



# **ENERGY STAR®**

## **Light Commercial HVAC**

### **Draft 2 Version 3.0**

**Stakeholder Webinar and Discussion**

**Abigail Daken, U.S. EPA**

**October 6, 2016**



## Webinar Audio Access

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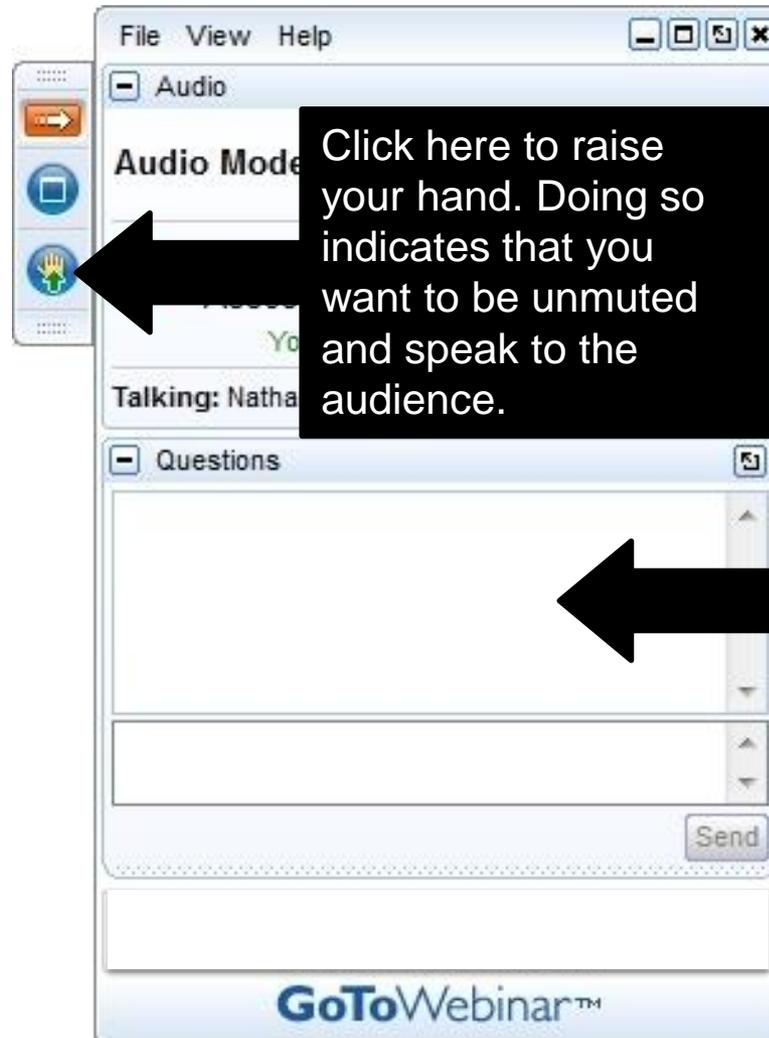
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# Webinar Participation



Click here to raise your hand. Doing so indicates that you want to be unmuted and speak to the audience.

Type any questions or comments here during the webinar.



# Agenda

- 1** Introduction
- 2** Scope and Definitions
- 3** Energy Efficiency Criteria
- 4** Test Methods and Sampling
- 5** Next Steps
- 6** Discussion



# Introduction

|   |                            |
|---|----------------------------|
| 1 | Introduction               |
| 2 | Scope and Definitions      |
| 3 | Energy Efficiency Criteria |
| 4 | Test Methods and Sampling  |
| 5 | Next Steps                 |
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# Specification Development Cycle





# Important Process Elements

- Consistency
- Transparency
- Inclusiveness
- Responsiveness
- Clarity



# Guiding Principles for Specification Development

1. Significant energy savings can be realized on a national basis
2. Product performance can be maintained or enhanced with increased energy efficiency
3. Purchasers recover their investment in increased energy efficiency within a reasonable period of time
4. Energy efficiency can be achieved through several technologies
5. Product energy consumption and performance can be measured and verified with testing
6. Labeling would effectively differentiate products and be visible for purchasers



# Scope and Definitions

|          |                              |
|----------|------------------------------|
| 1        | Introduction                 |
| <b>2</b> | <b>Scope and Definitions</b> |
| 3        | Energy Efficiency Criteria   |
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## Scope - Capacity Range

- $\geq 65,000$  Btu/h and  $< 240,000$  Btu/h
- Units  $< 65,000$  Btu/h continue to be out of scope due to poor product payback (over 20 years)
  - EPA reached out to commenters for cost and energy data to update analysis
  - No data to support better payback was supplied



# Definitions

- Updated to maintain consistency
  - Commercial Package Air-Conditioning and Heating Equipment as per 10 CFR part 431, Subpart F
  - Basic Model as per 10 CFR part 431, Subpart F
    - Commercial Package Air-Conditioning and Heating Equipment
    - Variable Refrigerant Flow Multi-Split
  - Cooling Capacity
    - As per AHRI Standard 340/360-2015



# Energy Efficiency Criteria

|          |                                   |
|----------|-----------------------------------|
| 1        | Introduction                      |
| 2        | Scope and Definitions             |
| <b>3</b> | <b>Energy Efficiency Criteria</b> |
| 4        | Test Methods and Sampling         |
| 5        | Next Steps                        |
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## Updated Proposed Criteria for Draft 2

- Stakeholders expressed concern that Draft 1 proposals in all subcategories were too stringent
- Upon further analysis, EPA agreed, and Draft 2 contains updated proposals
- Data sources:
  - AHRI Directory of Certified Product Performance
  - DOE Technical Support Document
  - ENERGY STAR Unit Shipment Data
  - Discussions with manufacturers and other stakeholders
- In many cases, proposed levels align with other requirements (e.g. CEE Tiers)



## Notes on Metrics

- COP17 is a performance requirement
  - Several commenters stated that this poses no significant additional burden
- IEER rounding requirement
  - VRF: ANSI/AHRI Standard 1230-2010
  - AC and HP: AHRI Standard 340/360



# Draft 2 Proposed Criteria for Light Commercial Air Conditioners

| Equipment Type                           | Size Category                   | Heating Section Type          | Minimum Energy Efficiency Criteria |
|--|---------------------------------|-------------------------------|------------------------------------|
| Small Air-Cooled Central Air Conditioner | ≥65,000 Btu/h – <135,000 Btu/h  | Electric Resistance (or None) | 12.2 EER; 14.0 IEER                |
|  |                                 | All other                     | 12.0 EER; 13.8 IEER                |
| Large Air-Cooled Central Air Conditioner | ≥135,000 Btu/h – <240,000 Btu/h | Electric Resistance (or None) | 12.2 EER; 13.2 IEER                |
|  |                                 | All other                     | 12.0 EER; 13.0 IEER                |



# Draft 2 Proposed Criteria for Light Commercial Heat Pumps

| Equipment Type             | Size Category                   | Heating Section Type          | Minimum Energy Efficiency Criteria                    |
|----------------------------|---------------------------------|-------------------------------|---|
| Small Air-Cooled Heat Pump | ≥65,000 Btu/h – <135,000 Btu/h  | Electric Resistance (or None) | 11.8 EER; 12.8 IEER; 3.4 COP at 47°F; 2.4 COP at 17°F |
|                            |                                 | All other                     | 11.6 EER; 12.6 IEER; 3.4 COP at 47°F; 2.4 COP at 17°F |
| Large Air-Cooled Heat Pump | ≥135,000 Btu/h – <240,000 Btu/h | Electric Resistance (or None) | 10.9 EER; 12.0 IEER; 3.3 COP at 47°F; 2.1 COP at 17°F |
|                            |                                 | All other                     | 10.7 EER; 11.8 IEER; 3.3 COP at 47°F; 2.1 COP at 17°F |



# Draft 2 Proposed Criteria for Light Commercial VRF Multi-Split Systems

| Equipment Type                 | Size Category                   | Heating Section Type  | Minimum Energy Efficiency Criteria                    |
|--------------------------------|---------------------------------|-----------------------|---|
| VRF Air-Cooled Air Conditioner | ≥65,000 Btu/h – <135,000 Btu/h  | All                   | 12.0 EER; 17.4 IEER                                   |
| VRF Air-Cooled Air Conditioner | ≥135,000 Btu/h – <240,000 Btu/h | All                   | 12.0 EER; 16.4 IEER                                   |
| VRF Air-Cooled Heat Pump       | ≥65,000 Btu/h – <135,000 Btu/h  | Without Heat Recovery | 11.8 EER; 17.4 IEER; 3.4 COP at 47°F; 2.4 COP at 17°F |
|                                |                                 | With Heat Recovery    | 11.6 EER; 17.2 IEER; 3.4 COP at 47°F; 2.4 COP at 17°F |
| VRF Air-Cooled Heat Pump       | ≥135,000 Btu/h – <240,000 Btu/h | Without Heat Recovery | 10.9 EER; 16.4 IEER; 3.3 COP at 47°F; 2.1 COP at 17°F |
|                                |                                 | With Heat Recovery    | 10.7 EER; 16.2 IEER; 3.3 COP at 47°F; 2.1 COP at 17°F |

## Summary of Differentiation and Payback

| Size Category`                     | Equipment Type | Heating Section Type  | Model % | Payback (yrs)* |
|------------------------------------|----------------|-----------------------|---------|----------------|
| ≥65,000 Btu/h –<br><135,000 Btu/h  | AC             |                       | 23%     | 6.0            |
|                                    | HP             |                       | 8%      | 5.0            |
|                                    | VRF HP         | Without Heat Recovery | 36%     | 5.7            |
|                                    |                | With Heat Recovery    | 34%     | 5.7            |
| ≥135,000 Btu/h –<br><240,000 Btu/h | AC             |                       | 30%     | 3.8            |
|                                    | HP             |                       | 14%     | 2.9            |
|                                    | VRF HP         | Without Heat Recovery | 62%     | 3.5            |
|                                    |                | With Heat Recovery    | 65%     | 3.5            |

\*EPA uses simple payback of incremental initial cost divided by annual utility bill savings.



# Review of Test Method

|          |                                  |
|----------|----------------------------------|
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## Review of Test Method

- 10 CFR Part 431 Subpart F § 431.96
  - IEER, EER, and COP
    - VRF products shall meet the test requirements of AHRI 1230 for IEER
      - EPA will update the specification language once VRF IEER testing is incorporated into the CFR



# Updated Sampling Requirements

- Sampling language is maintained, with two options:
  - Products selected for testing per DOE sampling requirements in 10 CFR Part 429, Subpart B § 429.43.
  - A single sample is selected and tested (same process as V2.2)
- For typical product, if multiple sample option is used, four samples must be available for testing as per EPA verification test guidance to certification bodies
- EPA agrees this is overly burdensome for products that must be built to order for testing
- EPA will work with stakeholders to craft updated guidance for this type of product



# Next Steps

- 1 Introduction
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## Next Steps

- Comment deadline **October 19, 2016**
- Draft Final November 2016
- Final and available for certification by end of 2016
- Effective 1/1/2018 (all products must meet to be labeled)



# Discussion

|          |                            |
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## Discussion

- Open to comments and questions
- Please raise your hand in the webinar control panel or write in a question



## Written Comments

- In addition to making verbal comments during today's meeting, stakeholders are strongly encouraged to submit written comments and data.
  - *Comments will be displayed for public viewing unless otherwise specified by the commenter.*
- Please send all comments to: [LCHVAC@energystar.gov](mailto:LCHVAC@energystar.gov)

**Comment Deadline**

**October 19, 2016**

[Cover Memo](#)  
[Specification](#)



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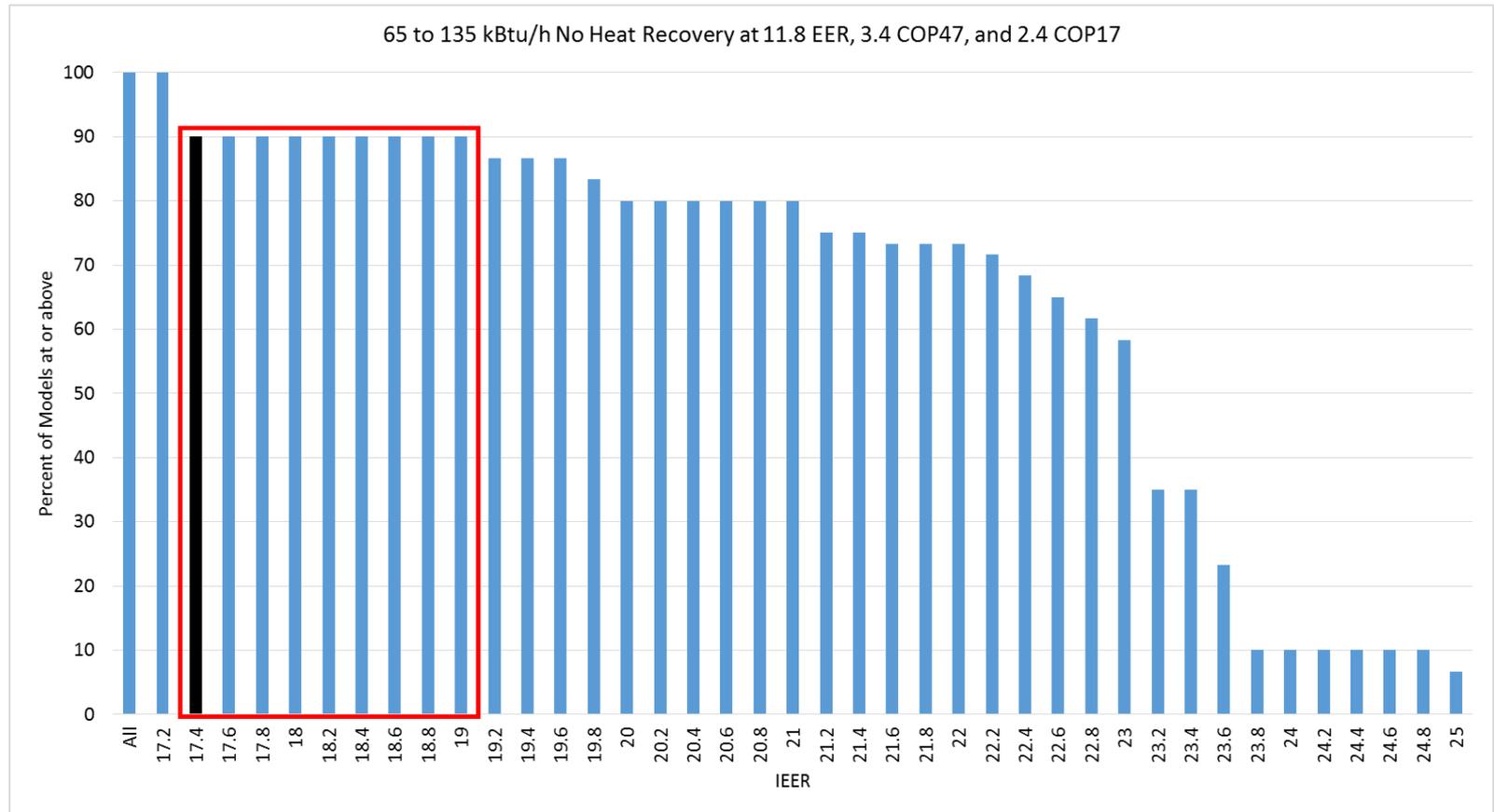




# Back-up Slides

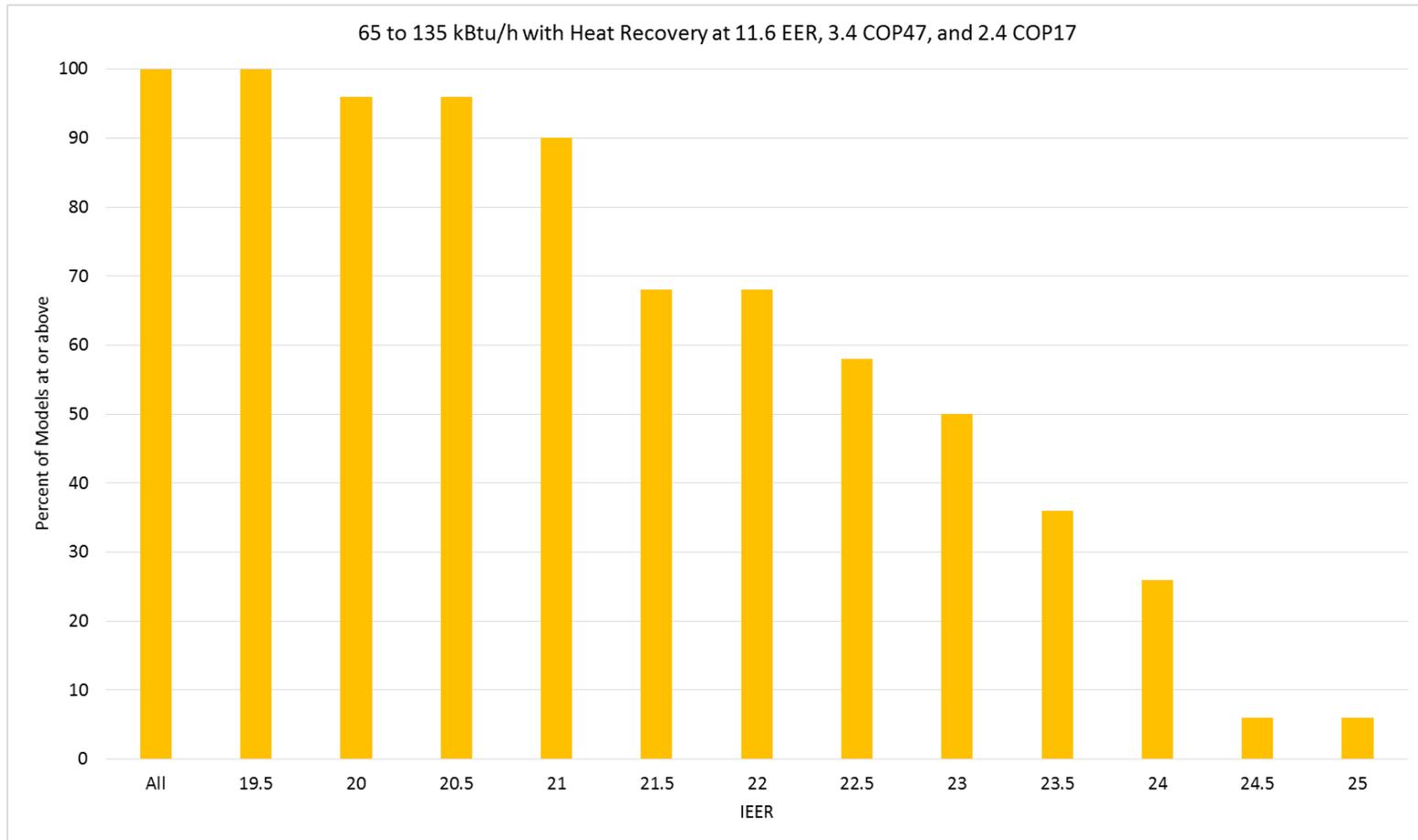


# VRF IEER Analysis (65 to 135 kBtu/h No Heat Recovery)



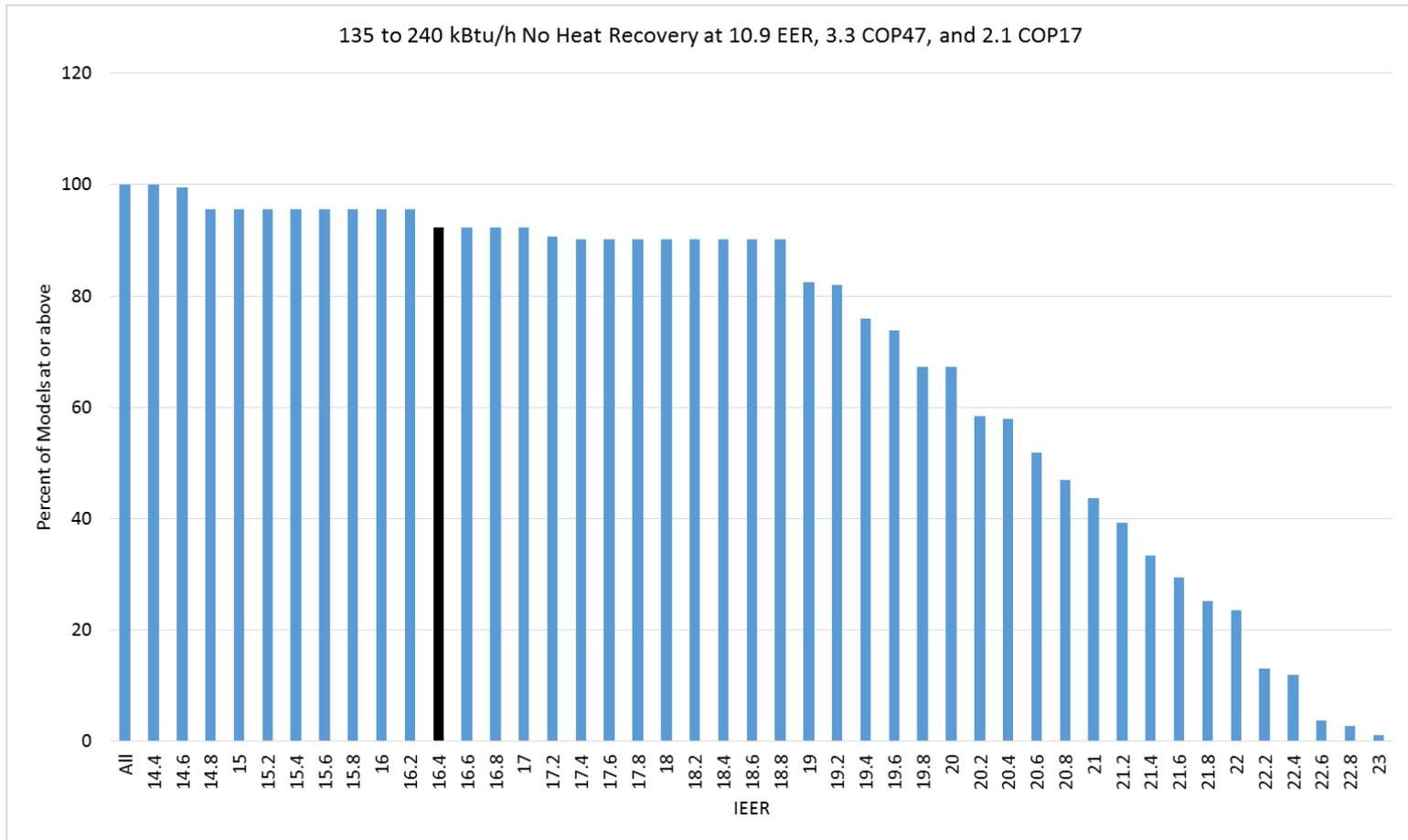


# VRF IEER Analysis (65 to 135 kBtu/h with Heat Recovery)



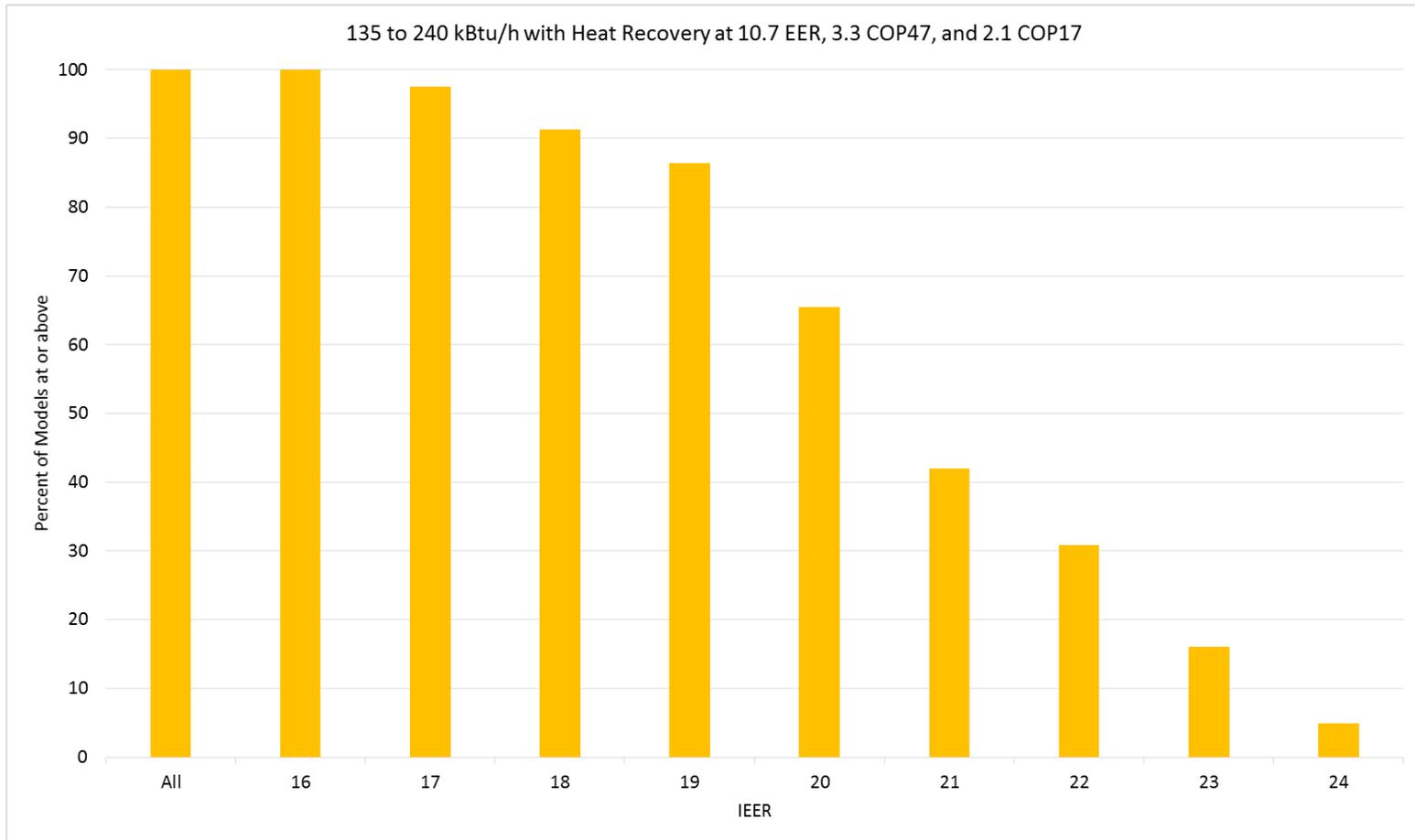


# VRF IEER Analysis (135 to 240 kBtu/h No Heat Recovery)





# VRF IEER Analysis (135 to 240 kBtu/h with Heat Recovery)





# Energy and Cost Data Spreadsheet on webpage

- Energy and Cost Data Spreadsheet
  - [https://www.energystar.gov/products/spec/energy\\_star\\_light\\_commercial\\_hvac\\_version\\_3\\_0\\_pd](https://www.energystar.gov/products/spec/energy_star_light_commercial_hvac_version_3_0_pd)