the ENERGY STAR® label influences a customer's decision to purchase equipment? On a scale from 0 to 10 with 0 not being important, and 10 being incredibly important, how important do you see most customers valuing ENERGY STAR® label?
- On a scale from 1 to 5, with 1 being not at all familiar and 5 being extremely familiar, how familiar are you with the new Appliance Energy Standards?

The above questions were integral to collect the key information the researchers needed to not only quantify the used versus new commercial kitchen equipment market among buyers and sellers, but also understand general decision-making practices in the market. The research team utilized Qualtrics, a platform designed to create, distribute, and analyze survey and interview responses to allow for both web and phone-based results in the same database. This allows for simple Microsoft Excel exports to analyze results alongside the current appliance standards. Key data collection results are provided below in Table 4 and Table 5.

Table 4. End-user survey respondents who purchased used equipment by type

Equipment Type	Number of Respondents	Respondents who Purchased Used Equipment	% Used
Oven	92	20	22%
Fryer	87	10	11%
Commercial Dishwasher	42	6	14%
Hot Food Holding Cabinet	22	3	14%
Steam Cooker	18	1	6%
Total	261	40	15%

Source: DNV, October 27, 2022, and November 3, 2023.

Table 5. Percent of sales overall by distributor

Technology	Average Percentage of sales
New Equipment	70%
Used Equipment	30%

Source: DNV, October 27, 2022, and November 3, 2023.

Analysis

Before the research team could analyze data from the end-user surveys and distributor interviews, the survey and interview responses were cleaned and reviewed for analysis. Analysts reviewed the survey and interview responses several times to identify obvious outliers and irregularities, in addition to quantifying the data for Boolean (yes/no) questions and questions that asked respondents to rate a question on a numerical scale. To ensure the data was clean and consistent, the research team instituted a quality control lead to ensure there was consistency in data collection, quantification of results, and qualitative data was characterized appropriately. The cleaned data fed into analysis workbooks to document the findings alongside current appliance standards to visualize how the respondent data compared against current appliance standards.

To better understand possible future changes to the market after the appliance standards take full effect, the research team asked both end-users and distributors about their current level of awareness regarding the appliance standards. End-users were asked on scale from 1 to 5 with 1 being not at all familiar and 5 being extremely familiar, how familiar they are with the new appliance standards. The mean response was a 2.0, indicating that awareness of the standards is still low at the customer level. The same question was asked to distributors, and mean response to the question regarding their awareness of the new appliance standards increased to an average of 2.2, indicating that the distributors are similarly aware of the new appliance standards compared to customers. The research team documented anecdotal feedback from the distributor interviews that indicated the following key findings:

- Some distributors had heard conflicting information leading to confusion about the standards.
- There is some concern that the qualifying equipment could be significantly more expensive than the non-ENERGY STAR® equipment.
- Online sales might be able to bypass the standards more easily threatening the profitability of brick-and-mortar stores.
- Current rebates are very advantageous for both end users and distributors. If rebates disappear, it is likely that the percentage of used equipment sold in the marketplace would increase.
- Smaller customers will likely not be able to take on the cost of new equipment. Bigger and more established stores would not be as impacted by higher costs.

While the distributor responses do not provide enough evidence to make changes to the updated baselines, they do indicate that there could be potential changes to the market over time in response to the new standards, and the percentage of used equipment in the marketplace could increase in the future. The bulk of analysis occurred because the used equipment end-user survey results were corroborated by the distributor results (see Table 5). The end-user used equipment survey results were evaluated alongside the appliance standards to create a new weighted baseline based on the used-equipment market. These are the primary results and presented in the next section of this paper.

Findings

This section presents results from analyses of the end-user survey responses to produce updated weighted baselines based on the used equipment respondent data. Where possible, we present comparisons to the new appliance standards to visualize the impact of the used equipment market. The weighted ISP baseline values are evaluated based on the proportion of used equipment sales and new equipment sales. The values that are being weighted are the energy consumption parameters that govern the appliance standards and the energy consumption parameters of the used equipment. In cases where efficiency level and energy idle rate parameters were not obtained from the interview directly, ENERGY STAR status, estimated time of purchase, and equipment age were collected to estimate those parameters.

Fryers

The results for electric and gas fryer weighted baseline adjustments for the Rhode Island market are presented below in Table 6 and Table 7. Based on the survey respondents, the weighted ISP baseline for electric fryers was determined to be less stringent than ENERGY STAR v2.0 baseline efficiency values by 1% in efficiency and 1% in idle energy rate for electric fryers. The weighted baseline was more impactful on gas fryer equipment. The weighted ISP baseline for gas fryers was determined to be less stringent than ENERGY STAR v2.0 baseline efficiency values by 2% in efficiency and roughly 4% in idle energy rate in Btu/hr. In Massachusetts, fryers were not targeted for baseline analysis.

Table 6. Weighted baseline for fryer, electric, Rhode Island

Electric Fryer	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Standard Vat, Weighting	11%	2%	87%	N/A
Cooking Efficiency (%)	75%	80%	80%	79%
Idle Energy Rate (W)	1,200	1,000	1,000	1,022
Large Vat, Weighting	11%	2%	87%	N/A
Cooking Efficiency (%)	75%	80%	80%	79%
Idle Energy Rate (W)	1,200	1,100	1,100	1,111

Source: DNV, November 3, 2023.

Table 7. Weighted baseline for fryer, gas, Rhode Island

Gas Fryer	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Standard Vat, Weighting	11%	2%	87%	N/A
Cooking Efficiency (%)	35%	50%	50%	48%
Idle Energy Rate (Btu/hr)	17,000	9,000	9,000	9,880
Large Vat, Weighting	11%	2%	87%	N/A
Cooking Efficiency (%)	35%	50%	50%	48%
Idle Energy Rate (Btu/hr)	17,000	12,000	12,000	12,550

Source: DNV, November 3, 2023.

Convection Oven

The results for electric and gas full-size convection ovens are presented below in Table 8, Table 9, Table 10, and Table 11. Based on the survey respondents, the weighted ISP baseline results followed the electric and gas fryer results closely. The electric convection oven weighted ISP baseline in Rhode Island and Massachusetts was 1% less stringent than ENERGY STAR v2.0 baseline efficiency values and roughly 3.5% less stringent in idle energy rate in watts. The gas convection oven weighted ISP baseline in Rhode Island and Massachusetts was 2% less stringent than ENERGY STAR v2.0 baseline efficiency values and roughly 4-7% less stringent in idle energy rate in Btu/hr.

Table 8. Weighted baseline for commercial convection oven full size, electric, Rhode Island

Full Size Convection Oven, Electric	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	15%	2%	83%	N/A
Cooking Efficiency (%)	65%	71%	71%	70%
Idle Energy Rate (W)	2,000	1,600	1,600	1,660

Source: DNV, November 3, 2023.

Table 9. Weighted baseline for commercial convection oven full size, gas, Rhode Island

Full Size Convection Oven, Gas	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	15%	2%	83%	N/A
Cooking Efficiency (%)	30%	46%	46%	44%
Idle Energy Rate (Btu/hr)	18,000	12,000	12,000	12,900

Source: DNV, November 3, 2023.

Table 10. Weighted baseline for commercial convection oven full size, electric, Massachusetts

Full Size Convection Oven, Electric	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	14%	14%	72%	N/A
Cooking Efficiency (%)	65%	71%	71%	70%
Idle Energy Rate (W)	2,000	1,600	1,600	1,656

Source: DNV, October 27, 2022

Table 11. Weighted baseline for commercial convection oven full size, gas, Massachusetts

Full Size Convection Oven, Gas	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	14%	14%	72%	N/A
Cooking Efficiency (%)	30%	46%	46%	44%
Idle Energy Rate (Btu/hr)	18,000	12,000	12,000	12,420

Source: DNV, October 27, 2022

Combination Oven, Electric

The results for electric combination ovens are presented below in Table 12, Table 13, Table 14, and Table 15. Massachusetts did not have the data granularity to parse out baselines by pan size. The results in the weighted baselines across the Rhode Island and Massachusetts

electric combination oven market followed similar results as other measures. The electric combination oven weighted ISP baseline in Rhode Island and Massachusetts was 2% less stringent than ENERGY STAR v2.0 baseline efficiency values across steam mode and convection mode and roughly 10-45% less stringent in idle energy rate in watts driving more opportunity for savings and program participation.

Table 12. Weighted baseline for commercial combination oven convection mode, electric, Rhode Island

Combination Oven, Electric, Convection Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
<15 pan Weighting	15%	2%	83%	N/A
<15 pan Cooking Efficiency (%)	65%	76%	76%	74%
<15 pan Idle Energy Rate (W)	3,000	1,700	1,700	1,895
15-28 pan weighting	15%	2%	83%	N/A
15-28 pan Cooking Efficiency (%)	65%	76%	76%	74%
15-28 pan Idle Energy Rate (W)	3,750	2,200	2,200	2,433
>28 pan Weighting	15%	2%	83%	N/A
>28 pan Cooking Efficiency (%)	65%	76%	76%	74%
>28 pan Idle Energy rate (W)	5,280	2,700	2,700	3,083

Source: DNV, November 3, 2023.

Table 13. Weighted baseline for commercial combination oven steam mode, electric, Rhode Island

Combination Oven, Electric, Steam Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
<15 pan Weighting	15%	2%	83%	N/A
<15 pan Cooking Efficiency (%)	40%	55%	55%	53%
<15 pan Idle Energy Rate (W)	10,000	2,640	2,640	3,744
15-28 pan weighting	15%	2%	83%	N/A
15-28 pan Cooking Efficiency (%)	40%	55%	55%	53%
15-28 pan Idle Energy Rate (W)	12,500	3,500	3,500	4,850
>28 pan Weighting	15%	2%	83%	N/A
>28 pan Cooking Efficiency (%)	40%	55%	55%	53%
>28 pan Idle Energy rate (W)	18,000	4,360	4,360	6,406

Source: DNV, November 3, 2023.

Table 14. Weighted baseline for commercial combination oven convection mode, electric, Massachusetts

Combination Oven, Electric, Convection Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	14%	14%	72%	N/A
Cooking Efficiency (%)	65%	76%	76%	74%
Energy Rate (W)	3,750	2,099	2,099	2,330

Source: DNV, October 27, 2022.

Table 15. Weighted baseline for commercial combination oven steam mode, electric, Massachusetts

Combination Oven, Electric, Steam Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	14%	14%	72%	N/A
Cooking Efficiency (%)	40%	55%	55%	53%
Energy Rate (W)	12,500	3,300	3,300	4,588

Source: DNV, October 27, 2022.

Combination Oven, Gas

The results for gas combination ovens are presented below in Table 16, Table 17, Table 18, and Table 19. Massachusetts did not have the data granularity to parse out baselines by pan size. However, the results in the weighted baselines across the Rhode Island and Massachusetts gas combination oven market followed the trend of a strong used equipment market driving a weighted baseline that is less stringent than ENERGY STAR v2.0. The gas combination oven weighted ISP baseline in Rhode Island and Massachusetts was 3% less stringent than ENERGY STAR v2.0 requirements across steam mode and convection mode and roughly 10-45% less stringent in idle energy rate in Btu/h driving more opportunity for savings and program participation.

Table 16. Weighted baseline for commercial combination oven convection mode, gas, Rhode Island

Combination Oven, Gas, Convection Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
<15 pan Weighting	15%	2%	83%	N/A
<15 pan Cooking Efficiency (%)	35%	56%	56%	53%
<15 pan Idle Energy Rate (Btu/hr)	15,000	7,675	7,675	8,774
15-28 pan weighting	15%	2%	83%	N/A
15-28 pan Cooking Efficiency (%)	35%	56%	56%	53%
15-28 pan Idle Energy Rate (Btu/hr)	20,000	8,650	8,650	10,353
>28 pan Weighting	15%	2%	83%	N/A
>28 pan Cooking Efficiency (%)	35%	56%	56%	53%
>28 pan Idle Energy rate (Btu/hr)	30,000	9,625	9,625	12.681

Source: DNV, November 3, 2023.

Table 17. Weighted baseline for commercial combination oven steam mode, gas, Rhode Island

Combination Oven, Gas, Steam Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
<15 pan Weighting	15%	2%	83%	N/A
<15 pan Cooking Efficiency (%)	20%	41%	41%	38%
<15 pan Idle Energy Rate (Btu/hr)	45,000	9,511	9,511	14,834
15-28 pan weighting	15%	2%	83%	N/A
15-28 pan Cooking Efficiency (%)	20%	41%	41%	38%
15-28 pan Idle Energy Rate (Btu/hr)	60,000	10,811	10,811	18,189
>28 pan Weighting	15%	2%	83%	N/A
>28 pan Cooking Efficiency (%)	20%	41%	41%	38%
>28 pan Idle Energy rate (Btu/hr)	80,000	12,111	12,111	22,294

Source: DNV, November 3, 2023.

Table 18. Weighted baseline for commercial combination oven convection mode, gas, Massachusetts

Combination Oven, Gas, Convection Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	14%	14%	72%	N/A
Cooking Efficiency (%)	35%	56%	56%	53%
Energy Rate (Btu/hr)	9,607	8,425	8,425	8,590

Source: DNV, October 27, 2022.

Table 19. Weighted baseline for commercial combination oven steam mode, gas, Massachusetts

Combination Oven, Gas, Steam Mode	Used Equipment		New Equipment	Weighted ISP Baseline
	Conventional	ENERGY STAR v2.0	ENERGY STAR v2.0	
Weighting	14%	14%	72%	N/A
Cooking Efficiency (%)	20%	41%	41%	38%
Energy Rate (Btu/hr)	15,256	10,511	10,511	11,175

Source: DNV, October 27, 2022.

Steam Cookers

The results for electric steam cookers are presented below in Table 20. In both states, electric steam cookers did not have the respondent sample size or used equipment market breadth to warrant a weighted baseline.

Table 20. Electric steam cooker survey results

State	Used Equipment Sales	New Equipment Sales
MA	0	6
RI	1	12

Source: DNV, October 27, 2022. DNV, November 3, 2023.

Summary of Findings and Conclusion

Below we summarize the main findings described above with respect to understanding the used equipment market of commercial kitchen equipment and how the used equipment market can impact the baseline efficiency and baseline energy idle rates. The outcome of the study resulted in revised TRM baselines to include the study-supported used equipment weighted baseline parameters of cooking energy efficiency and idle energy rate. The recommended TRM baseline updates were adopted where the used equipment market makes up at least 10% of sales. In Rhode Island, the used equipment ISP study resulted in revised baseline energy efficiency and energy idle rate parameters for gas and electric fryers, gas and electric convection ovens, gas and electric combination ovens, gas double rack ovens, electric hot food holding cabinets, low-temperature dishwashers, and high-temperature dishwashers. In Massachusetts, the used equipment ISP study resulted in revised baseline energy efficiency and energy idle rate parameters for gas and electric convection ovens, gas and electric combination ovens, and gas single and double rack ovens.

In addition, other inputs in savings calculations, such as hours of use and pounds of food cooked per day, were recommended to be monitored to refine inputs that drive savings. Rhode Island compared survey data with assumptions from other TRMs and found the hours of use

survey data unsubstantiated to result in an update. Massachusetts found electric and gas fryers and electric and gas ovens warranted minor changes to savings calculating parameters production capacity (lbs/hr), operating hours per day, operating days per year, and pounds of food cooked per day impacting deemed savings calculations in the 2025-2027 Three Year Plan Technical Reference Manual.

The revised baselines support commercial food service program participation by including the reality of the used equipment market, customer decision making practices, and distributors knowledge of the current appliance standards in the respective states. While not all jurisdictions may have the same used equipment market prevalence, reviewing TRM-measure updates through the lens of customer decision practices, program participation, and understanding the supply and demand elements to the target market are critical to develop prescriptive savings estimates and utilize incentive programs to meet energy efficiency goals.

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