



# ENERGY STAR®

## Automatic Commercial Ice Makers

Draft 1 Version 3.0 Stakeholder Webinar  
January 25, 2017





# Agenda

- Introductions
- Purpose of Revision
- Activities to Date
- Review of the Draft 1 Proposal
- General Discussion & Questions
- Timeline & Next Steps

# Introductions

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ICF





# Purpose of Revision



# Triggers for Specification Revisions

- Significant increase in ENERGY STAR market penetration
- Change in Federal minimum efficiency standards
- Technological advancements
- Concern about consumers not realizing expected energy savings
- Product performance or quality concerns
- New or improved test procedure



# Activities to Date



# ACIM Specification Version 3.0

- **Specification Revision Launch**
  - August 19, 2016
- **Launch Webinar**
  - September 1, 2016
- **Draft 1 Version 3.0 Specification**
  - January 6, 2017
- **Draft 1 Webinar**
  - January 25, 2017



# Review of Draft 1 Proposal





## Specification Revision

- Amend terms and definitions to align with DOE's final rule
- Lower the maximum energy use (kWh/100 Lbs. Ice)
- Refrigerant reporting requirement
- Optional criteria for ACIMs with connected functionality



# Approach for Determining Proposed Certification Criteria

- **Building the Dataset**
  - EPA assembled a dataset based on products that will meet the DOE 2018 levels
    - Data sources:
      - ENERGY STAR Product Finder
      - Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Directory of Certified Product Performance
- **Determining Performance Levels**
  - Utilized a linear approach to evaluating performance in Version 3.0
    - Evaluates the relationship between energy use and harvest capacity based on the performance data
    - Ensures ENERGY STAR products offer significant energy savings, and are available in a variety of subtypes and sizes



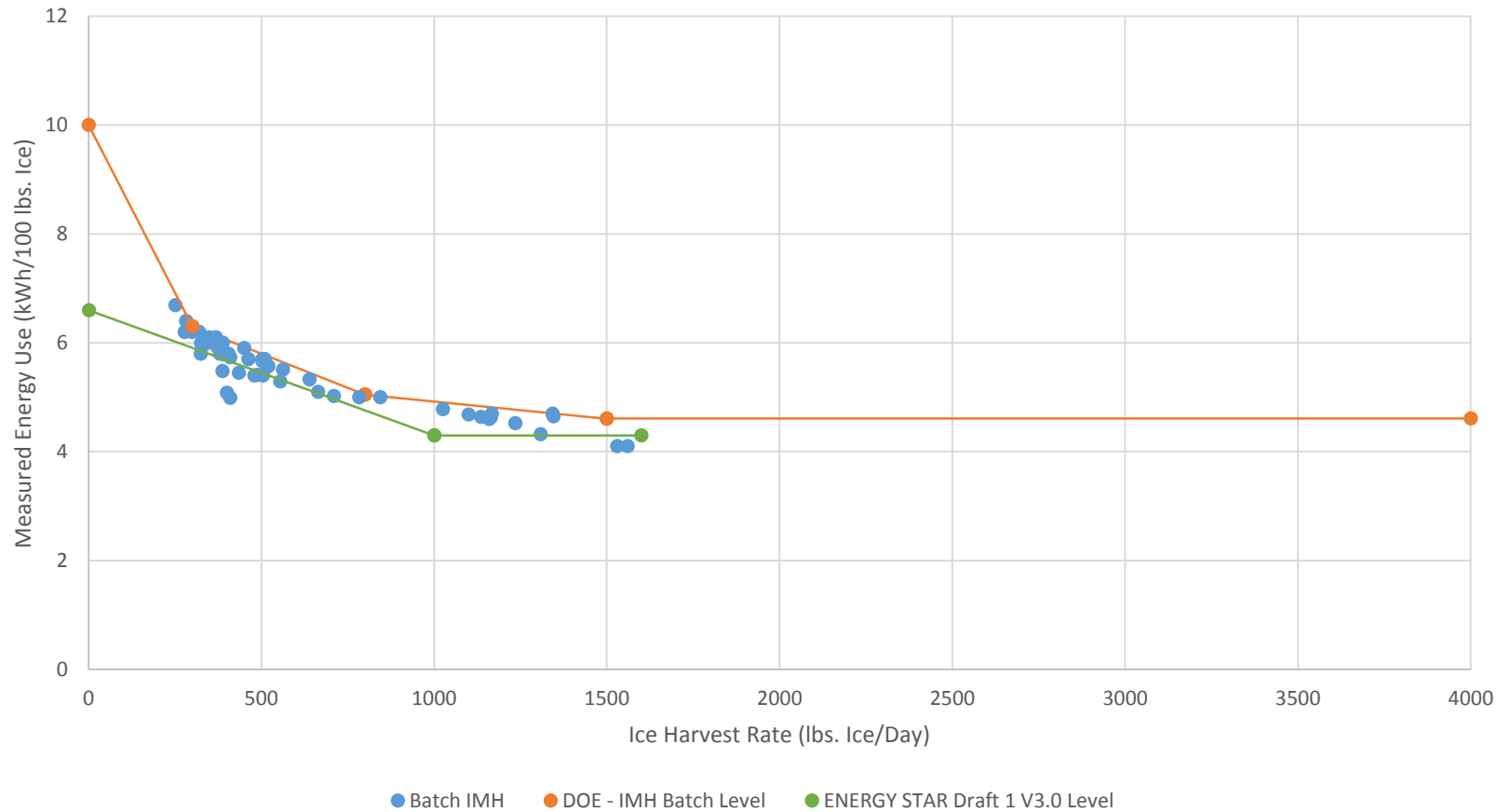
# Draft 1 Certification Criteria

Equipment Type	Applicable Ice Harvest Rate Range (lbs of ice/24 hrs)	Energy Use (kWh/100 lbs ice)	Potable Water Use (gal/100 lbs ice)
<b>IMH</b>	$H < 1000$	$\leq -0.0023H + 6.6$	$\leq 20.0$
	$1000 \leq H \leq 1600$	$\leq 4.3$	
<b>RCU</b>	$H < 1025$	$\leq -0.0029H + 7.07$	$\leq 20.0$
	$1025 \leq H \leq 4000$	$\leq 4.1$	
<b>SCU</b>	$H < 200$	$\leq -0.032H + 11.75$	$\leq 25.0$
	$200 \leq H \leq 500$	$\leq 5.35$	

Equipment Type	Applicable Ice Harvest Rate Range (lbs of ice/24 hrs)	Energy Use (kWh/100 lbs ice)	Potable Water Use (gal/100 lbs ice)
<b>IMH</b>	$H < 800$	$\leq -0.0026H + 7.0$	$\leq 15.0$
	$800 \leq H \leq 4000$	$\leq 4.92$	
<b>RCU</b>	$H < 800$	$\leq -0.005H + 8.0$	$\leq 15.0$
	$800 \leq H \leq 4000$	$\leq 4.0$	
<b>SCU</b>	$H < 700$	$\leq -0.006H + 8.5$	$\leq 15.0$
	$700 \leq H \leq 4000$	$\leq 4.3$	

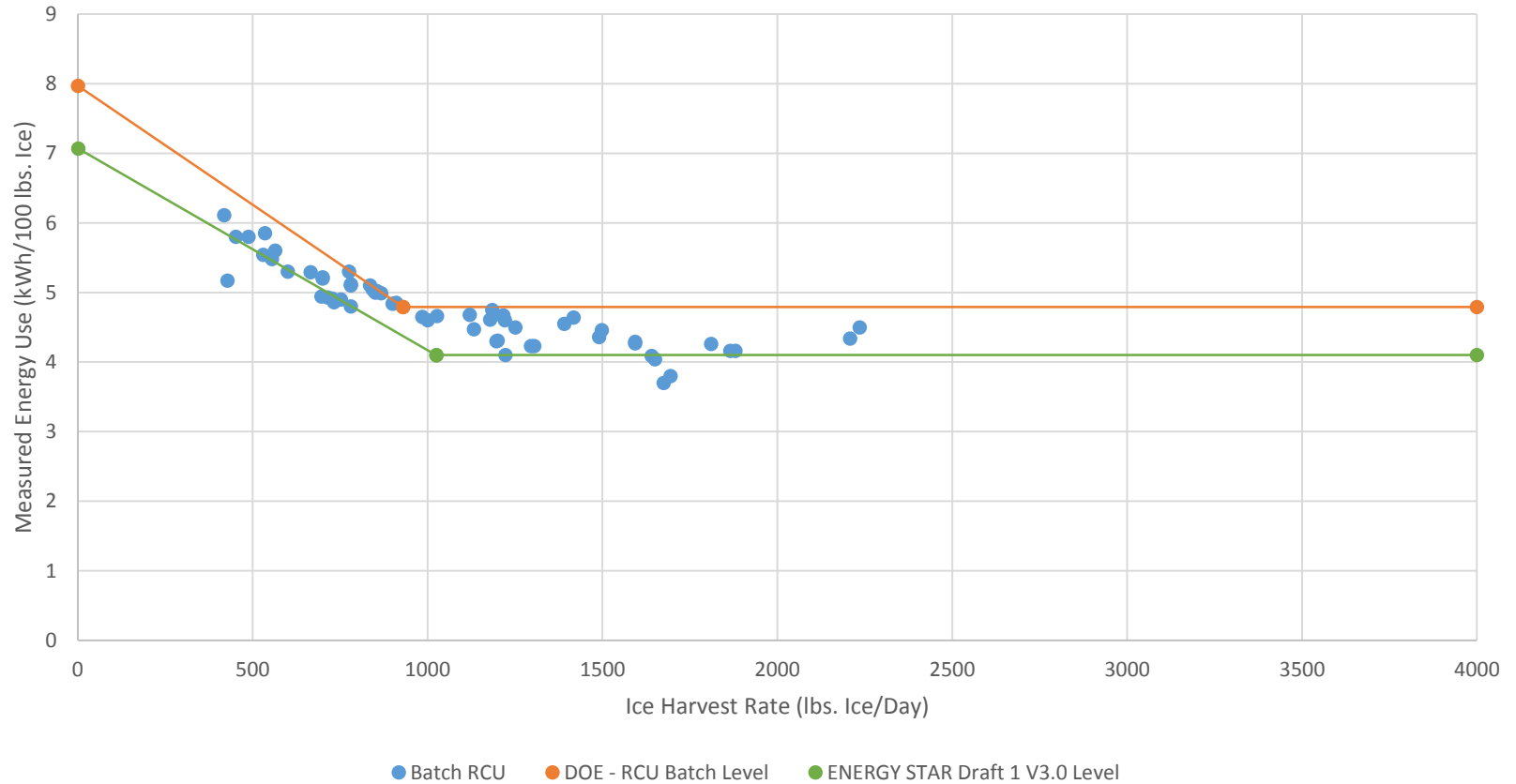


# Batch IMH



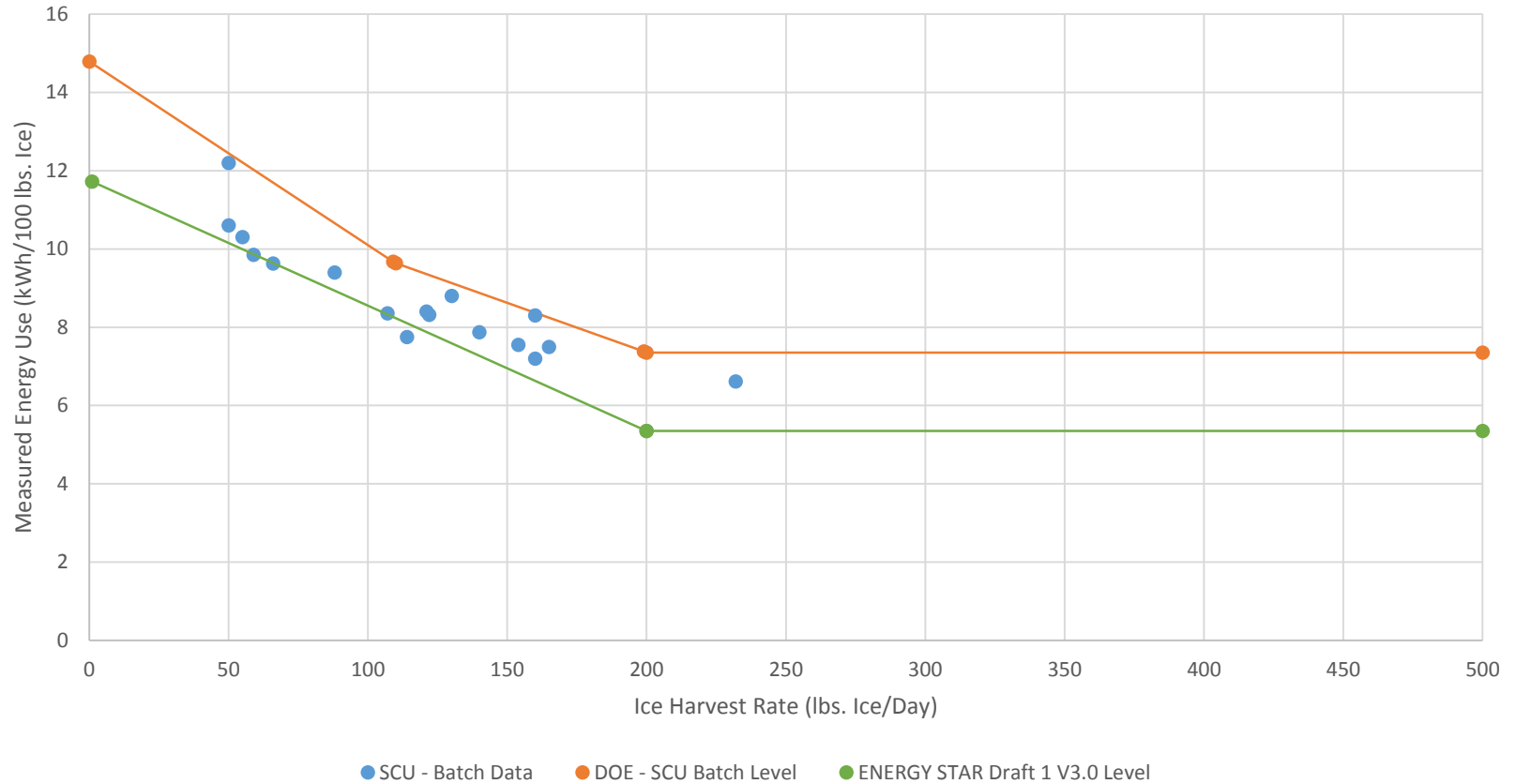


# Batch RCU



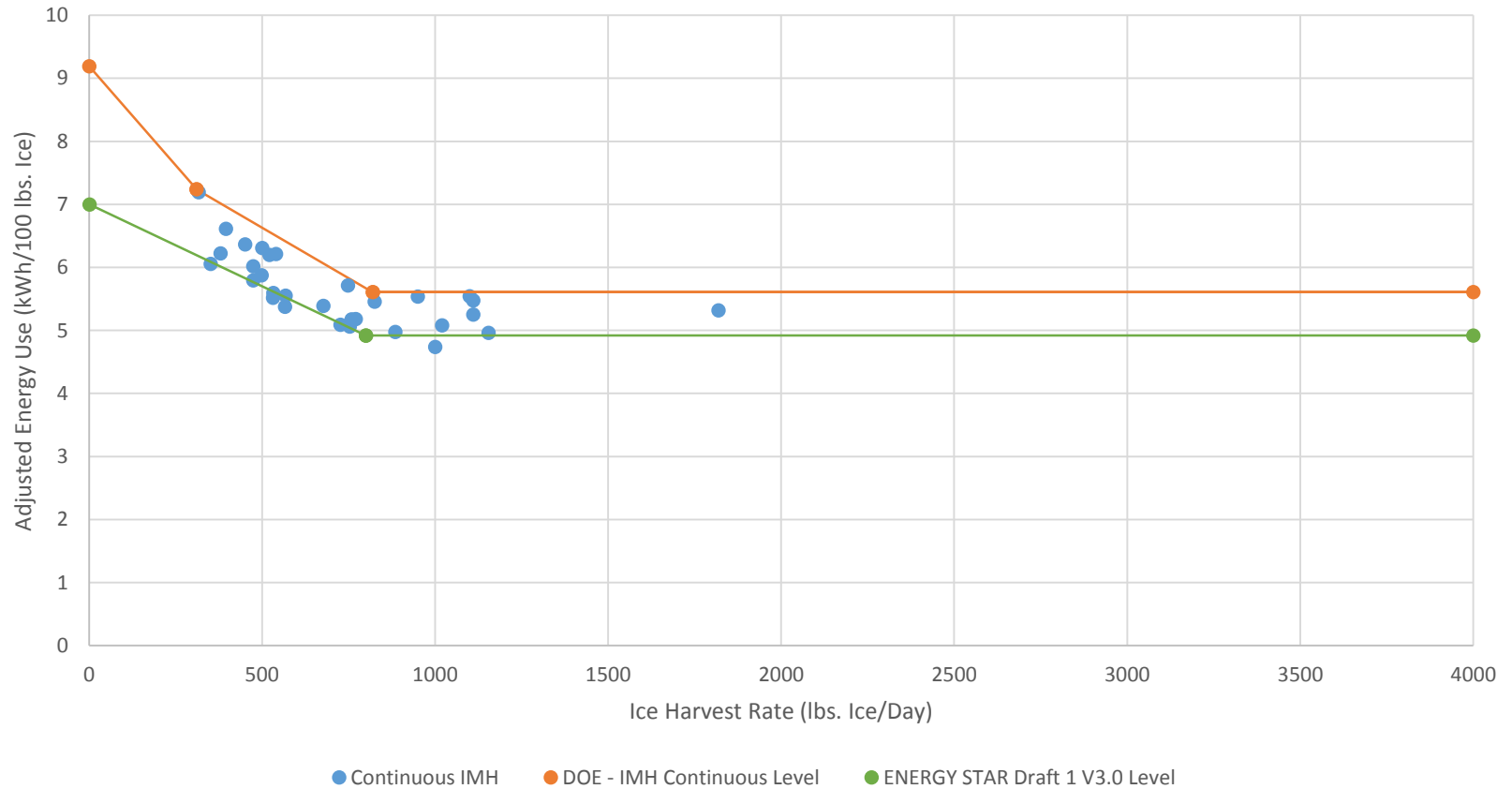


# Batch SCU



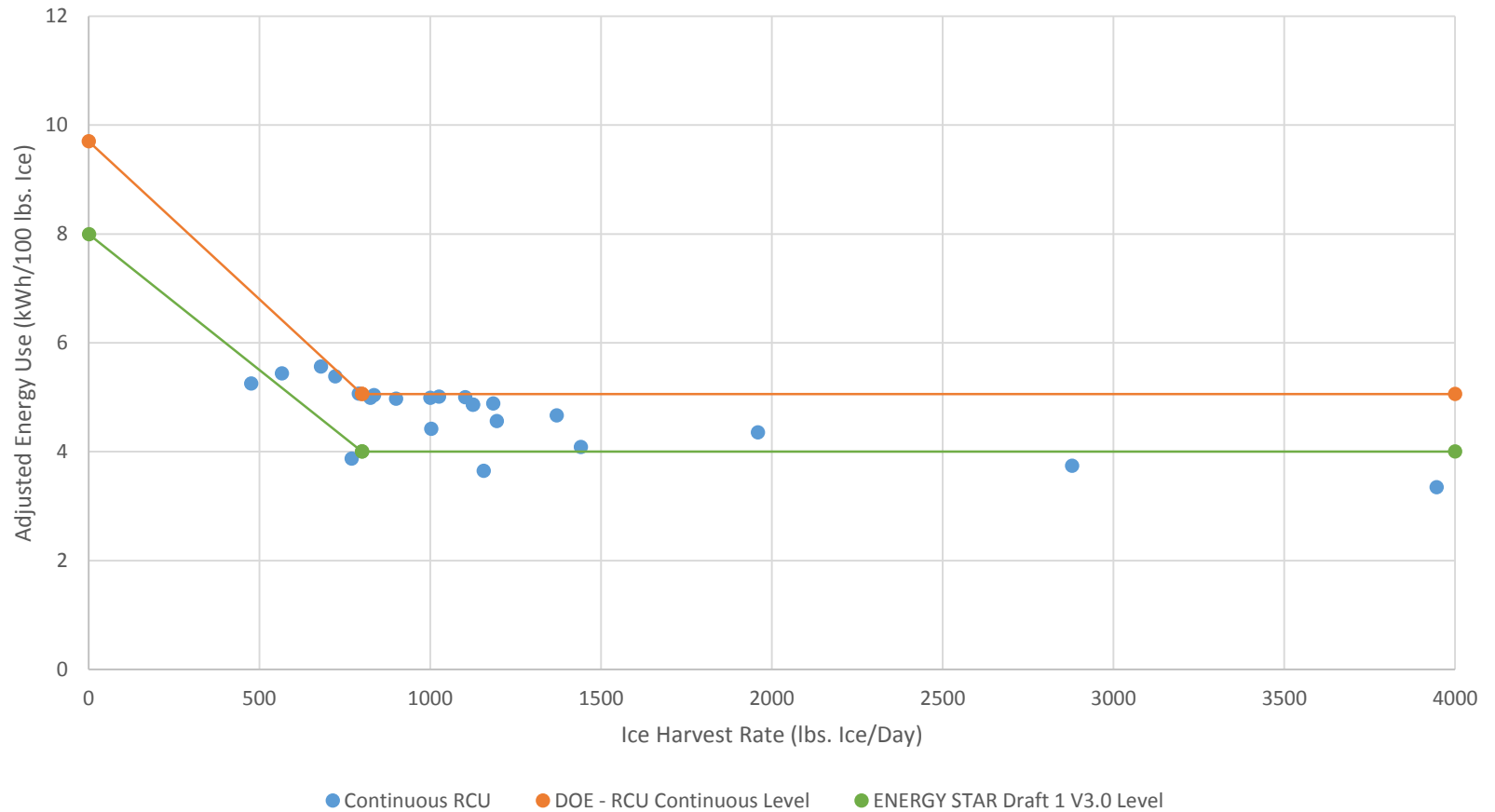


# Continuous IMH





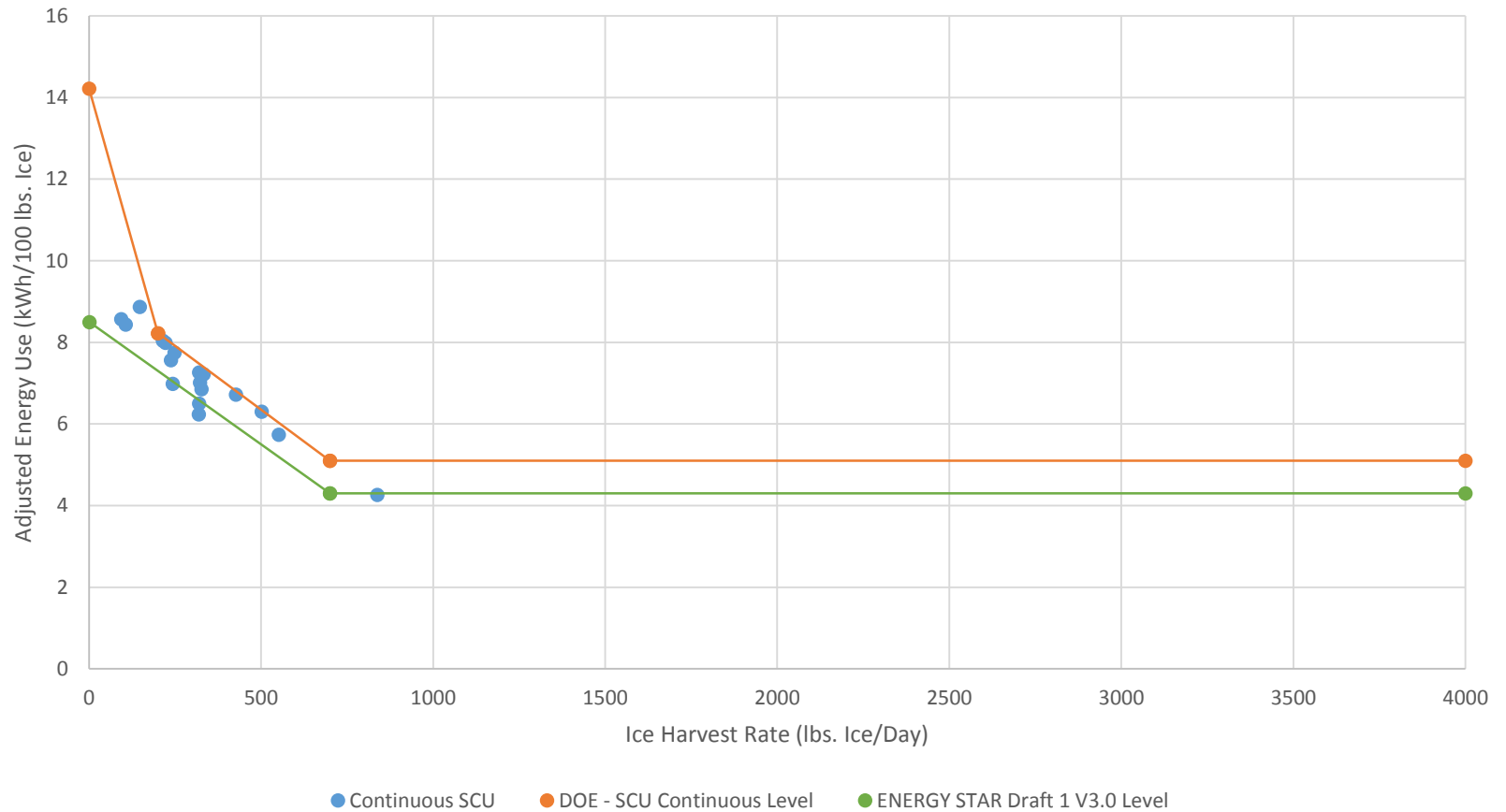
# Continuous RCU







# Continuous SCU





## Energy & Water Use

- **Testing currently done in “manufacturer recommended settings”**
  - What other settings are available to an end-user?
  - How much does energy and water use vary in alternative settings?
  - Are these various settings easily adjustable by the operator?
  - Is field data that makes clear which alternate settings are used and how often available?
- **Dump or purge**
  - Do manufacturers collect information on the amount of water discharged during these dump or purge cycles?
  - What is involved with recording discharge from these cycles?



## Energy & Water Use, *Cont.*

- **Impact of Water quality**
  - How do manufacturers advise/educate customers about water hardness in their respective region, and yielding the best quality while utilizing water in the most efficient way?
  - Would installation criteria specifying the inclusion of a water filtration device create a level playing field for comparing water usage at varying water hardness levels?



# Refrigerants

- **Additional Reporting Requirement**
  - EPA has added an additional reporting requirement for the type of refrigerant used in certified products.
  - The refrigerant used for each certified product will be posted on the ENERGY STAR Product Finder.
- **Low-GWP Refrigerants**
  - EPA encourages manufacturers to consider the early adoption of climate-friendly hydrocarbon refrigerants.



# Connected Functionality (CF)

- **Optional Criteria**

- Designed to recognize products that offer CF.
- Proposed criteria is intended to be consistent, and build off other ENERGY STAR specifications with CF.
- Products that meet the criteria will be highlighted on the ENERGY STAR Product Finder.
- EPA is interested in collaborating with stakeholders to further develop the proposed criteria.



# Connected Functionality: Terms & Definitions

**Communication Link**: The mechanism for bi-directional data transfers between the ACIM and one or more external applications, devices or systems.

**Demand Response (DR)**: Changes in electric usage by demand-side resources from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized.



# Connected Functionality: Terms & Definitions, *Cont.*

**Interface Specification**: A document or collection of documents that contains detailed technical information to facilitate access to relevant data and product capabilities over a communications interface.

**Load Management Entity**: Device, service or system that interacts with the product to shift, control or manage ice maker electrical usage, e.g. a DRMS or energy management system.



## Connected Functionality: Terms & Definitions, *Cont.*

**Demand Response Management System (DRMS)**: The system operated by a program administrator, such as the utility or third party, which dispatches signals with DR instructions and/or price signals to the ENERGY STAR ACIM products and receives messages from the ACIM product.





## Connected Functionality: Terms & Definitions, *Cont.*

**Open Standards**: Communication with entities outside the ACIM that use, for all communication layers, standards:

- Included in the Smart Grid Interoperability Panel (SGIP) Catalog of Standards, and/or
- Included in the NIST Smart Grid Framework Tables 4.1 and 4.2, and/or
- Adopted by the American National Standards Institute (ANSI) or another well-established international standards organization



# Connected Functionality in ACIMs

- **Primary Use Case**

- Enabling intelligent Remote Management of ice production to reduce energy usage and/or offset energy costs.
- Offering support for Demand Response programs and smart grid integration.
  - When an ACIM is enrolled in a utility DR program, it would be capable of reducing load in response to a DR signal by delaying ice production.

- **Questions for Stakeholders**

- Are there additional use cases for connected ACIMs?
- What is the market availability?



# Proposed Connected Functionality Criteria

- **Remote Management**: The product shall be capable of receiving and responding to remote requests via a communication link that enable intelligent control of ice production in order to reduce energy use and/or energy expense. For example, such functionality could enable interconnection with an external device, or service that actively alters ice production in order to minimize energy expense when enrolled in a Time-of-Use or other time-varying electricity price program.



# Proposed Connected Functionality Criteria, *cont.*

- **Capabilities Summary**: A  $\leq$  250-word summary description of the product's Remote Management and DR capabilities/services shall be submitted. In this summary, EPA recommends noting the following, as applicable:
  - Overview of Remote Management capability
  - Demand Response capability
  - Whether the product can be directly addressed via the interface specification
  - Open communications supported by the product
  - Feedback to Load Management Entity
  - Measures to limit Demand Response impacts, if any.
  - Demand Response configurability/flexibility by the customer and/or Load Management Entity



# General Discussion & Questions



## Next Steps & Timeline

- **Comments:**
  - Due February 3, 2017
  - Send to [icemachines@energystar.gov](mailto:icemachines@energystar.gov)
- **Timeline:**
  - Pending comments received in response to the Draft 1, EPA will determine if a subsequent Draft 2 will be issued; otherwise, Version 3.0 will go straight to a Final Draft
  - Version 3.0 specification effective January 1, 2018



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