



ENERGY STAR[®] Commercial Ovens

Version 3.0 Draft 2 Webinar

Stakeholder Meeting

November 4, 2021





Webinar Participation

- Please mute yourself when you are not speaking (use local mute or dial *6).
 - Red= mute
 - Green= unmute
- Feel free to ask questions at any time

Submit written comments to cfs@energystar.gov by **December 2, 2021**



Prompt for questions or feedback



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Talking: Liz Davis

Questions

[Enter a question for staff]

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Webinar Housekeeping

Webinar ID: 608-865-371

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Stakeholder Breakdown in Today's Webinar

Registrations for today's webinar include:

- 12 Product Brand Owners/Manufacturers
- 5 EEPS/Utilities
- 5 Consultants
- 3 Labs
- 3 Associations



Meeting Agenda

1. Introductions and Purpose of Revision
2. Review of Proposed Changes
3. Test Methods
4. Definitions and Reporting Requirement
5. Criteria
6. Analysis and Results
7. Closing - Next Steps & Questions



Introductions

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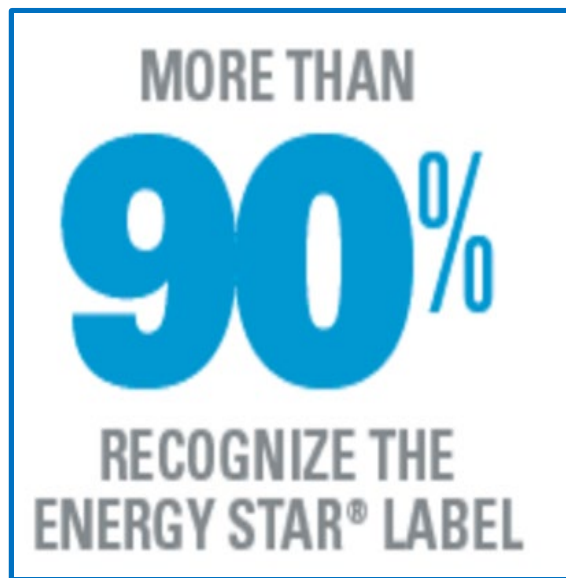
What is ENERGY STAR?



- Influential and trusted symbol of **energy efficiency**
- Available across **75+ product categories**
- Since 1992, a voluntary **partnership** among government, business, and consumers
- Products are independently certified to meet strict energy-efficiency guidelines set by the **U.S. EPA**
- **Utilities** offer **rebates** on ENERGY STAR certified equipment
- **Saves** end-users **energy, water, and money**
- Helps protect the **climate**



Benefits to joining ENERGY STAR

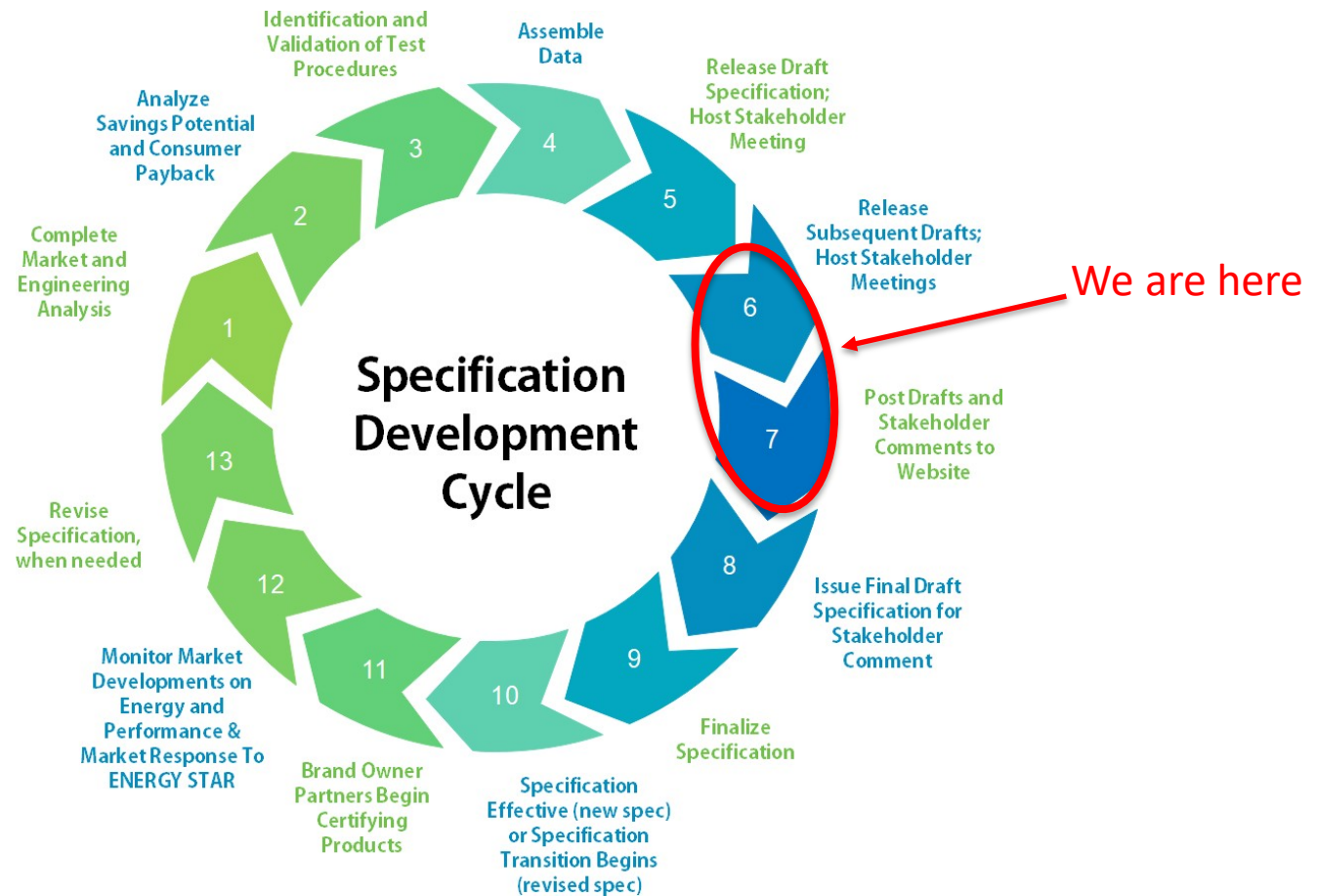


Source: CEE's 2019 Household Survey
<https://www.energystar.gov/awareness>

- Access a network of over 700 utilities
- Leverage the label recognition
- Access customer support teams at EPA
- Utilize co-brandable materials
- Participate in promotional events
- Get listed on publicly-available ENERGY STAR search tools
- Receive email notifications about program activities
- Apply for the ENERGY STAR Partner of the Year Award
 - Deadline December 7, 2021
 - <https://www.energystar.gov/about/awards>



ENERGY STAR Specification Development Process





Guiding Principles That Drive Specification Revisions

- Revisions are driven by the need to continuously recognize and differentiate top performing products on the market:
 - Significant increase in ENERGY STAR market penetration, [estimated **54%** as of [2020 USD Report](#)]
 - New or revised test methods
 - Technological advancements (stakeholder interest)
 - Change in Federal minimum efficiency standards
 - Product performance or quality concerns



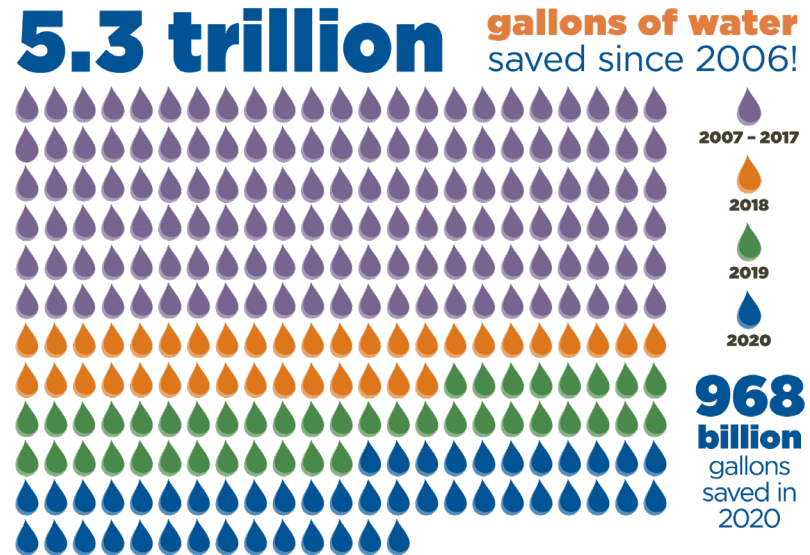
What Is WaterSense?



WaterSense is a voluntary partnership program launched by EPA in 2006 that provides a simple way to identify water-efficient:

- Products
- Programs
- Practices
- Homes

Products are independently certified for water efficiency **and** performance



That's the water used in **200 days** by all U.S. households!



WaterSense Labeled Products



**Tank-Type and
Flushometer-Valve
Toilets**



Flushing Urinals



Showerheads

**More than 37,000 Labeled
Product Models and 3,700 Homes**



**Weather- and Soil Moisture
-Based Irrigation
Controllers**



Lavatory Faucets



Homes



**Spray Sprinkler
Bodies**



Water factors are also included in many ENERGY STAR certified products



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Review of Proposed Revisions

- **Test Methods**
 - Addition of water consumption test method to convection ovens
- **Terms, Definitions, and Proposed Reporting Requirements**
 - Water consumption rate definitions were separated by oven type and condensate cooling water is explicitly included, if applicable.
 - Water consumption reporting requirement for applicable convection, rack, and combination ovens
- **Criteria levels**
 - Water consumption criteria for combination ovens
 - Full-size electric convection ovens binned by pan capacity
 - Combi oven steam mode criteria revised back to v2.2



We encourage any questions or feedback



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Test Methods

Oven Types	Test Method Reference
Convection Ovens	<p>ASTM F1496-13(2019), Standard Test Method for Performance of Convection Ovens</p> <p><i>For water metrics if applicable: ASTM F2861-20, Standard Test Method for Enhanced Performance of Combination Oven in Various Modes</i></p> <p>F2092-14 Standard Specification for Convection Oven Gas or Electric</p>
Combination Ovens	<p>ASTM F2861-20, Standard Test Method for Enhanced Performance of Combination Oven in Various Modes</p> <p>F1495-20 Standard Specification for Combination Oven Electric or Gas Fired</p>
Rack Ovens	<p>ASTM F2093-18, Standard Test Method for Performance of Rack Ovens</p> <p>F2092-14 Standard Specification for Convection Oven Gas or Electric</p>

NSF/ANSI 170-2019, Glossary of Food Equipment Terminology is also referenced



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Definitions

- **Average Water Consumption Rates:** The monitored water consumption of an oven during specified test conditions. These metrics shall include condensate cooling water, if applicable.
 - Combination Oven Water Consumption Rate: The water consumed during idle and heavy load cooking periods in steam and convection mode, expressed as gallons per hour per steam pan (gal/hr/pan). Gallon per hour per pan shall be based on GN 1/1 steam table pans and for full and half-size combination ovens and GN 2/3 steam table pans for 2/3-size combination ovens.
 - Convection Oven Water Consumption Rate: The water consumed during the moisture injection mode by an oven without a dedicated steam only mode. The highest moisture injection mode available shall be tested during the idle and cooking modes, expressed as gallons per hour per full-size or half-size sheet pan (gal/hr/pan).
 - Rack Oven Water Consumption Rate: The water consumed by an oven with a moisture (steam) injection mode, the highest moisture setting delivered per cycle is captured.
- **Average Rack Oven Steam Injection Rate:** Water consumption during a period where the highest steam injection mode available is introduced into the baking cavity of a rack oven during a steam injection cycle, expressed as gallons per minute (gal/min).



Proposed Reporting Requirement

- **Water Consumption Rates**
 - Combination oven water consumption (gal/hr/pan) during idle periods in steam and convection mode
 - Convection ovens with moisture injection (gal/hr/pan) during idle and cooking periods
 - Rack ovens with steam injection (gal/min) during the steam generation period





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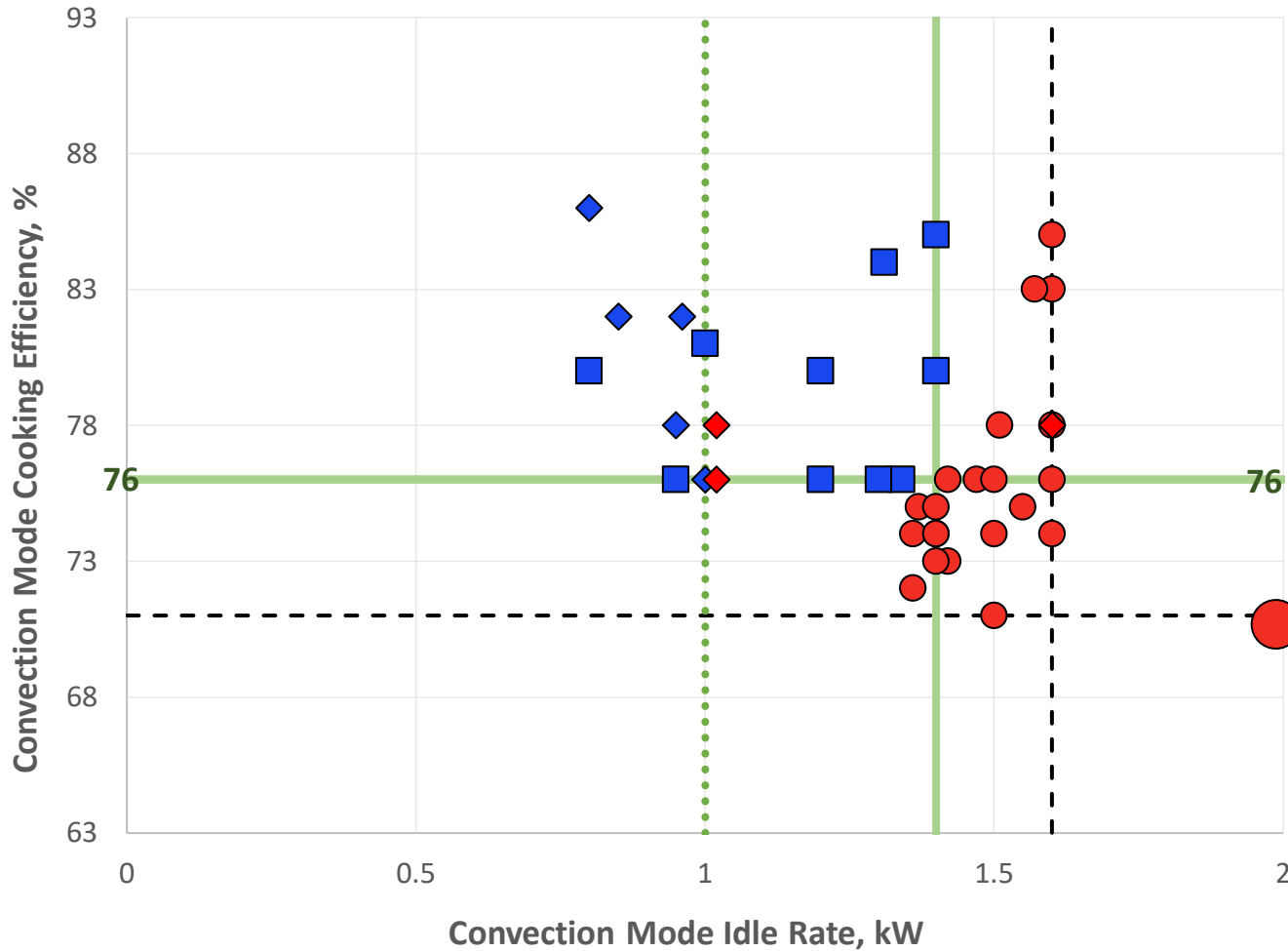
Approach to Criteria

- Binned **full-size electric convection ovens** by sheet pan capacity to include higher capacity ovens and more correctly distinguish between low capacity and high capacity ovens in the dataset.
 - Three other strategies were also considered:
 - 1. Binning by production capacity rates,
 - 2. Redefining the full-size and half-size sub-categories by production capacity,
 - 3. Adjusting the idle energy rate equation by normalizing it by production capacity



Electric Convection Ovens: Full-Size

Full-sized Electric Convection models Binning by Number of Sheet Pans



EPA proposes binning full-size electric convection ovens by sheet pan capacity to include higher capacity ovens and more correctly distinguish between low capacity and high capacity ovens in the dataset.

Based on 2019 and 2020 Unit Shipment Data as well as market expertise, the ENERGY STAR estimated market share in this sub-category is approximately 70%. Shipment data (2019, 2020) received for this sub-category represent a vast majority of the market which was taken into account in the market share estimates.

- Proposed Min Eff. All Full-Size
- Current Max Idle
- Current Min Eff.
- ◆ Passing <5 pans Ovens
- Passing ≥ 5 Pans Ovens
- Failing ≥5 Pans Ovens
- ◆ Failing <5 Pans Ovens



Approach to Criteria (continued)

- General criteria changes
 - Specific models were removed from the dataset based on stakeholder feedback or because they were miscategorized or were discontinued.
 - Combis: V2.2 steam mode criteria were used because SSL are not standardized. Convection idle rates were adjusted and are more stringent from Draft 1 to continue recognizing about 25% of the most energy efficient combination oven models.
- Energy efficiency was prioritized over water consumption rates and combi data from the ENERGY STAR QPL were used to propose criteria during the cooking period for steam and convection mode. Most models meeting the energy metrics passed the water consumption criteria.



Commercial Ovens Proposed V3.0 Criteria

Oven Type	Fuel Type	Max Steam Mode Idle Energy Rate (Btu/hr or kW)	Max Convection Mode Idle Energy Rate (Btu/hr or kW)	Min Steam Mode Cooking Energy Efficiency (%)	Min Convection Mode Cooking Energy Efficiency (%)
Combi: Full and Half size (5-40 Pan Capacity)	Electric	0.133P+0.6400	<i>0.083P+0.35</i>	55	78
Combi: 3-4 Pan Capacity and 2/3-size	Electric	0.6P	0.05P+0.55	51	70

Grey shading indicates no change in criteria level from v2.2

Darker blue shading indicates new subcategory for some products under the new scope expansion

Italicized font indicates change in criteria from Draft 1 to Draft 2

Commercial Ovens Proposed V3.0 Criteria



Oven Type	Fuel Type	Max Steam Mode Idle Energy Rate (Btu/hr or kW)	Max Convection Mode Idle Energy Rate (Btu/hr or kW)	Min Steam Mode Cooking Energy Efficiency (%)	Min Convection Mode Cooking Energy Efficiency (%)
Combi: Full and Half size (5-40 Pan Capacity)	Electric	0.133P+0.6400	<i>0.083P+0.35</i>	55	78
Combi: 3-4 Pan Capacity and 2/3-size	Electric	0.6P	0.05P+0.55	51	70
Combi: Full and Half size (≥5 Pan Capacity)	Gas	200P+6511	<i>140P+3800</i>	41	57
<i>Convection: Full size ≥ 5 Pans</i>	Electric		<i>1.4</i>		76
<i>Convection: Full size < 5 Pans</i>	Electric		<i>1.0</i>		
Convection: Half size	Electric		1		71
Convection: Full size	Gas		9,500		49

Grey shading indicates no change in criteria level from v2.2

Darker blue shading indicates new subcategory for some products under the new scope expansion

Italicized font indicates change in criteria from Draft 1 to Draft 2

Combi Ovens Proposed V3.0 Water Consumption Criteria



Combi Operation	Fuel Type	Cooking Period Water Consumption rate
Steam Mode	Electric and Gas	< 1.0 gallons per hour per pan
Convection Mode	Electric and Gas	< 0.5 gallons per hour per pan

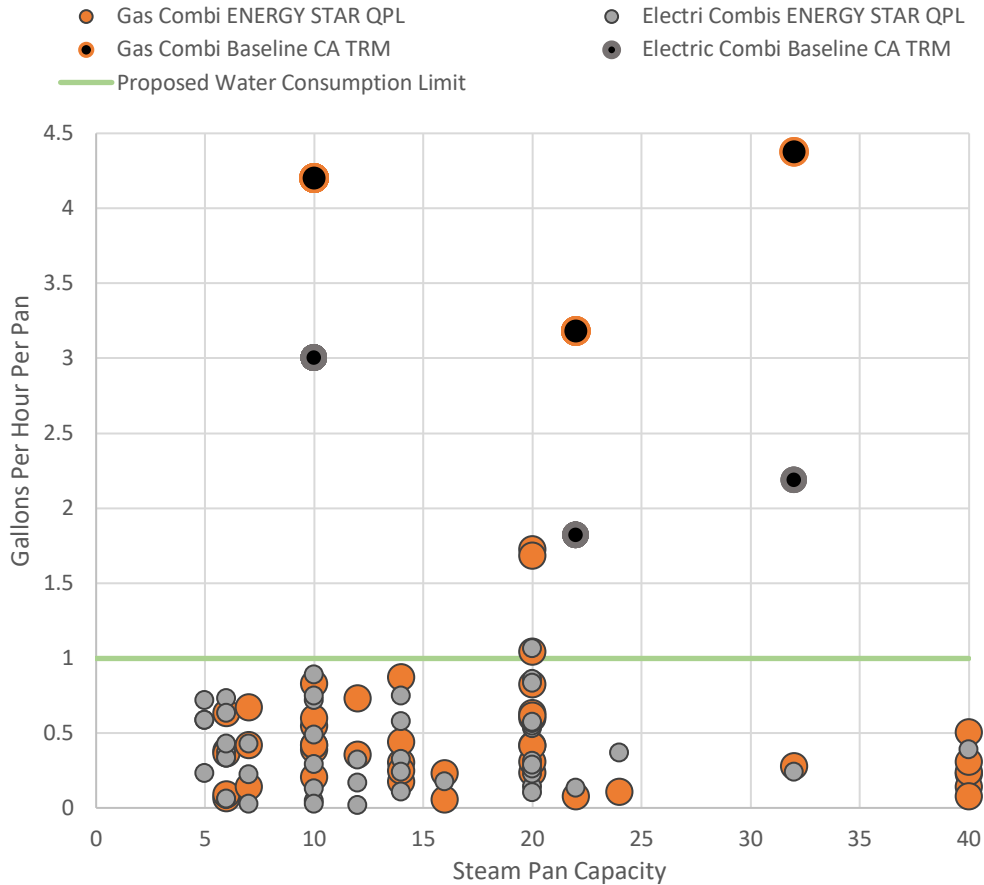
Several standards have incorporated water consumption thresholds for combination ovens

- Leadership in Energy and Environmental Design (LEED) Version 4.1
 - <1.5 gallons per hour per pan including condensate cooling water
- ANSI/GBI 01-2019 Green Globes Assessment Protocol for Commercial Buildings
 - <1.5 gallons per hour per pan in steam mode
- ASHRAE 189.1-2020 Standard for the Design of High-Performance Green Buildings
 - 10 gallons per hour in full operational mode
- IAPMO's Water Efficiency and Sanitation Standard for the Built Environment 2020 (WE•Stand)
 - <0.5 gallons per hour per oven cavity in convection mode
 - <1.5 gallons per hour per pan in steamer mode

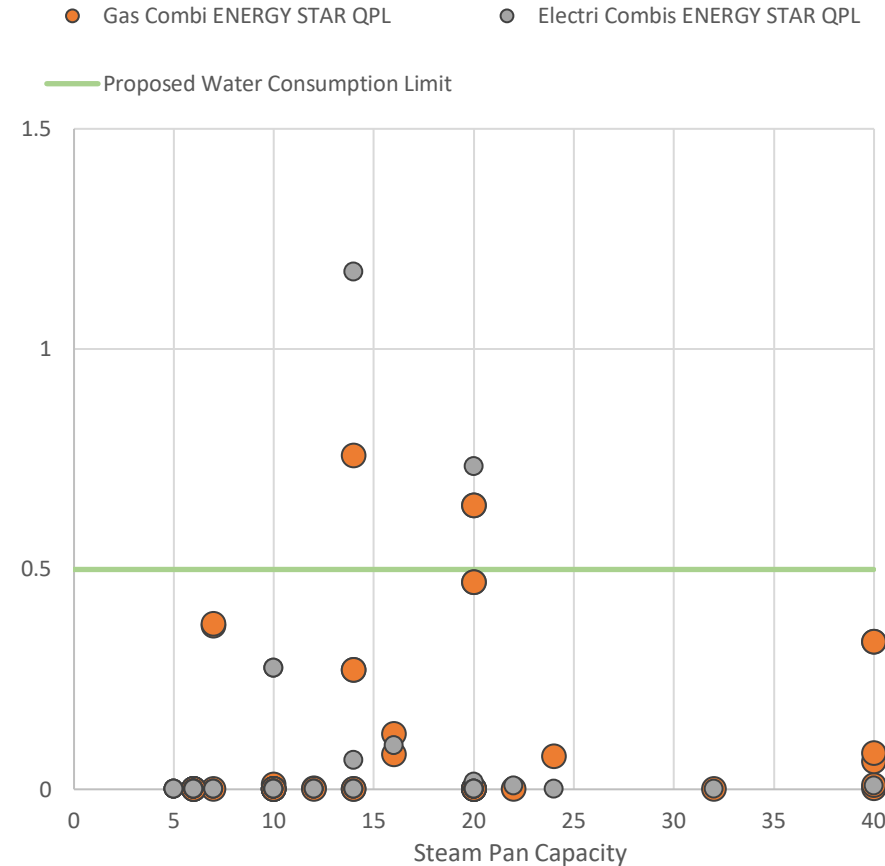


Water Consumption Thresholds

Water Consumption Criteria- Electric and Gas Combi: data from ESTAR QPL, gallons per hour per pan assumption, steam mode only.



Water Consumption Criteria- Electric and Gas Combi: data from ESTAR QPL, gallons per hour per pan assumption, convection mode only.





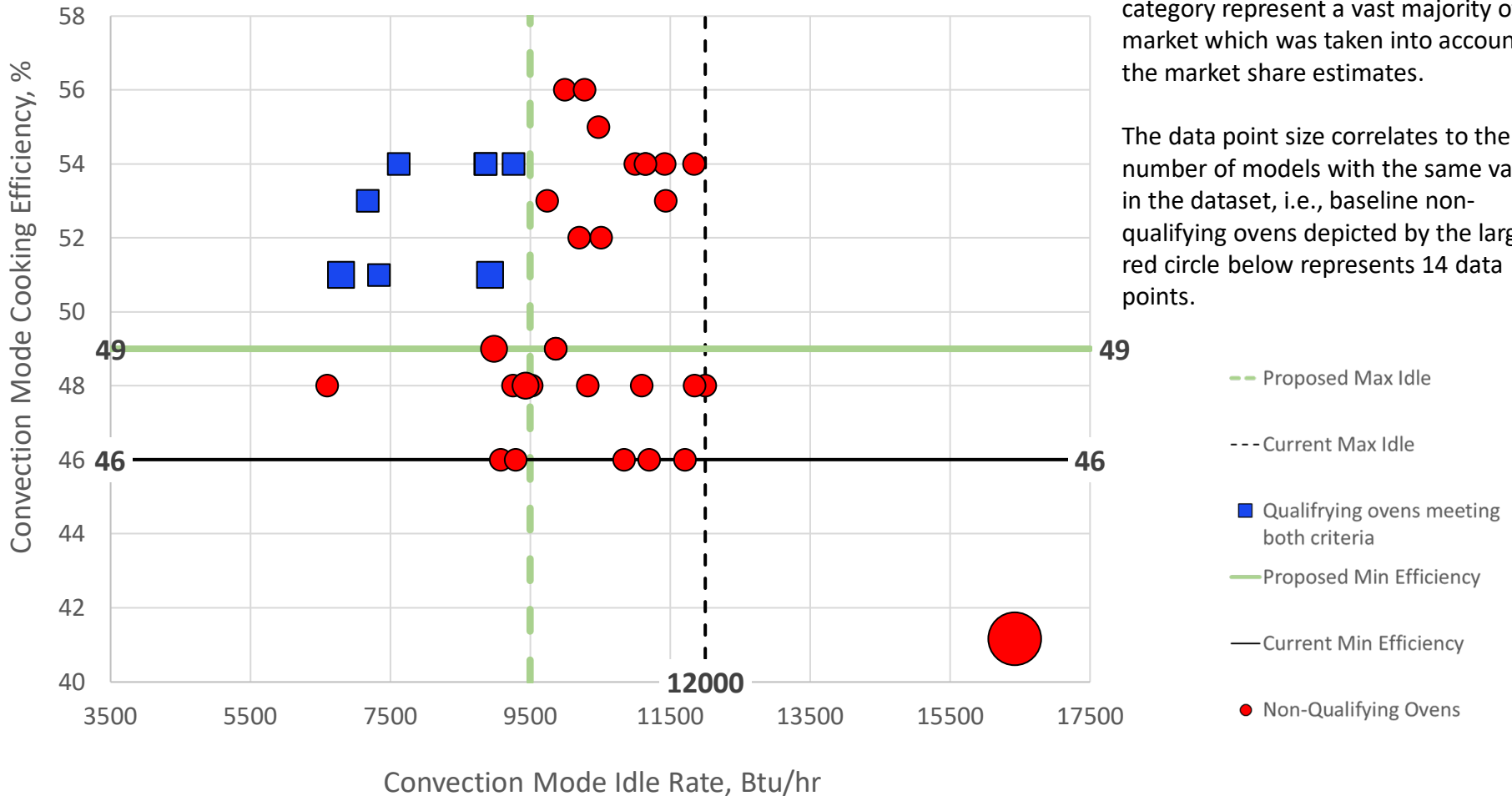
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Gas Convection Ovens

Both Metrics for Gas Convection Models



Based on 2019 and 2020 Unit Shipment Data as well as market expertise, ENERGY STAR estimated market share in this sub-category is nearly 50%. Shipment data (2019, 2020) received for this sub-category represent a vast majority of the market which was taken into account in the market share estimates.

The data point size correlates to the number of models with the same values in the dataset, i.e., baseline non-qualifying ovens depicted by the largest red circle below represents 14 data points.

- Proposed Max Idle
- Current Max Idle
- Qualifying ovens meeting both criteria
- Proposed Min Efficiency
- Current Min Efficiency
- Non-Qualifying Ovens



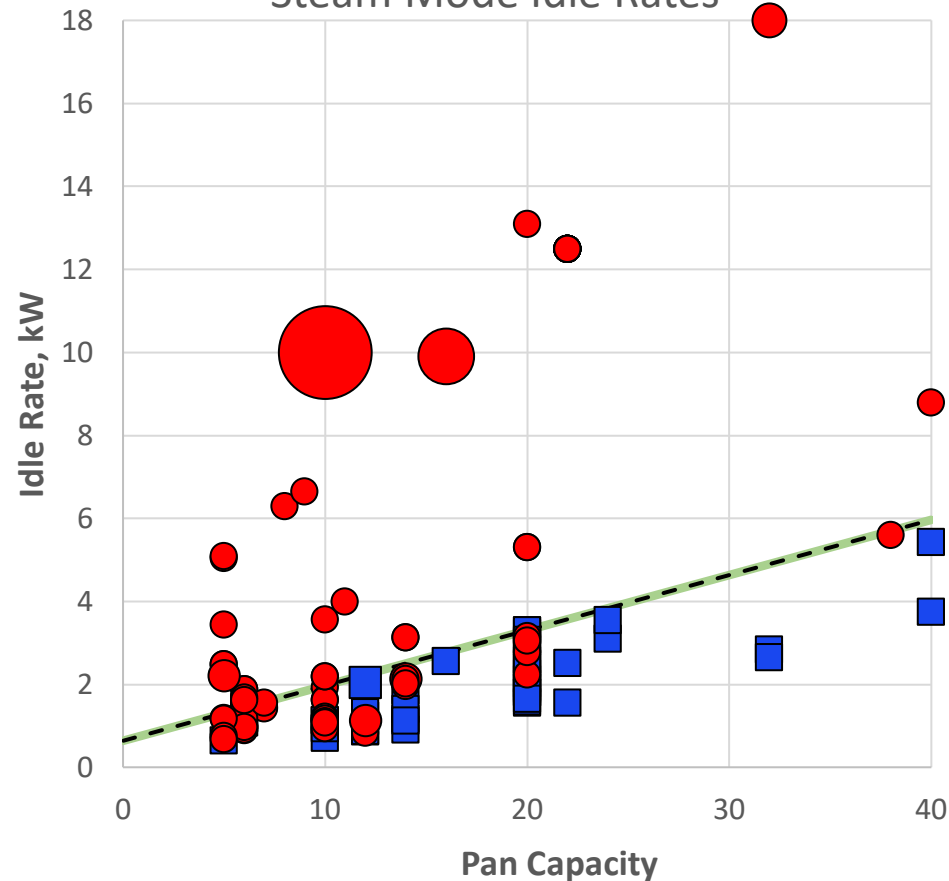
Electric Combi Ovens: Full and Half-Size (5-40 Pan Capacity) Idle Rates

Steam mode idle rate and cooking-efficiency were not adjusted due to stakeholder concerns regarding potential impacts to humidity.

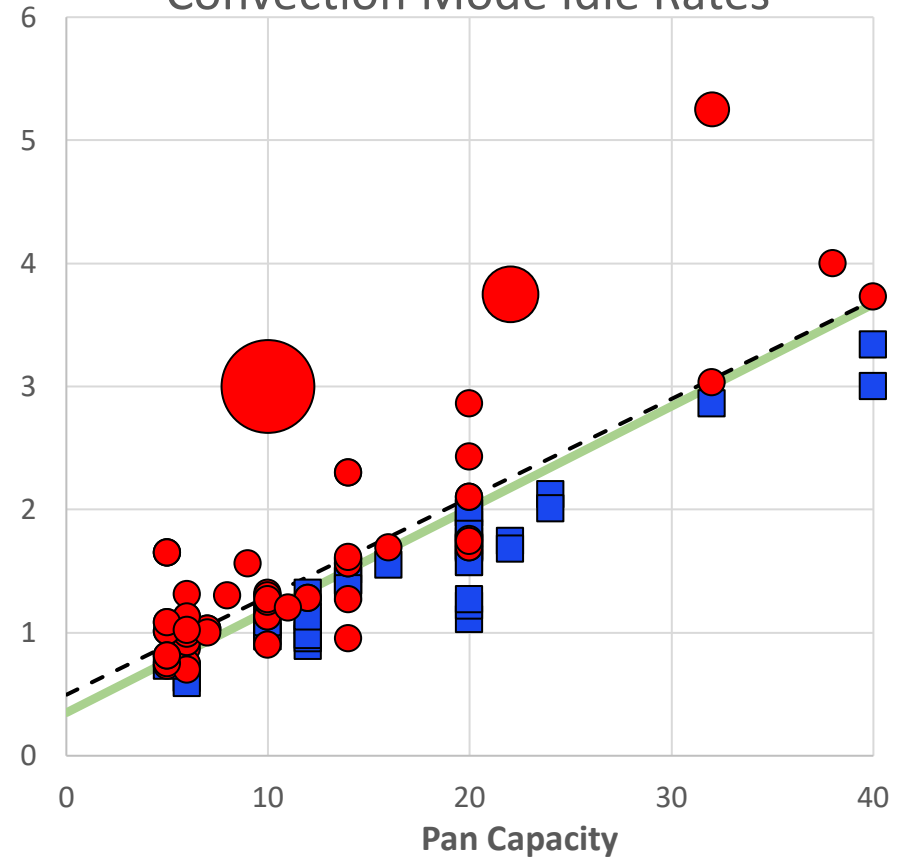
Steam Idle Rate: $0.133P+0.6400$

Proposed Convection Idle Rate: $0.083P+0.35$

Steam Mode Idle Rates



Convection Mode Idle Rates



— Proposed Max

--- Current Min

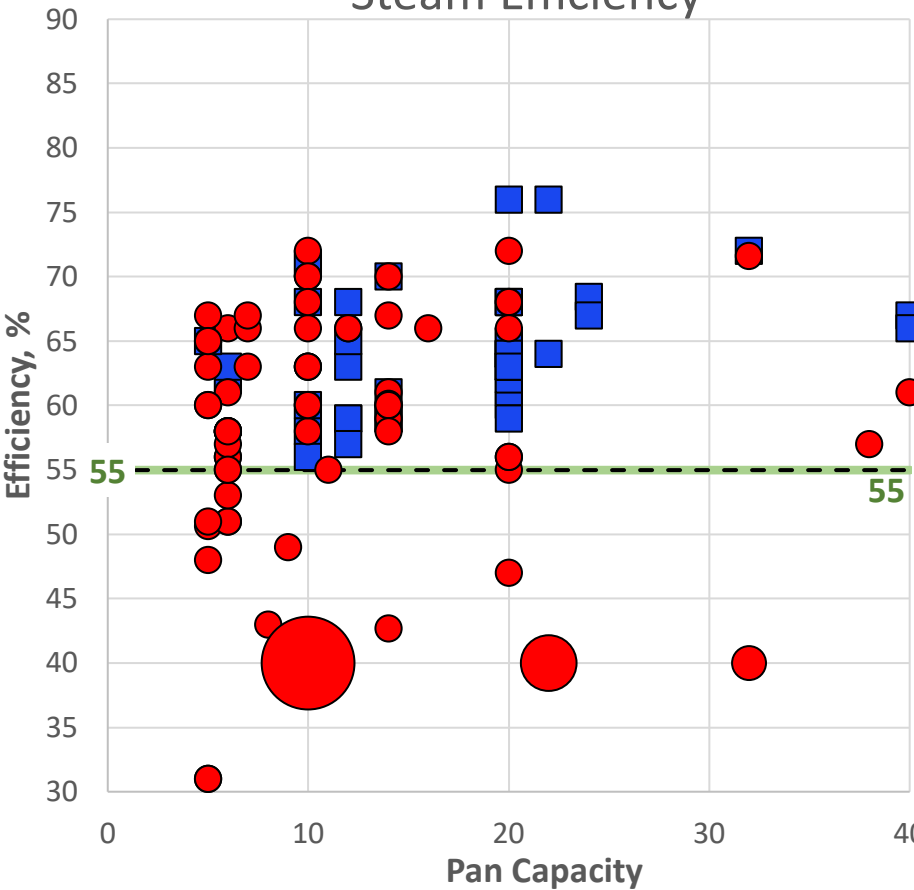
■ Qualifying ovens that pass 4 metrics

● Non-Qualifying Ovens

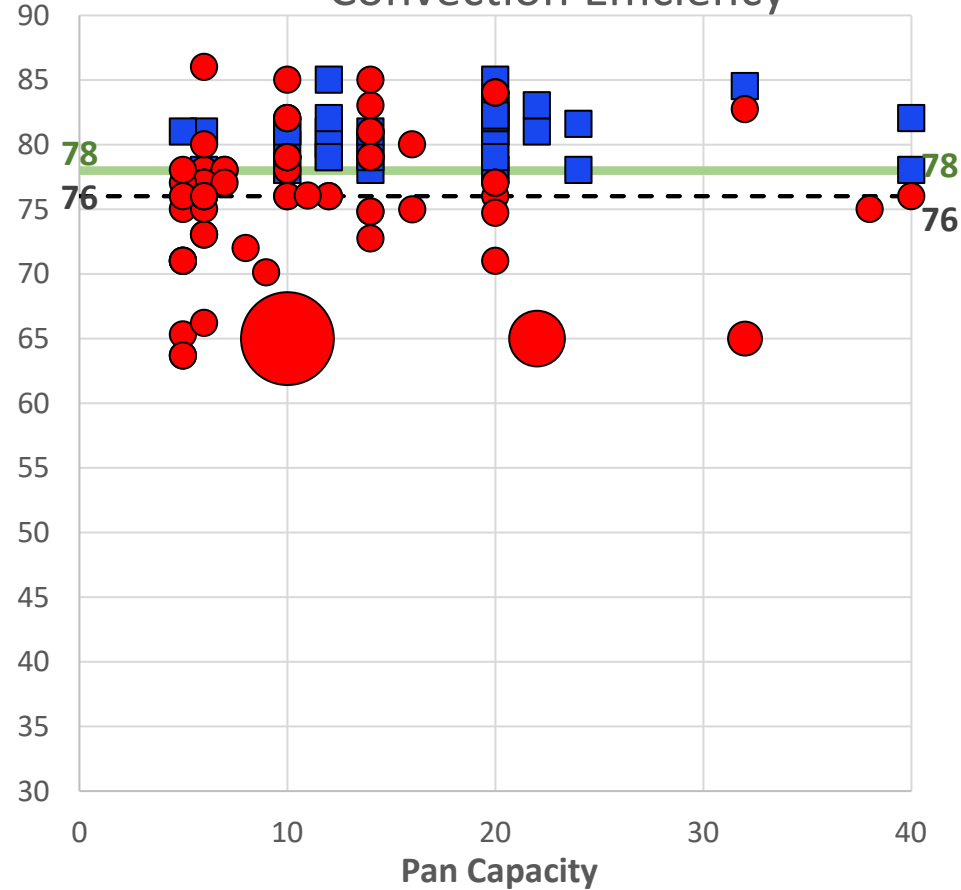


Electric Combi Ovens: Full and Half-Size (5-40 Pan Capacity) Efficiencies

Steam Efficiency



Convection Efficiency

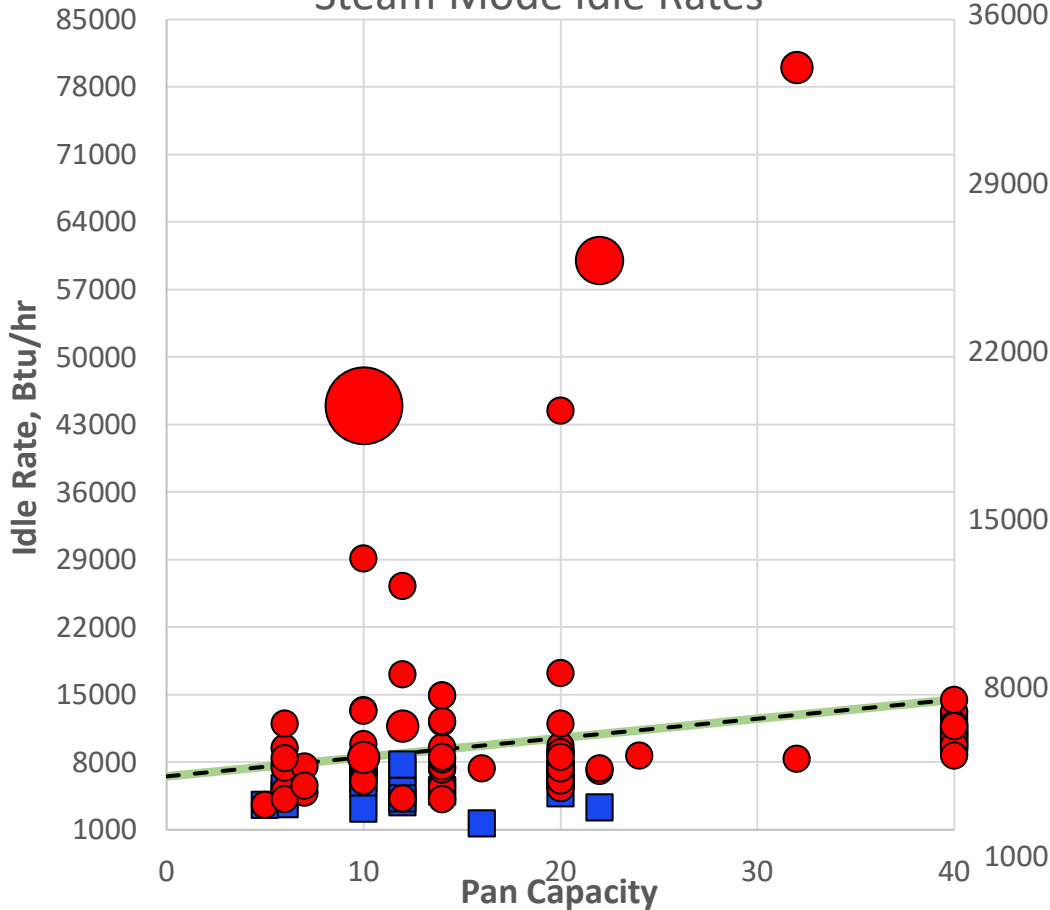




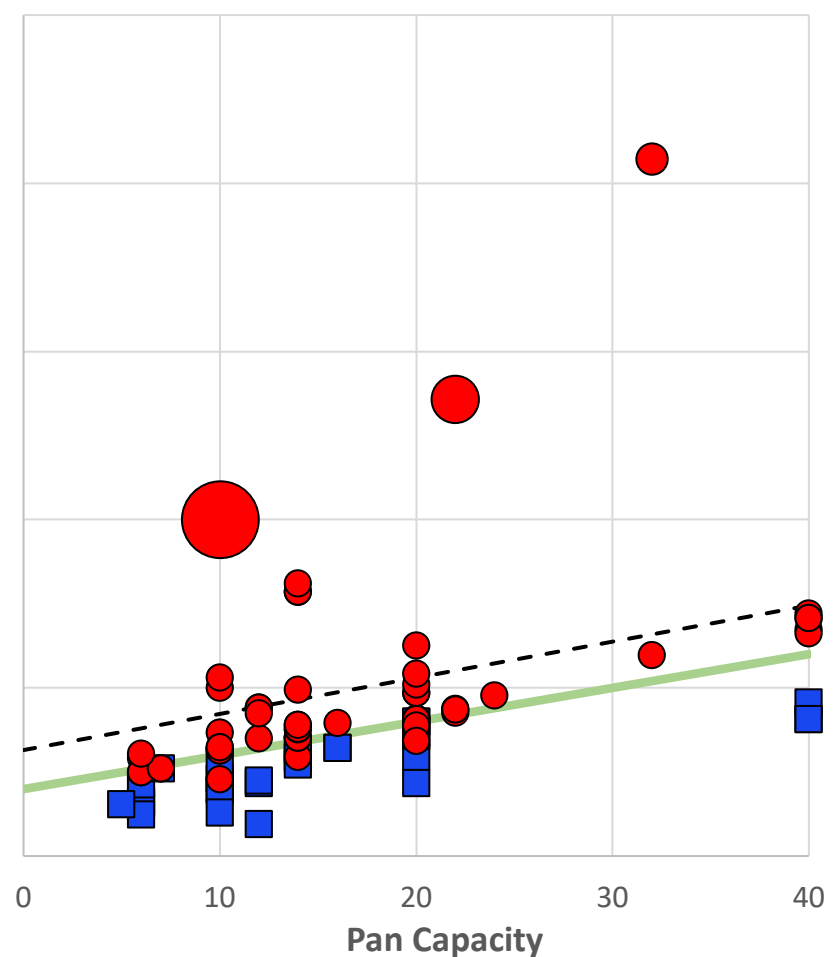
Gas Combi Ovens Idle Rates

— Proposed Max
 --- Current Min
 ■ Qualifying ovens that pass 4 metrics ● Non-Qualifying Ovens

Steam Mode Idle Rates



Convection Mode Idle Rates



Steam mode idle rates were not adjusted due to stakeholder concerns regarding potential impacts to humidity.

Steam Idle Rate: 200P+6511

Proposed Convection Idle Rate: 135P+4000

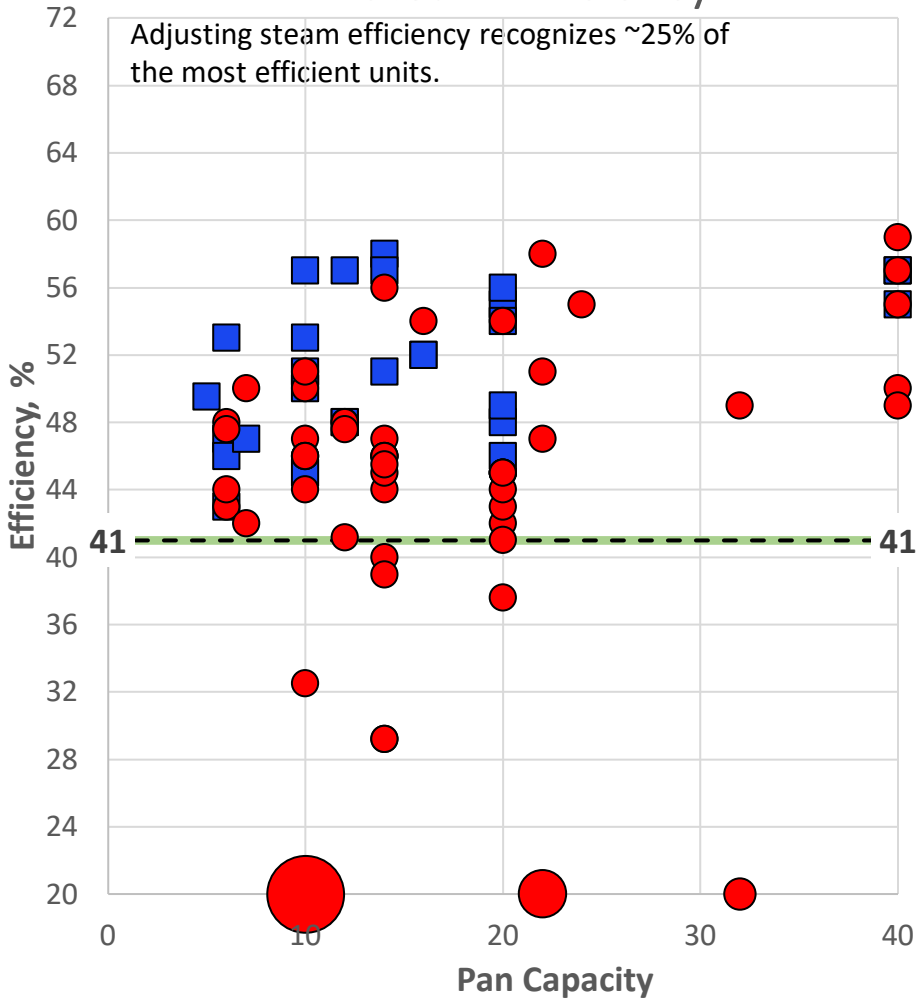


Gas Combi Ovens Efficiencies

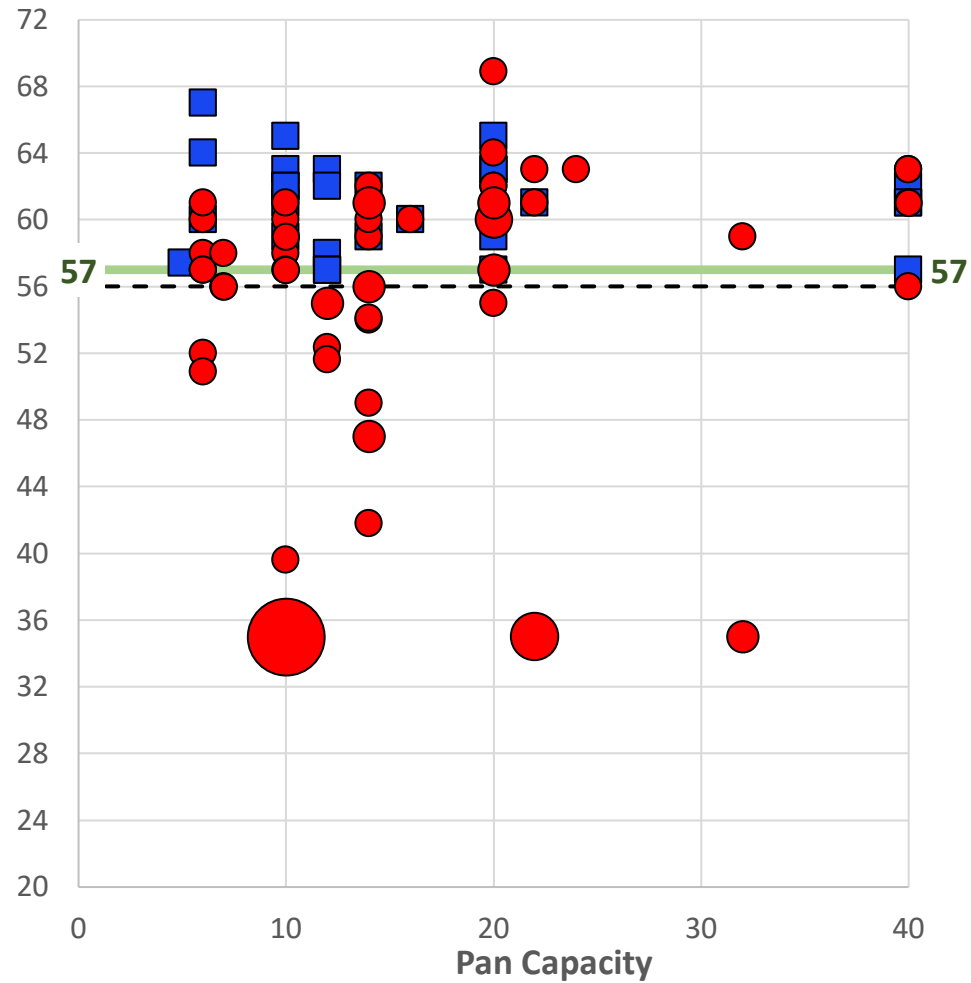
- Proposed Max
- Current Min
- Qualifying ovens that pass 4 metrics
- Non-Qualifying Ovens

Steam Efficiency

Adjusting steam efficiency recognizes ~25% of the most efficient units.



Convection Efficiency



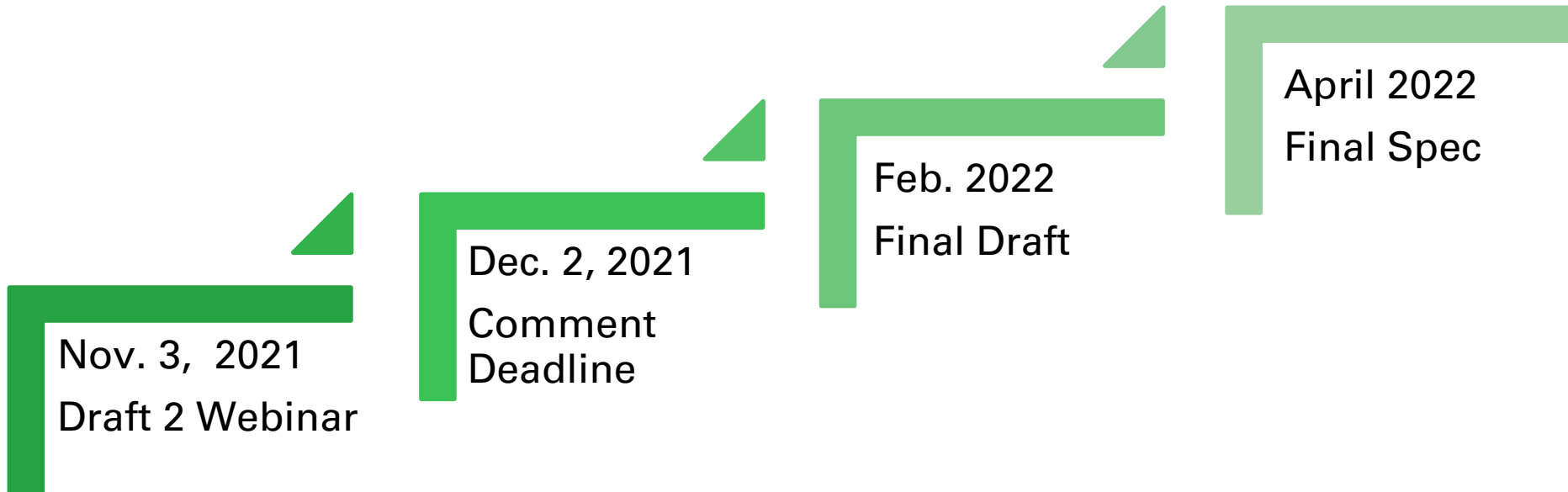


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Next Steps



Follow the development process on the [product development webpage](#)



Questions

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Stakeholders are encouraged to provide written comments for consideration to cfs@energystar.gov by December 2, 2021.