

ENERGY STAR[®]

Commercial Ovens

V 2.0 Draft 1 Discussion

May 7, 2012

NRA Show, McCormick Place

Chicago, Illinois

Today's Agenda

- Introductions and review of activities to date
- Review comments received on Draft 1
 - Definitions
 - Scope
 - Testing
 - Performance Criteria
- Discuss outstanding items, questions
- Identify next steps

Meeting Introduction

- EPA thanks all stakeholders who have participated thus far in the revision of the ENERGY STAR specification for Commercial Ovens
- Stakeholder participation is critical to the specification development

Activities to Date



- Official V2.0 Launch: November 21, 2011
- Stakeholder Webinar: December 15, 2011
- Draft 1 Released: March 9, 2012
- Draft 1 Comments Due: April 6, 2012

Definitions: Combination Oven Sub-Type



- Draft 1 sub-type definitions:
 - Countertop Combination Oven
 - A combination oven capable of holding half-size steam table pans measuring $10\frac{3}{8}$ x $12\frac{3}{4}$ x $2\frac{1}{2}$ -inch and unable to accommodate a minimum of one steam table pan measuring 12 x 20 x $2\frac{1}{2}$ -inch.
 - Full-Size Combination Oven
 - A combination oven that is able to accept a maximum of twelve steam table pans measuring 12 x 20 x $2\frac{1}{2}$ -inch.
 - Floor-Mounted, Full-Size Combination Oven
 - A combination oven that is able to accept a minimum of thirteen steam table pans measuring 12 x 20 x $2\frac{1}{2}$ -inch and a maximum of twenty standard sheet pans measuring 18 x 26-inch.

Definitions: Combination Oven Sub-Type



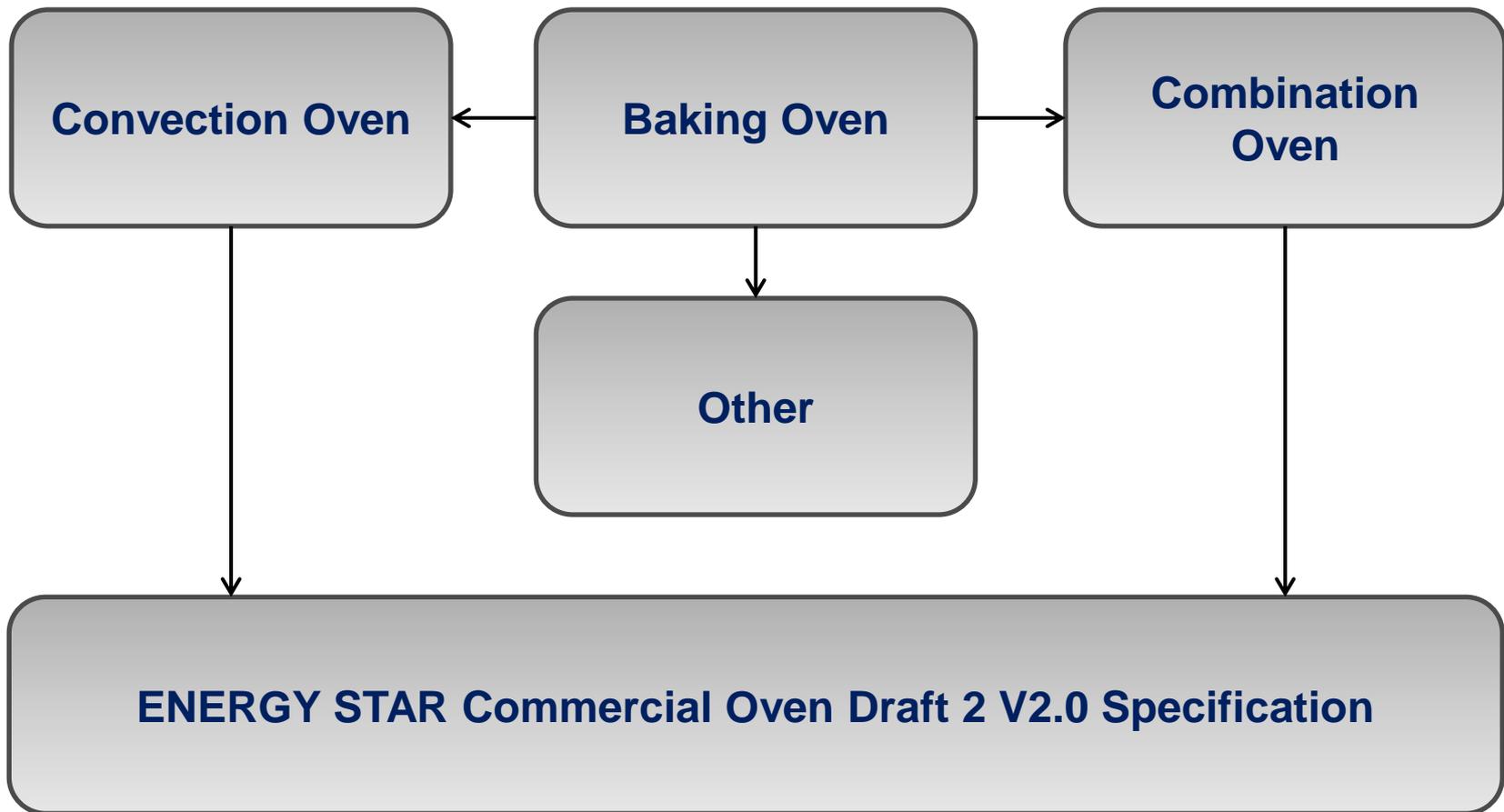
- Suggested sub-type definitions:
 - Countertop/Stand-Mounted Combination Oven
 - Half-Size: Capacity to accommodate a minimum of 3 half-size bake or sheet pans or steam table pans.
 - Full-Size: Capacity to accommodate a minimum of 5 full-size bake or sheet pans or steam table pans.
 - < Half-Size: Capacity to accommodate less than full-size steam table pans.
 - Floor-Mounted Combination Oven
 - Half-Size: Capacity to accommodate a minimum of 10 half-size bake or sheet pans or steam table pans.
 - Full-Size: Capacity to accommodate a minimum of 10 full-size bake or sheet pans or steam table pans.
- Bake/sheet pans, steam-table/hotel pans, or both?

Scope: Excluded Products



- EPA proposes that the countertop/stand-mounted combination ovens not capable of accommodating full-size steam pans shall remain excluded in the specification V2.0 scope.
 - Due to the proposed changes in the combination oven sub-type definitions section, the new language will be reflected in the scoping section of the Draft 2 specification.

Scope, cont.



Product Family Testing



- **Comment:** Testing at the most energy consumptive voltage puts manufacturers that offer models with adjustable voltage capabilities at a disadvantage.
- Testing voltage shall be reported on the QPL.
- In order to qualify a model for ENERGY STAR:
 1. The manufacturer must determine the most energy consumptive voltage configuration offered in the product family for qualification testing.
 2. Every voltage configuration in the product family must undergo testing and meet the ENERGY STAR performance criteria levels.
 3. Stakeholder feedback: alternative approaches?

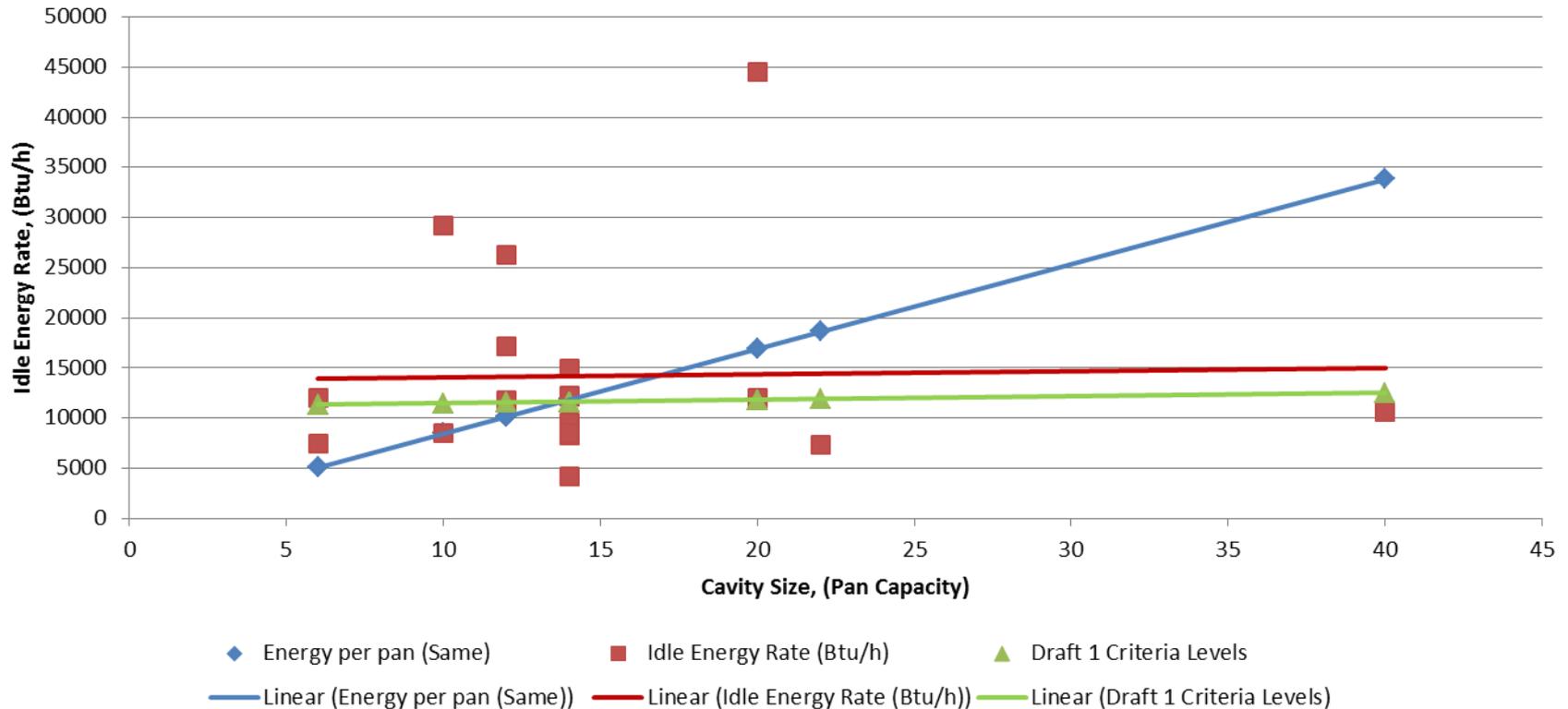
Performance Criteria

- **Comment:** Concerning the idle energy rate, why is there a difference in the energy allowed per pan for electric and gas?
 - Data driven process
 - Levels based on data made available to EPA
 - Data suggests inherent upward trend based on pan capacity
 - EPA is open to exploring alternative approaches determining idle rate criteria for Draft 2
 - Request for additional data

Performance Criteria: Idle Rate Criteria Versus Energy Per Pan



Steam Idle Energy Rate Data & Energy Per Pan Criteria (Steam Mode)



Performance Criteria: Methodology

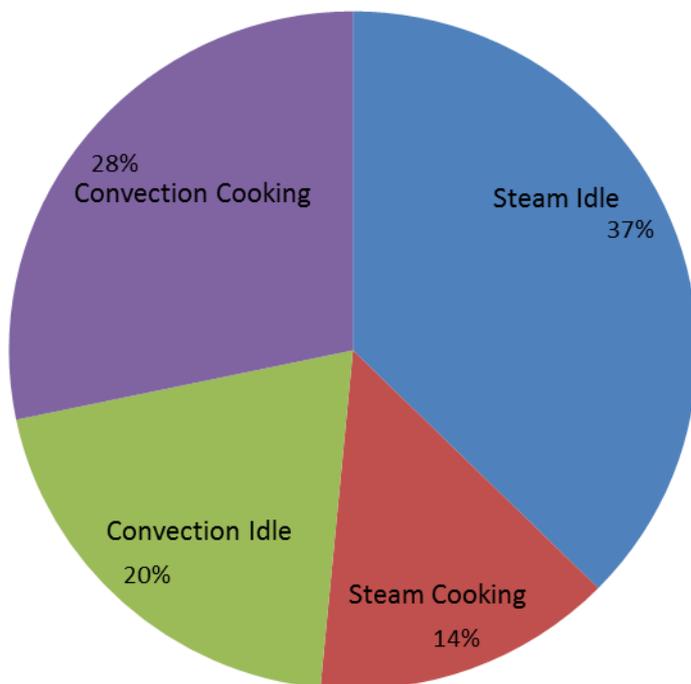


- EPA used a weighted approach in determining which modes and applications should have the most stringent criteria levels.
 - Assumptions were provided by the Food Service Technology Center's on-line cost calculators for combination ovens.

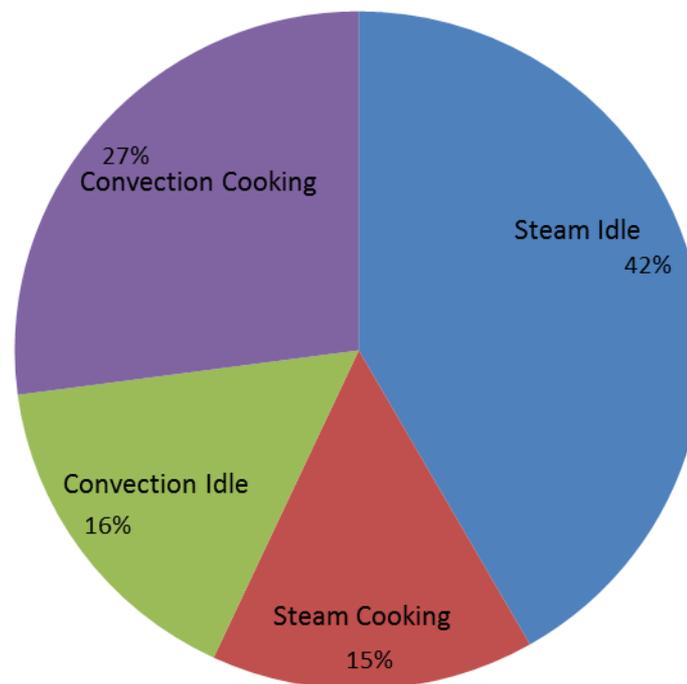
Determining Combination Oven Performance Criteria



Energy Intensity (Gas)



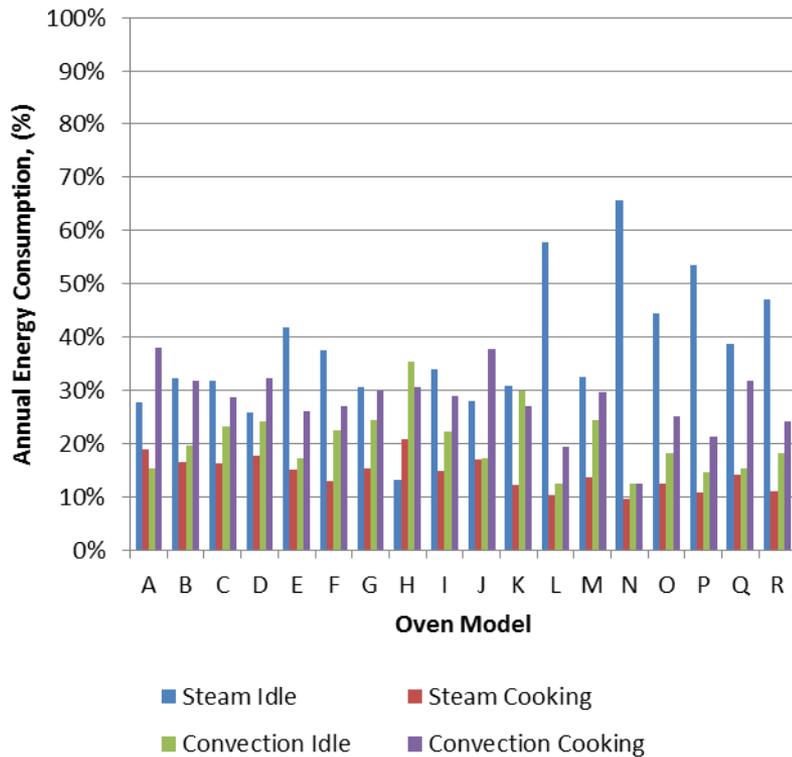
Energy Intensity (Electric)



Combination Oven Energy Consumption



Combination Oven Energy Intensity Profiles (Gas):



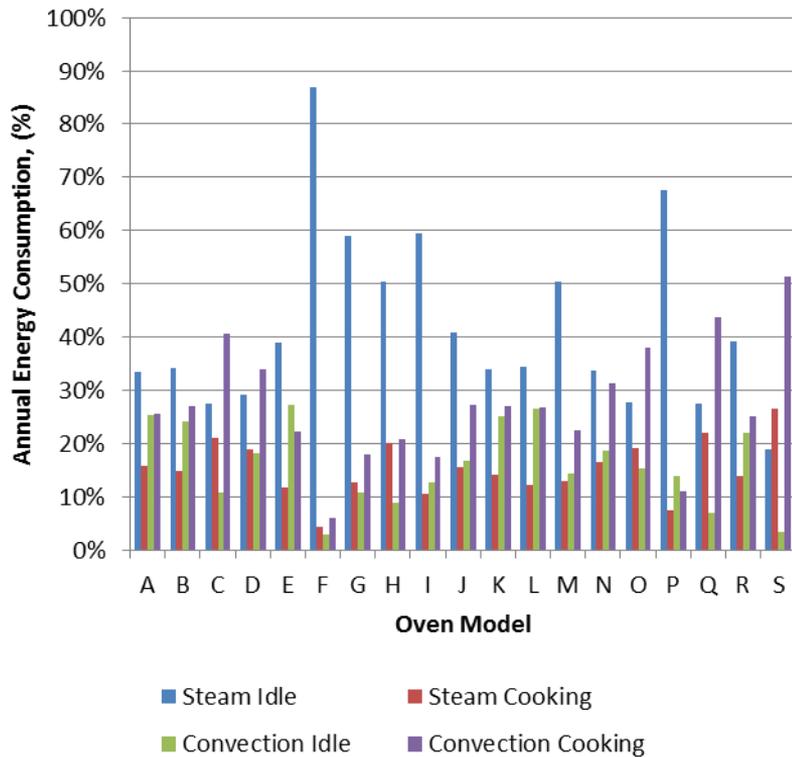
Average Energy Intensity (Gas):

Steam Mode		Convection Mode	
Idle	Cooking	Idle	Cooking
281 Therms	97 Therms	137 Therms	185 Therms
or			
37%	14%	20%	28%

Combination Oven Energy Consumption



Combination Oven Energy Intensity Profiles (Electric):



Average Energy Intensity (Electric):

Steam Mode		Convection Mode	
Idle	Cooking	Idle	Cooking
9,392 kWh	2,254 kWh	2,590 kWh	3,860 kWh
or			
42%	15%	16%	27%

Why did EPA select this approach?

- In order to achieve an appropriate qualification rate and still providing adequate choice for consumers, EPA determined that some modes/applications must have more or less stringent levels than others.
- By adopting the weighted method, we could identify which of those levels are the most energy consumptive, thus placing more stringent levels on the most appropriate modes/applications.

V2.0 Draft 1 Energy Efficiency Requirements



Gas		
Operation	Idle Rate, Btu/h	Cooking-Energy Efficiency, %
Steam Mode	$\leq 35P+11,111$	≥ 44
Convection Mode	$\leq 42P+6,625$	≥ 54
Electric		
Operation	Idle Rate, kW	Cooking-Energy Efficiency, %
Steam Mode	$\leq 0.02P+2.5889$	≥ 49
Convection Mode	$\leq 0.078P+0.8587$	≥ 74

Performance Criteria: Approach

- **Comment:** EPA should investigate a measured daily energy consumption metric that also includes:
 1. Energy performance reporting requirements; or
 2. A minimum efficiency criteria.
- A daily energy consumption metric approach would still require assumptions to be made in order to develop a qualifying list and actual energy consumption would still vary based on usage patterns.
- Including a supplementary minimum efficiency criteria would potentially result in non-qualifying models with low idle rates and above level cooking-energy efficiencies to consume less total energy than qualifying models.

Performance Criteria: Calculations



- **Comment:** Gas usage (Btu/h) should be converted to kW to better compare ovens among different fuel types.
 - ENERGY STAR takes a fuel neutral approach
 - Sets efficiency criteria for all relevant fuel types
 - The program does not combine fuel types for any other CFS product category
 - Fuel type drives choice, greatly dependent on what the end-user has available in their facility
 - May cause customer confusion

Performance Criteria: Technologies



- **Comment:** With the proposed steam mode idle criteria, all of the steam generator units would fail.
 - Masked data
 - At least 1 qualifying electric model contains a steam generator
- How is the market segmented amongst combination ovens with:
 - an external steam generator;
 - an internal steam generator; and
 - generator-free?

V2.0 Draft 1 Qualified Products List



- **Comment:** Based on the Draft 1 proposed criteria levels, there would be limited ENERGY STAR product availability for some end-users and local efficiency programs.
- **Comment:** EPA should disclose the number of manufacturers producing qualifying products based on the proposed criteria.
 - Some of the performance data provided to EPA for developing criteria levels is masked; therefore, EPA cannot determine an exact number of manufacturers that would qualify under the proposed Draft 1 levels.
 - Gas:
 - At least 2 manufacturers would have qualifying products, representing 5 out of the 18 models in the data set.
 - Electric:
 - 4 manufacturers would have qualifying products, representing 5 out of the 19 models in the data set.
 - Several models that would not qualify are masked.

Water Consumption Measurements



- Some models have a single water supply connection that provides the water required for steam generation and for condensate cooling.
 - Challenge: Separating and measuring the water consumption used for cooking, from the water used for condensate cooling.
- Measure and report the average water consumption rate for idle rate tests in steam and convection modes; and the steam mode cooking-energy efficiency tests.
 - Reporting: GPH/pan
 - Pan capacity shall be determined based on the number of pans situated in the oven during heavy-load steam mode cooking-energy efficiency tests. This may not align with the manufacturer's stated maximum pan capacity.
 - Stakeholder feedback: is this a fair approach?

Water: Measuring Drain Temperature



- As per the ASTM F2861 Test Method, a temperature sensor is to be installed where the drain water exits the combination oven to monitor the average and maximum drain condensate temperatures.
 - Should Draft 2 require that the drain temperatures be measured and reported as the test method instructs?
 - Average, maximum, or both?
- Water consumption (GPH/pan) coupled with drain temperature should provide the end-user with enough information to evaluate and compare water rates.

Revision Timeline: Target Dates

- **May 31, 2012** – Draft 2 released
 - June 29, 2012 - Comments due to EPA
- **July 20, 2012** – Final Draft released
- **August 1, 2012** - Final V2.0 released
 - Combination ovens could immediately start qualifying

* Dates subject to change based on the publication date of the ASTM Convection Oven test method to coincide with V2.0.

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