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# ENERGY STAR® for Commercial Ovens Stakeholder Meeting

February 4, 2009

Orange County Convention Center  
Orlando, FL



# What is ENERGY STAR?

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- National, government-backed symbol of energy efficiency for use on high-quality, energy-efficient products
- Voluntary program managed by U.S EPA and U.S. DOE
- Represents the top performers in the marketplace
  - It is a differentiator, not a “green seal of approval”

# ENERGY STAR Product Labeling

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## Objectives

- To reduce greenhouse gas emissions, caused by the inefficient use of energy
- To make it easy for businesses and consumers to identify and purchase products with enhanced energy efficiency that offer savings on utility bills while maintaining performance, features, and comfort

# Growth of ENERGY STAR

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- First ENERGY STAR qualified products in 1992 – computers and monitors

## Today

- More than **50 product categories**
- Over **2,000 manufacturers** labeling more than 40,000 product models
- Over **1,000** retail partners
- More than **550 utility partners** promoting ENERGY STAR
- Over **2.5 billion ENERGY STAR products sold** to date

# Brand Awareness and Success

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- ENERGY STAR awareness now more than 70% amongst U.S. consumers
  - Rising to nearly 80% in areas with strong utility programs
- In 2007 alone, Americans, with the help of ENERGY STAR prevented 40 million metric tons of greenhouse gas emissions
  - Equivalent to the annual emissions of **27 million vehicles**
  - Consumers saved more than **\$16 Billion** on utility bills

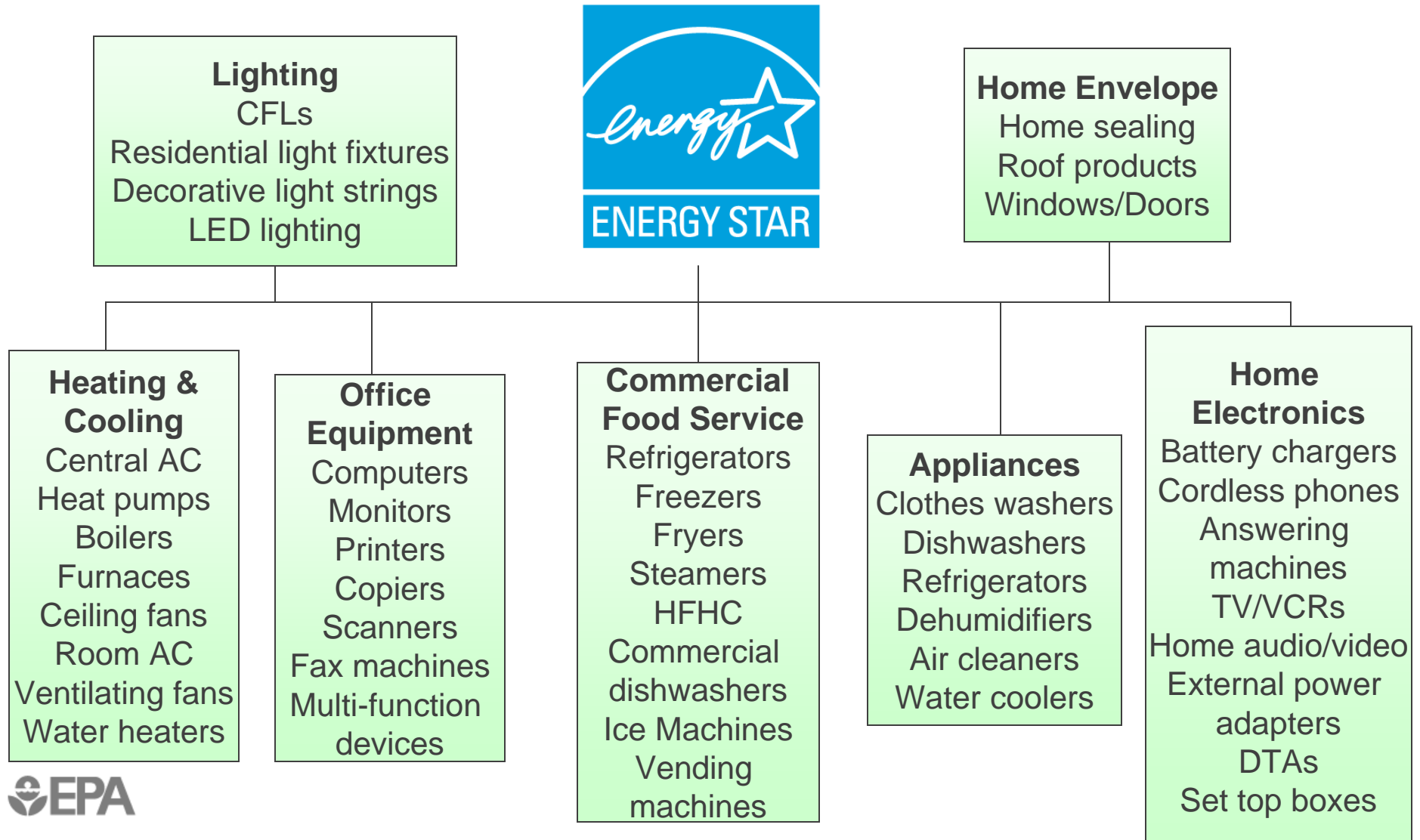
# ENERGY STAR Qualified Products

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- ENERGY STAR qualified products must meet strict energy efficiency guidelines
  - Include efficiency *and* quality requirements
  - Based on industry accepted test procedure used to consistently measure and compare efficiencies
- Manufacturers sign partnership agreements with EPA/DOE and then submit products for qualification
  - If qualified, the products may be labeled with the ENERGY STAR mark

# 50+ Product Categories Are Covered by ENERGY STAR in the US



# Guiding Principles for Specification Development



- Cost-effective efficiency
  - Maximum 5 years ROI
- Performance maintained or enhanced
- Significant energy savings & carbon emissions reduction potential
  - Unit and/or national basis
- Efficiency is achievable with several technologies
  - Focus on finished product performance
- Technology neutral requirements





# Guiding Principles, *cont.*

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- Product differentiation and testing are feasible
  - Available, industry accepted test procedure
  - Several manufacturers and products represented
  - Target top 25% in terms of energy efficiency
- Labeling can be effective in the market
  - Lack of existing metric for energy efficiency
  - Significant end user demand for greater efficiencies

# Specification Development Cycle



# Activities to Date for Ovens

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- Memo sent to stakeholders October 2008
  - Announced EPA interest in commercial ovens
  - Identified subcategories of initial interest
- Reviewed energy efficiency data provided by PG&E's Foodservice Technology Center
- Released Draft 1 specification on January 2
  - Comment deadline January 30
  - Two official comments received



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# Draft 1 Specification Requirements

Part 1: Partner Commitments

Part 2: Eligibility Criteria

# Partner Commitments

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## Standard Commitments:

- Annual submission/update of product information
- Clear display of the ENERGY STAR on products, on product packaging, in product literature, and on company Web site
- Annual submission of ENERGY STAR unit shipment data
- Regular updating of company contact info

Essential to continued growth and success of ENERGY STAR!



# Eligibility Criteria: Product Types

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- Convection and Rack Ovens
  - Convection: half-size, full-size
  - Rack: single-rack, double-rack
  - Electric and gas units
- EPA will evaluate other subcategories within 1 year of specification effective date
  - Dependent on test procedure and data availability
  - Follow similar specification development process

# Test Procedures

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- ASTM F1496, *Standard Test Method for Performance of Convection Ovens*
- ASTM F2093, *Standard Test Method for Performance of Rack Ovens*
- Measure cooking/baking energy efficiency and idle energy rate
- Both test procedures well vetted
  - Rack ovens procedure recently updated

# Convection Oven Requirements



<b>Gas</b>	
<b><i>Half-Size</i></b>	
Cooking Energy Efficiency	$\geq 44\%$
Idle Energy Rate	<b>TBD</b>
<b><i>Full-Size</i></b>	
Cooking Energy Efficiency	$\geq 44\%$
Idle Energy Rate	$\leq 13,000$ Btu/h
<b>Electric</b>	
<b><i>Half-Size</i></b>	
Cooking Energy Efficiency	$\geq 70\%$
Idle Energy Rate	$\leq 1.0$ kW
<b><i>Full-Size</i></b>	
Cooking Energy Efficiency	$\geq 70\%$
Idle Energy Rate	$\leq 1.6$ kW



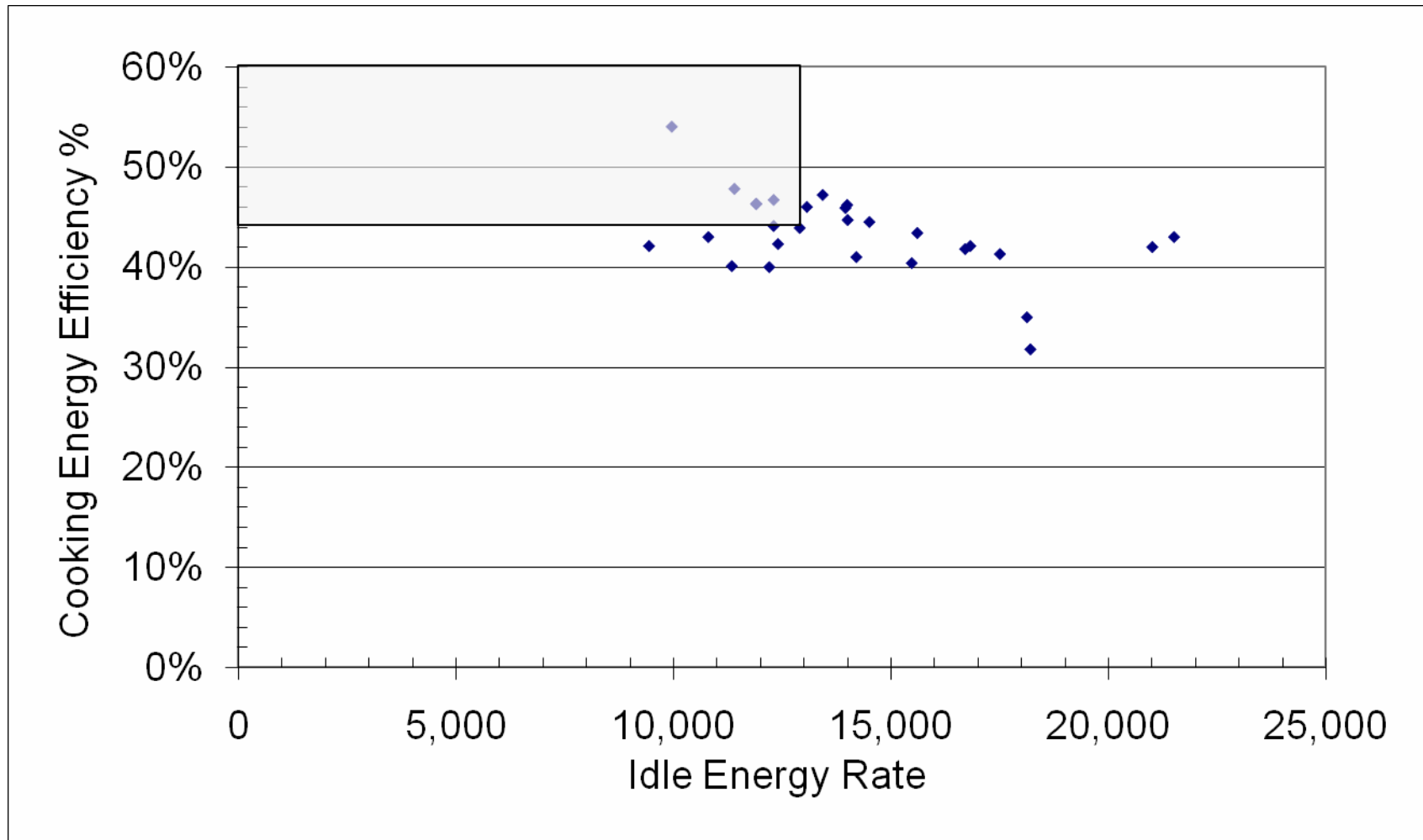
# Data Analysis

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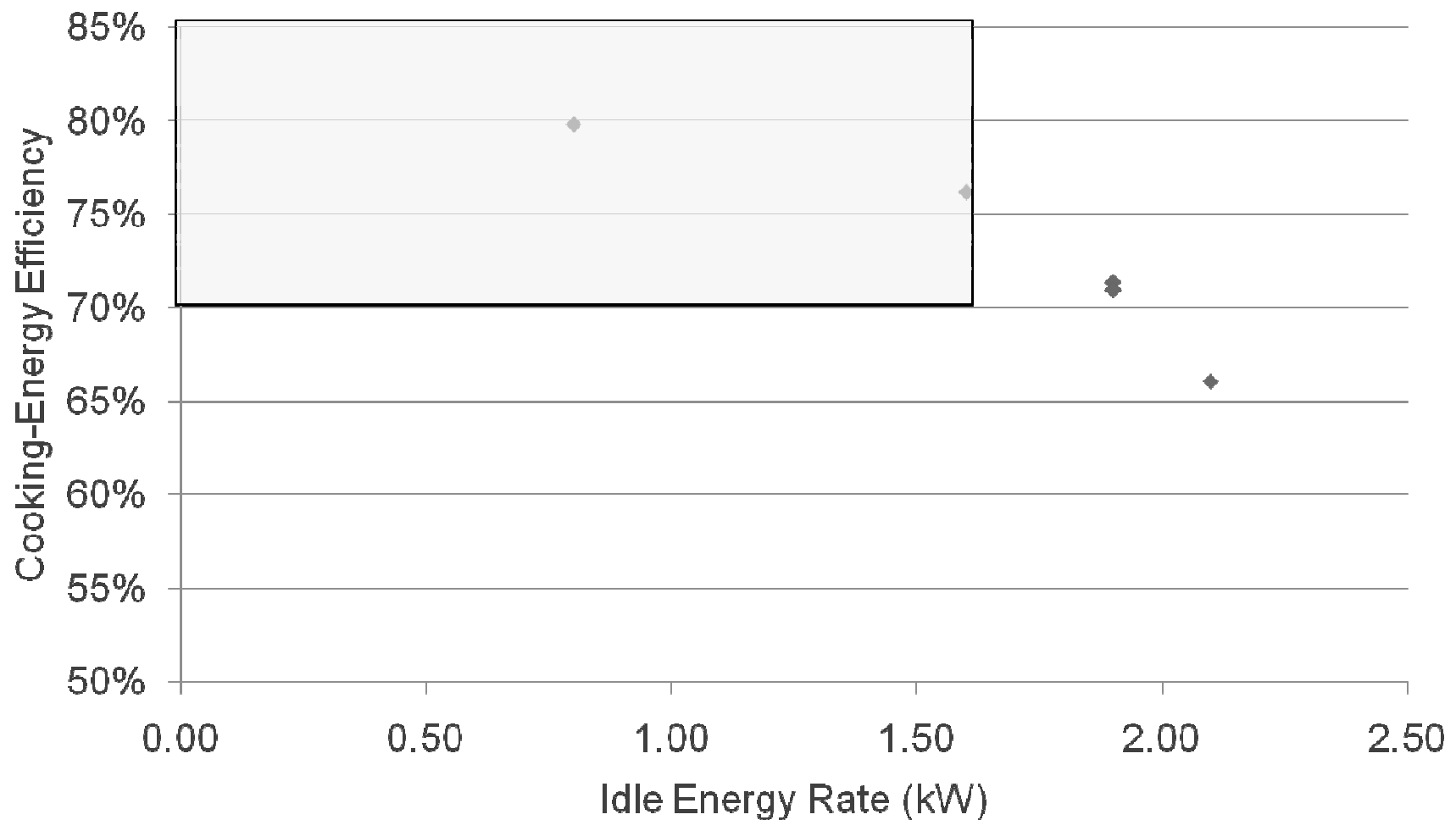


- FSTC testing through November 2008
- Gas Convection Dataset
  - Full-size: 28% of 28 models tested meet levels
  - 4 manufacturers represented
  - Only one data point for half-size category
- Electric Convection Dataset
  - Full-size: 28% of 7 models tested meet levels
  - Half-size levels: 33% of 6 models tested meet levels
  - 2 mfgs (full size) and 2 mfgs (half size) represented
  - Would like more data points to confirm levels

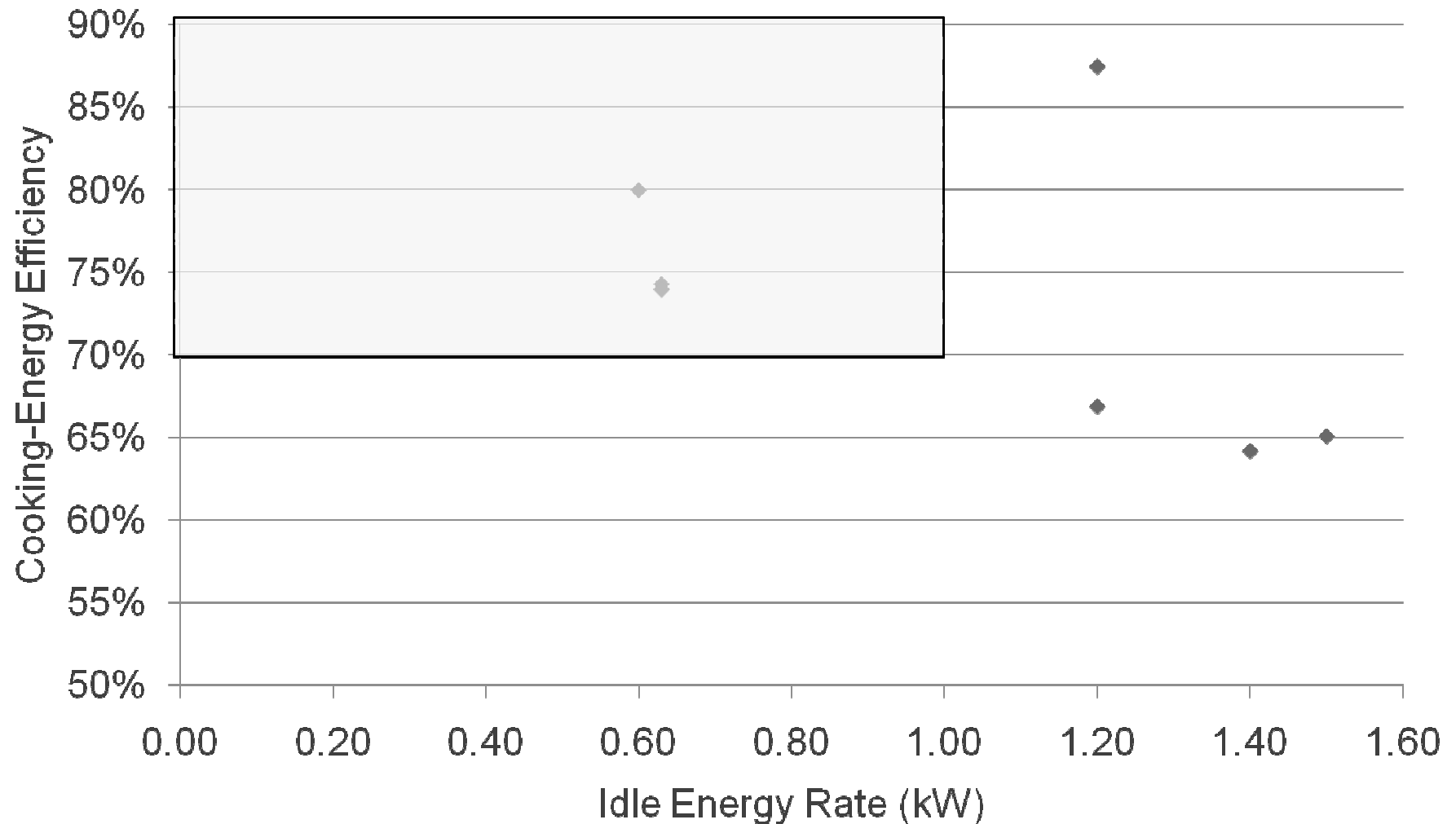
# Gas Convection Oven Dataset



# Electric Full-Size Convection Oven Data



# Electric Half-Size Convection Oven Data





# Rack Oven Requirements

Gas	
<b><i>Single Rack</i></b>	
Baking Energy Efficiency	TBD
Idle Energy Rate	TBD
<b><i>Double Rack</i></b>	
Baking Energy Efficiency	$\geq 52\%$
Idle Energy Rate	$\leq 35,000$ Btu/h
Electric	
<b><i>Single Rack</i></b>	
Baking Energy Efficiency	TBD
Idle Energy Rate	TBD
<b><i>Double Rack</i></b>	
Baking Energy Efficiency	TBD
Idle Energy Rate	TBD

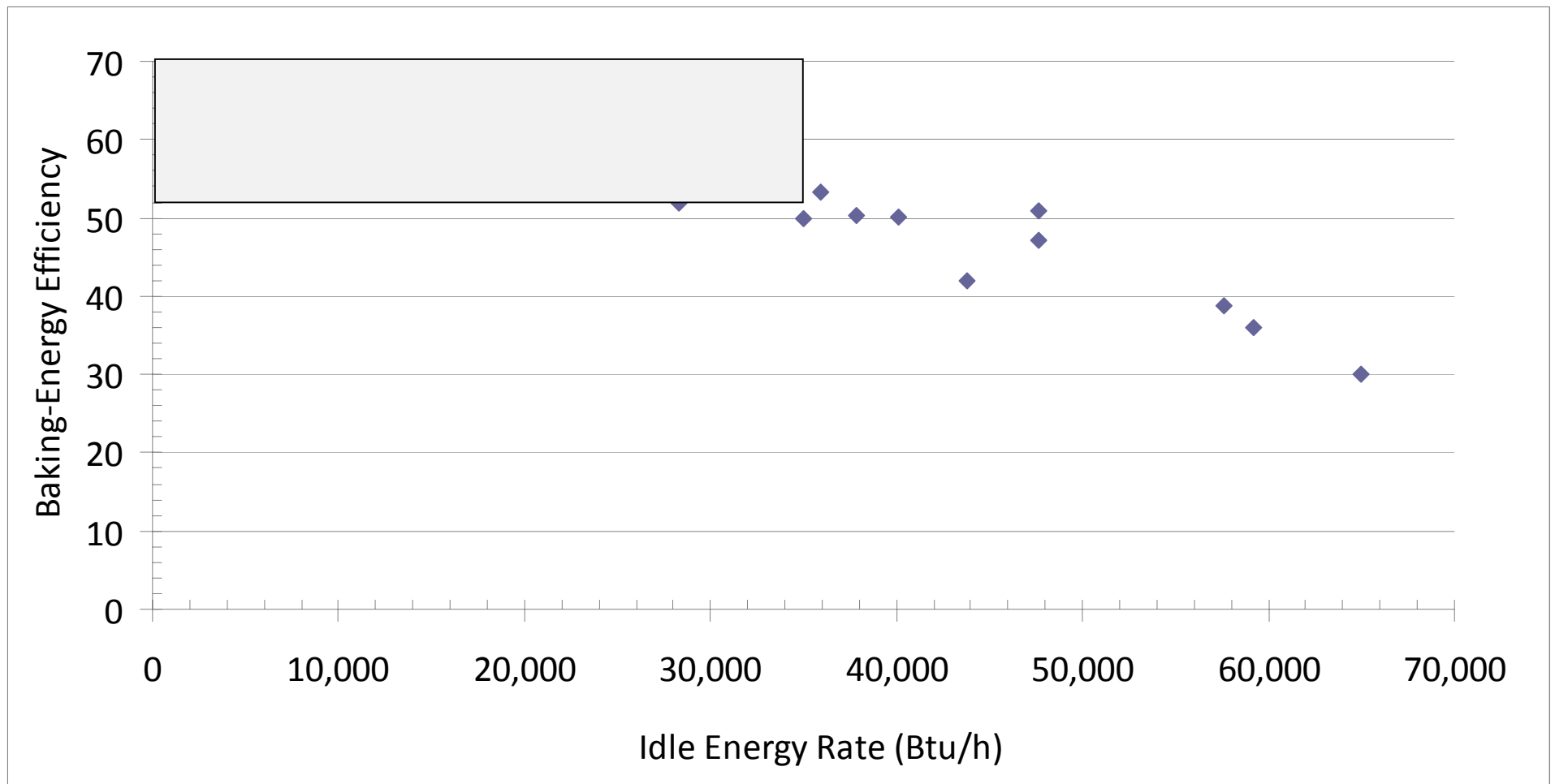
# Data Analysis

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- FSTC testing through November 2008
- Gas Rack Dataset
  - Double rack: 28% of 14 models tested
  - 4 manufacturers represented
- Need data on electric rack ovens and single rack gas ovens

# Gas Rack Oven Dataset



# Potential Energy & Dollar Savings



- Convection – Gas (full)
  - Unit energy savings: 31 million Btu/year
  - Dollar savings: \$350/year (2009)
- Convection – Electric (full)
  - Unit energy savings: 1,879 kWh/year
  - Dollar savings: \$187/year (2009)
- Rack – Gas (single rack)
  - Unit energy savings: 219 million Btu/year
  - Dollar savings: \$2,511/year (2009)



# Simple Payback Analysis



- Prices obtained from mfg. Web sites
- Gas, full-size convection oven
  - Ave Standard Model Price: \$5,794\*
  - Ave High Efficiency Model Price: \$6,079\*
  - Energy Savings: \$350/year (CCAP)
  - Payback: <1 year (0.81)
- Electric, full-size convection oven
  - Standard Model Price: \$6,076\*
  - High Efficiency Model Price: \$6,611\*
  - Energy Savings: \$187/year (CCAP)
  - Payback: 2.8 years

\*Discounted price (40% off list price, which is typical)

# Payback Analysis *cont.*



- Prices obtained from PG&E FSTC working papers
- Gas, double rack
  - Ave Standard Model Price: \$14,812\*
  - Ave High Efficiency Model Price: \$19,999\*
  - Energy Savings: \$2,511/year (CCAP)
  - Payback: 2 years

# Comments: Definitions



- Adjustments to Rack oven definition: A high-capacity oven **with the ability to produce steam internally**, and fitted with a motor-driven mechanism for rotating **multiple pans fitted into** one or more pan racks within the cavity
- *Add new* definition for **mini-rack ovens**: An oven with an internal rotating rack where pans are manually pushed onto the racks. Capacity of 5-8 pans
  - Should this subcategory be covered?
  - EPA does not have any data on this product type

# Comments: Definitions

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- EPA should use the definitions provided in the ASTM test procedures
  - ASTM definitions written to be very broad
  - ENERGY STAR definitions based on ASTM but are more specific to determine which oven types are eligible
  - ASTM will potentially revise its definitions to align with ENERGY STAR

# Comments: Data Representation

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- Data set skewed toward top performers, may not represent all options available
  - Proposed levels represent top 25% of available data set
  - Manufacturers encouraged to test more standard models to show range in efficiencies
  - EPA has the opportunity to revisit the levels if market penetration is low (e.g., annual unit shipment data)

# Comments: Set-Back Mode

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- Specification should require a set-back mode that reduces operating temperature during non-operation periods
  - How prevalent is this technology today?
  - Concerns regarding customer disabling feature
  - ASTM test procedure measures apples to apples, requires testing at 400°F

# Comments: Product Testing

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- Testing should be witnessed by an independent testing laboratory or approved by a professional engineer
  - EPA is beginning to require test reports signed by engineer for CFS equipment
- The ASTM testing procedures should require that test equipment have a verifiable calibration certificate no older than national standards requirements
  - Requirements for calibrated standards should be addressed at the ASTM level

# Comments: Oven Controls

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- Manufacturers may offer multiple types of controls to the end user, these controls can impact energy use
- EPA sees the following options:
  - Manufacturers test worst case scenario to ensure all options meet levels and report which was tested
  - Test each option and create a distinct model number for those that meet ENERGY STAR



# Performance Data Needs

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- Several areas where additional info is needed to determine requirements
  - Electric convection ovens (half and full-size)
  - Half-size gas convection ovens
  - Single-rack gas rack ovens
  - Electric rack ovens (single and double-rack)
- If additional data is not collected on rack ovens, EPA may exclude from ENERGY STAR at this time

# Effective Date

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- Proposed: May 1, 2009
  - Potential specification launch at the National Restaurant Show, May 16 – 19
  - Would allow manufacturers time to qualify and label units in time for the NRA Show
  - Dependent on how many drafts are needed prior to finalization

# Tentative Timeline

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- EPA to review written comments and feedback shared today
  - Target Draft 2 release: February 20
  - Comment deadline: March 20
  - Send additional data to [rduff@icfi.com](mailto:rduff@icfi.com)
- Final Draft released April 10
- Final version released/effective May 1
- Launch new specification at NRA Show

# Contact Information

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