



# Cold Climate ASHP Specification and the Future of Improved Performance Metrics

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8:45-9:45am

# ccASHP Specification Background



- Version 1.0 launched January 1, 2015
- Version 2.0 effective January 1, 2017

## Background- Original “Why”

- How to ID those products capable of operating/operating efficiently at low temperatures from those products that are not.
- Lack of confidence in HSPF to adequately characterize heating performance of air-source heat pumps at low temperatures.
  - Does not include low temperature testing points below 17°F
  - Assumes the use of electric resistance elements,
  - Tests in steady state operation (as opposed to allowing modulation).
- These deficiencies add up to a measurement that does not accurately reflect performance of the latest generation of air-source heat pumps, designed and optimized to provide heat efficiently during cold conditions.

# Background



- Designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher).
- Intended as a model equipment specification to be used broadly by energy efficiency program administrators in cold climates as a minimum requirement for program qualification.
- Intended for engineers, contractors, and other practitioners who need assurance that the equipment they select will have the required heating capacity at design temperature without unnecessary oversizing, and will serve the load efficiently throughout the ambient temperature range.

# ccASHP Specification Today- V2.0



## Scope

- Air-to-air, split system heat pumps
- Both single-zone and multi-zone systems
- <65k Btu/hour at 47°F (dry bulb)
- “Ducted” and “Ductless” systems
- Does NOT include ground-source or air-to-water heat pump systems

## Performance Requirements

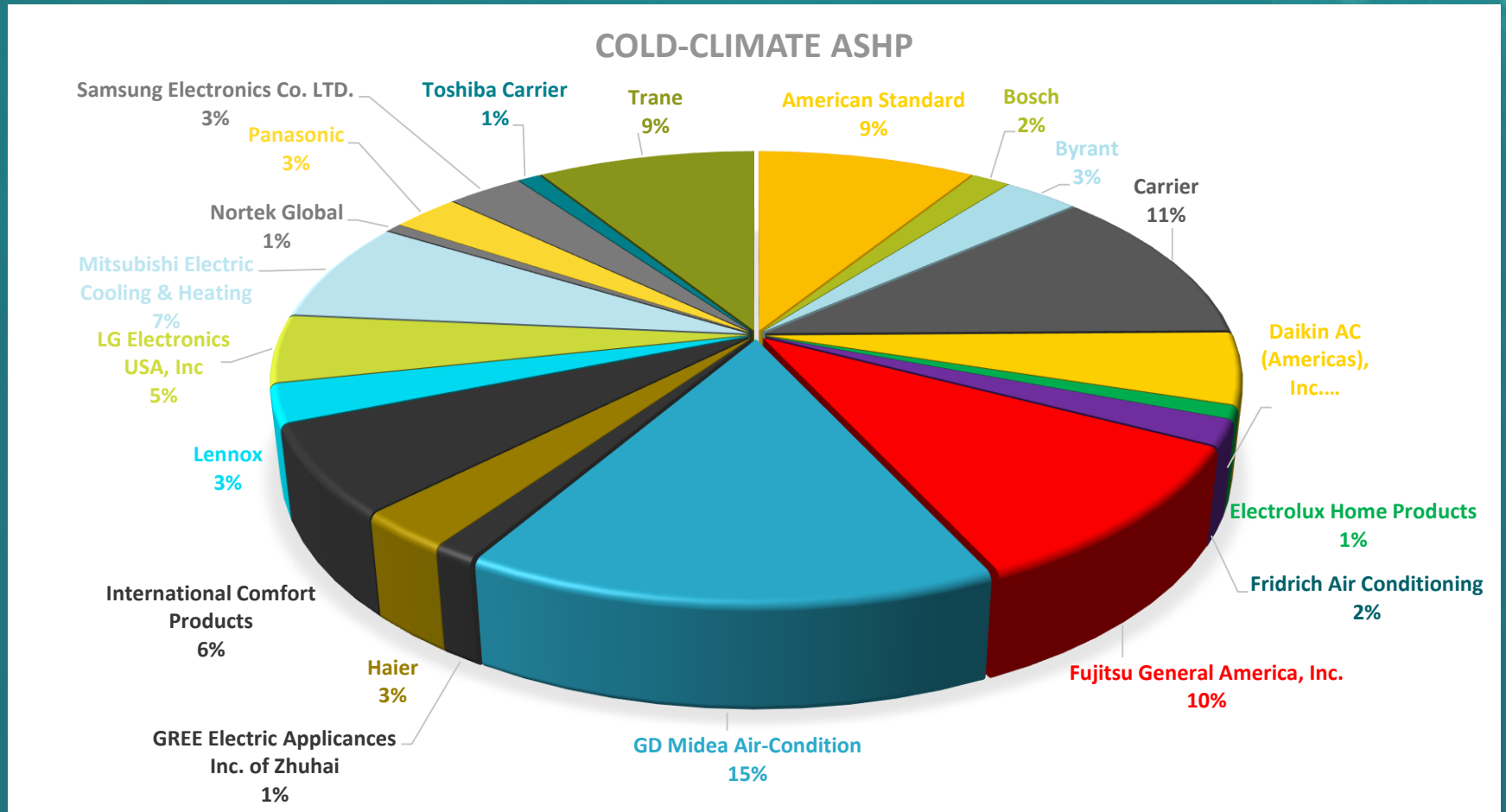
- Compressor must be variable capacity
- Indoor and outdoor units must be part of an AHRI matched system
- ENERGY STAR Certified
- COP @5° F >1.75 (at maximum capacity operation)
- HSPF >10
- Lab testing results OR Engineering data for each system must be reported through the attached “Cold Climate Air-Source Heat Pump Performance Information Tables”. Incomplete tables will not be considered.

# ccASHP Specification Today



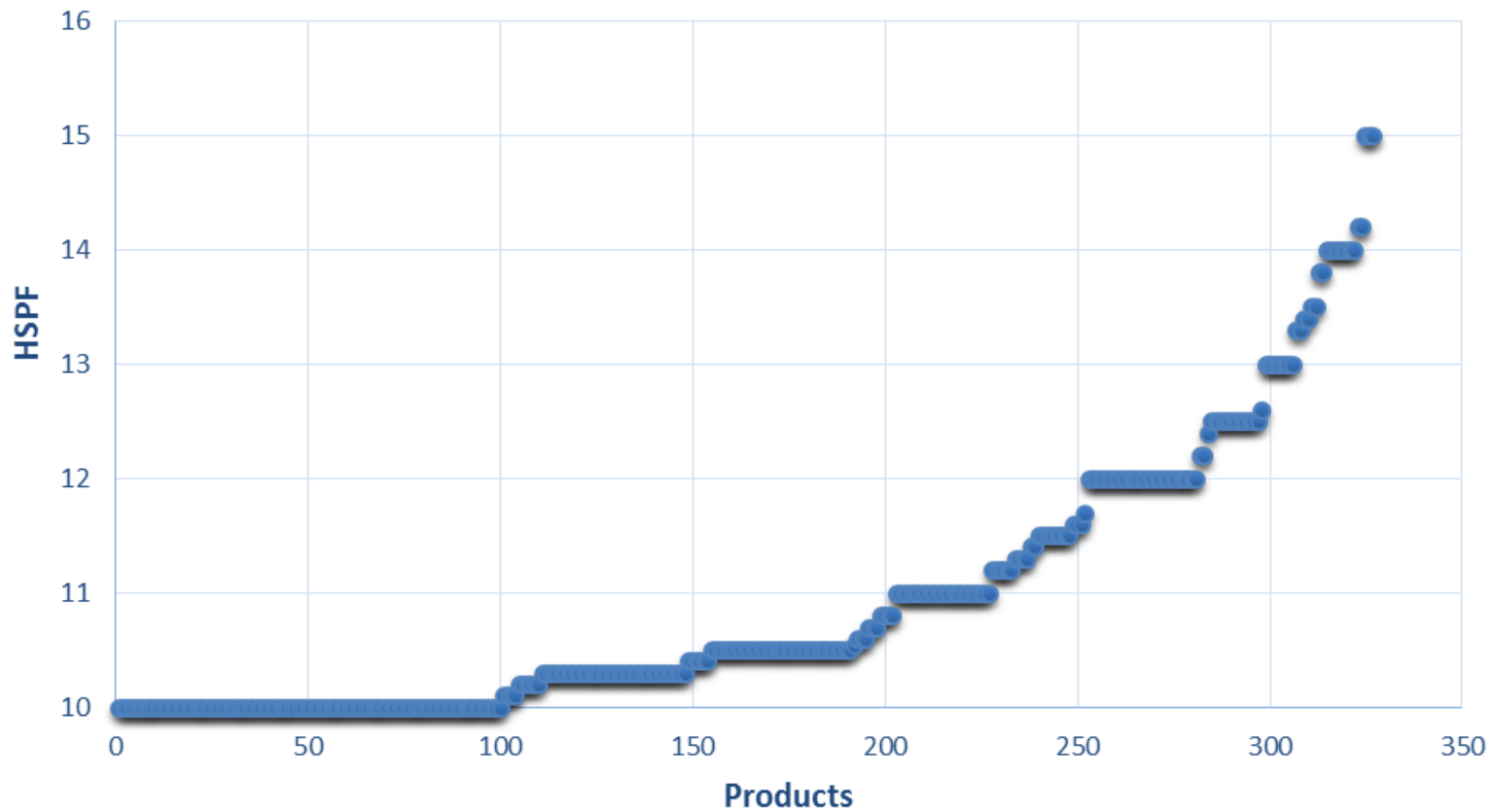
- Review Listing Spreadsheet

# Diverse Manufacturer Representation



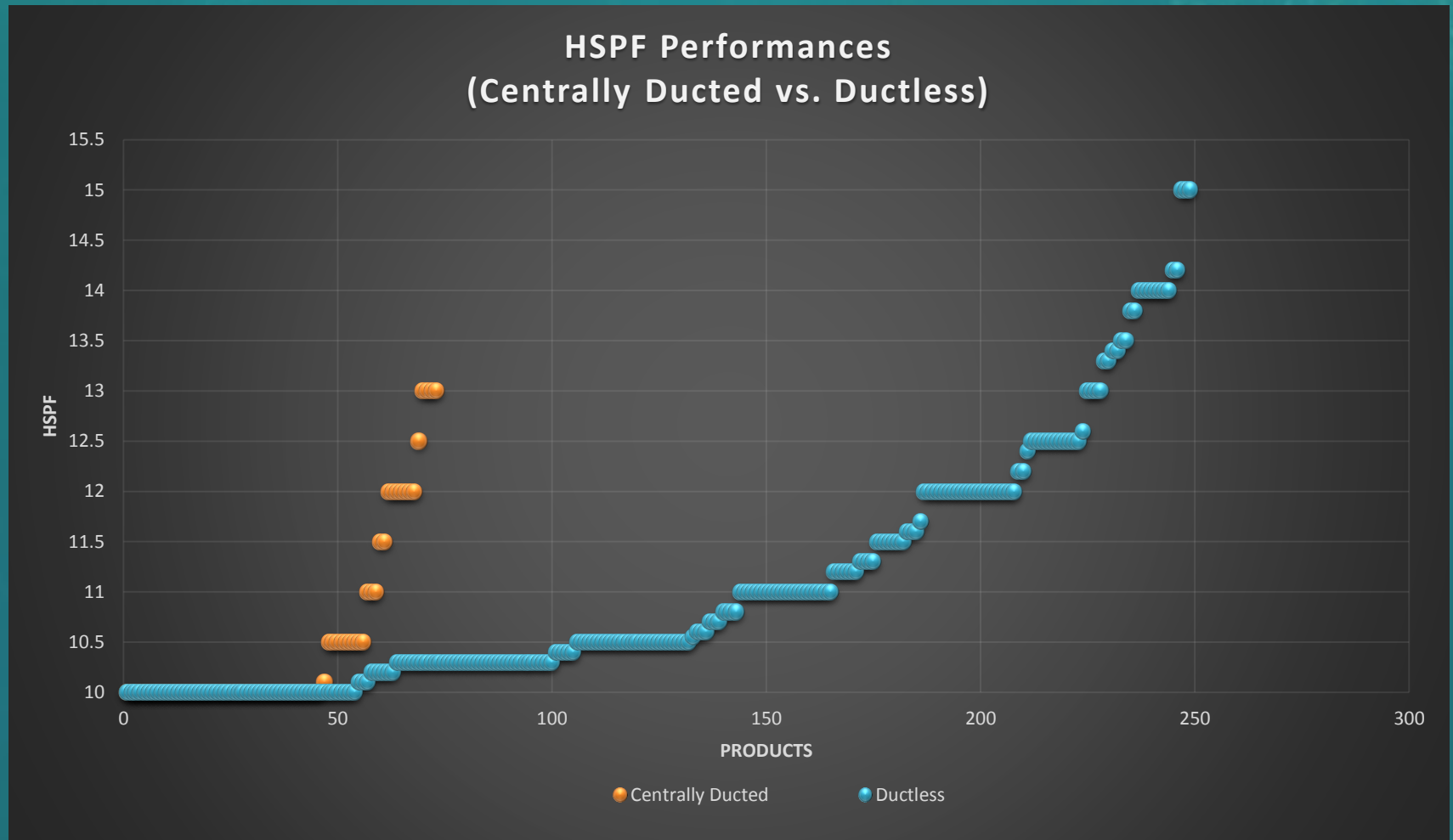
# HSPF Performances

## Products by HSPF performance



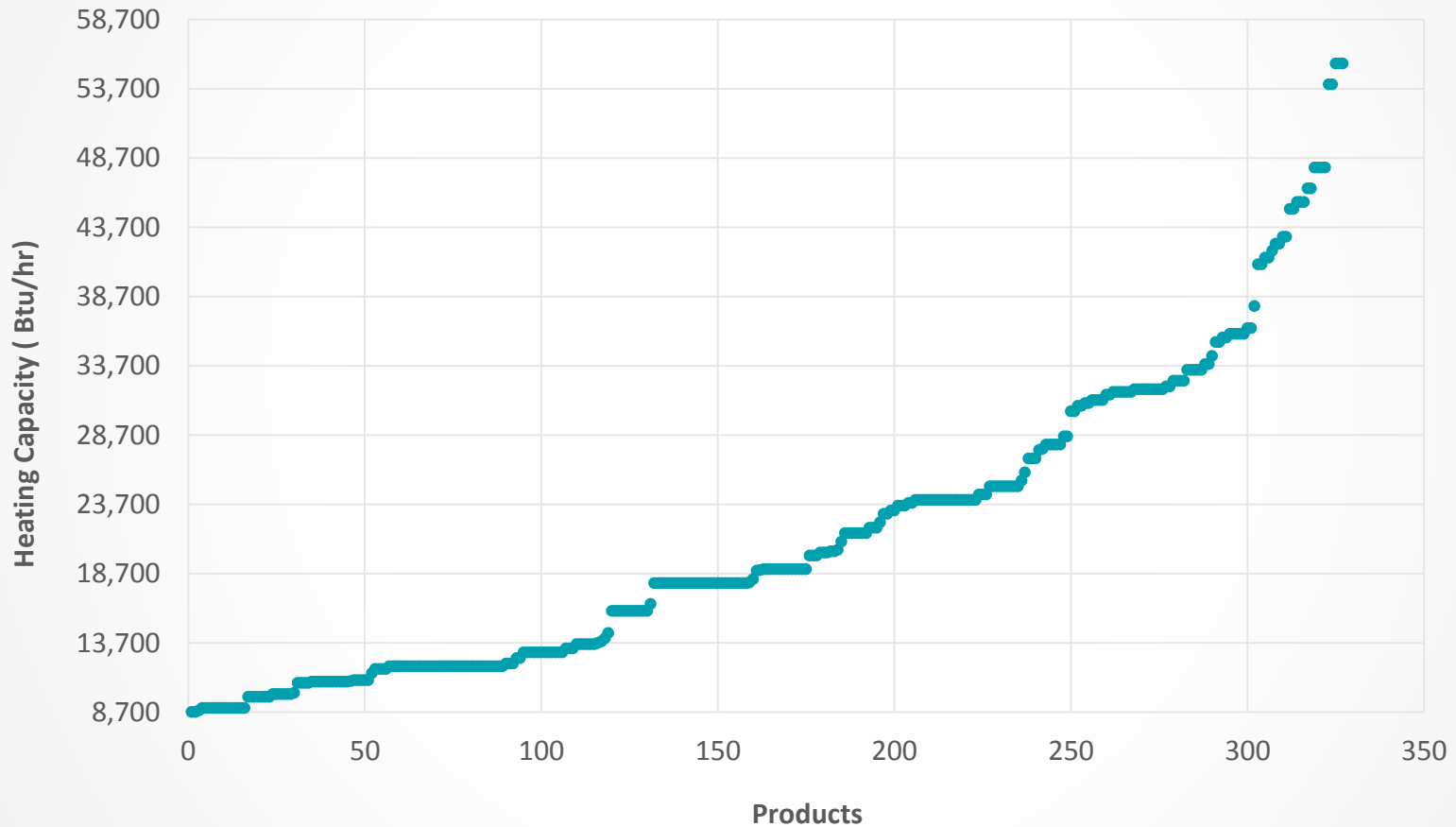


# HSPF Performances



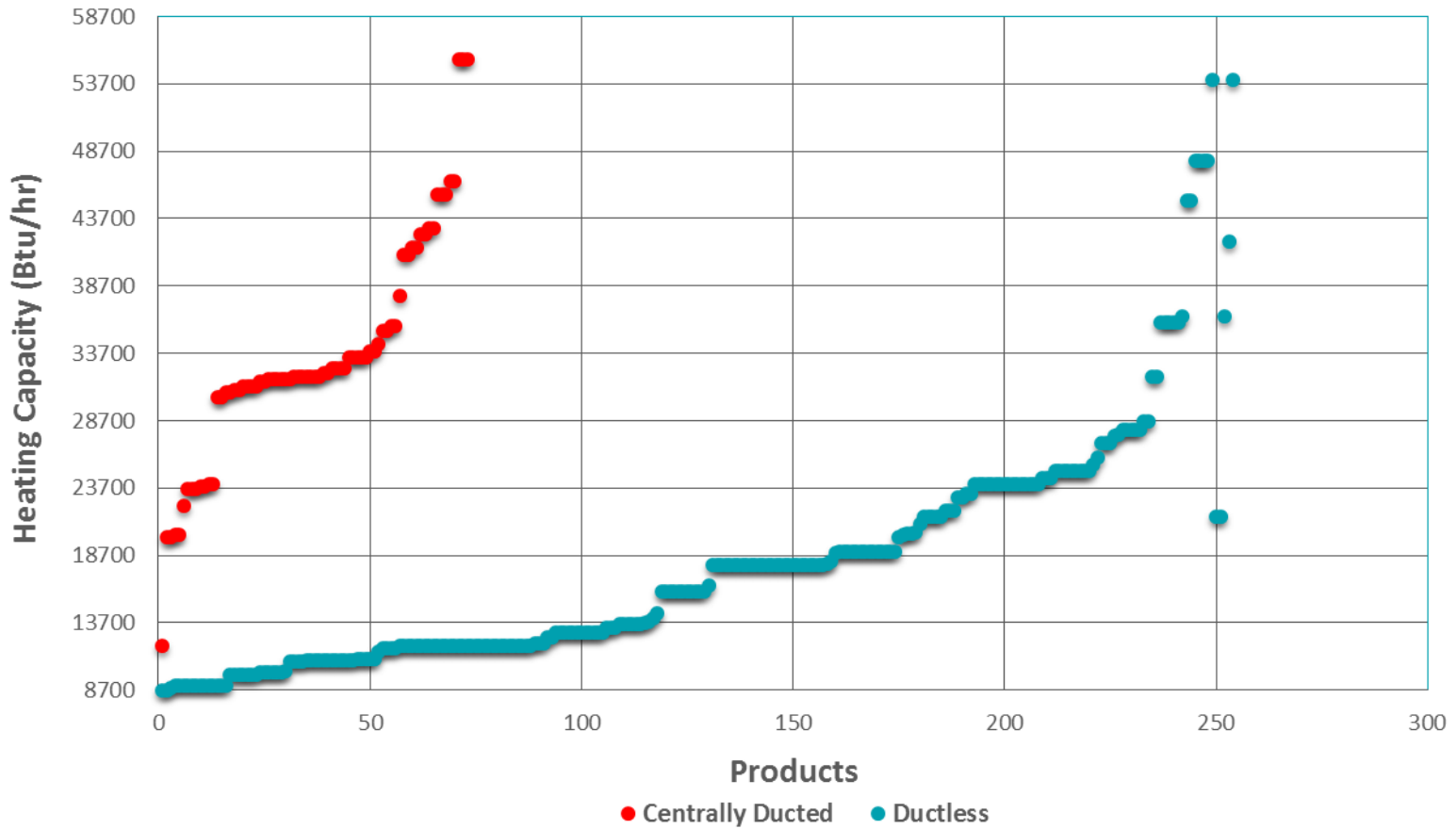
# Rated Heat Capacity

## Rated Heating Capacity @ 47 F



# Rated Heat Capacity

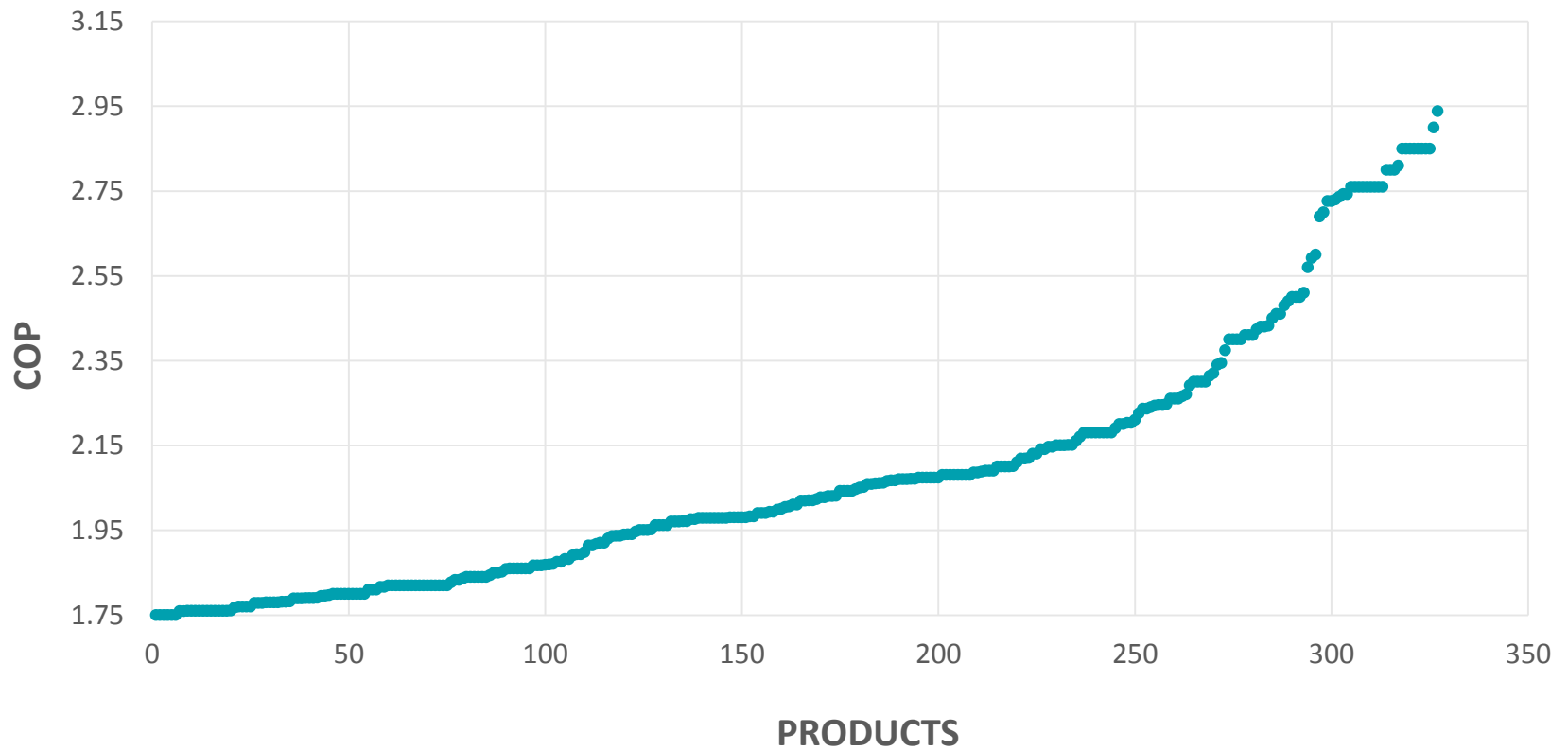
## Centrally Ducted vs. Ductless



# COP @ 5F (Max capacity)

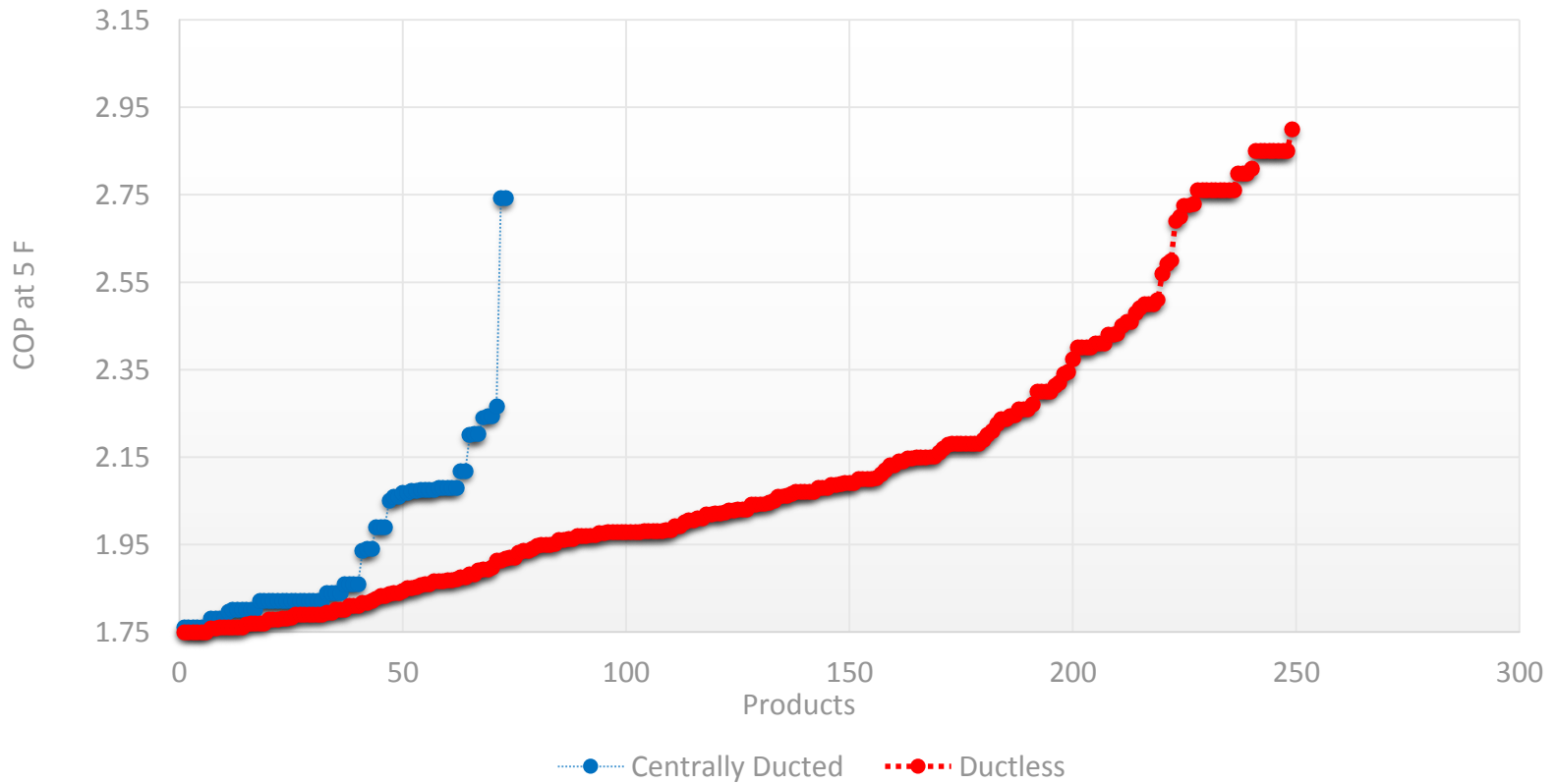


## COP at 5F

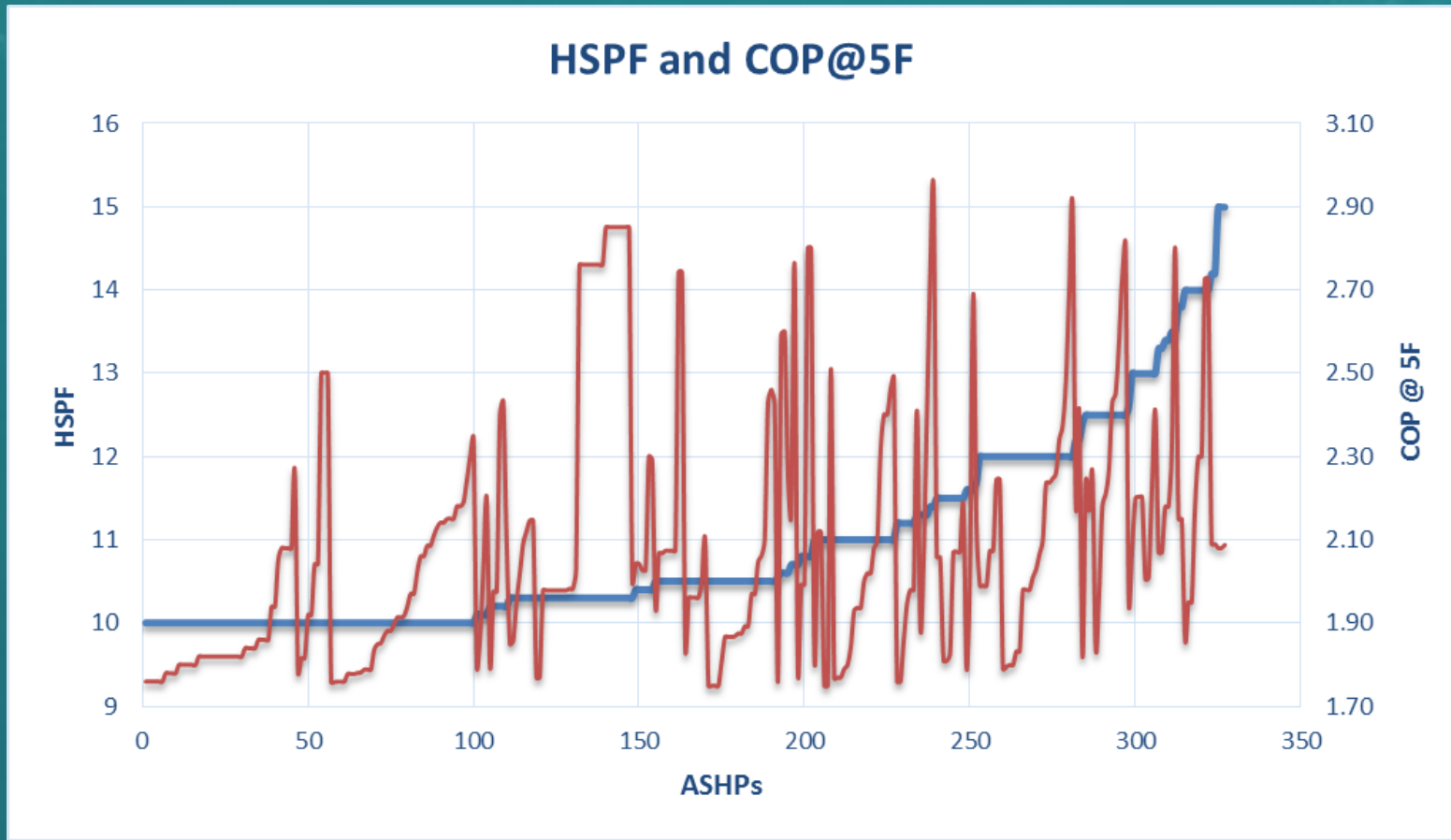


# COP @ 5F (Max capacity)

## COP at 5F (Centrally Ducted vs. Ductless)

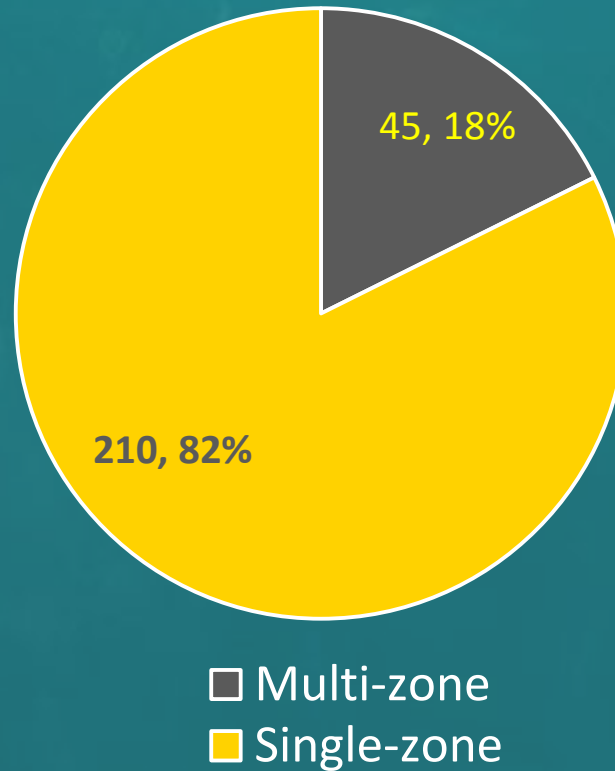


# Correlation between HSPF and COP



# Ductless Systems Breakdown

Market Share of Ductless Systems



# ccASHP Specification – Stakeholder Uses



- Massachusetts CEC
- Efficiency Vermont
- NYSERDA
- New Jersey Clean Energy Program
- Massachusetts Alternative Portfolio Standard
- Community Initiatives



# Informal Feedback

- Slow rate of listing mini-duct systems and multi-zone systems. Reconsider HSPF requirements?
- Min/Rated/Max Cooling capacity at 95F
- Challenge of meeting indirect EER requirement (ENERGY STAR requirement)?

# ccASHP Specification of Tomorrow



- How do we maximize usefulness/relevance of the next Version?
- Thoughts on the potential incorporation of CSA/third party testing?
- Are there minor near-term updates to consider?