ENERGY STAR Specification Development for Uninterruptible Power Supplies (UPSs)

Stakeholder Meeting

May 12, 2011

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ENERGY STAR Program

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ICF International

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ICF International

Agenda

Time (Eastern Time)	Topic
9:00- 9:15	Meeting Introduction
9:15-10:00	Phase 1 and Phase 2 Data Assembly and Outstanding Test Method Issues
10:00- 11:00	Energy Savings Potential and Draft 1 Specification Levels
11:00-11:30	Product Families and Modularity
11:30-noon	DC Output UPSs
Noon-12:45	LUNCH
12:45-1:30	**Communications and Measurement** •Questions from ENERGY STAR Buildings
1:30-2:15	Power and Performance Datasheet
2:15-3:00	Additional Issues

Meeting Introduction

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Meeting Introduction

- EPA thanks all stakeholders who have participated thus far in the development of the ENERGY STAR specification for Uninterruptible Power Supplies (UPSs)
  - Stakeholder participation is critical to the specification development
  - All stakeholders are encouraged to remain involved in the development process

Introduction: Why ENERGY STAR?

- UPS Energy Savings Potential is High
  - Estimated at 700 to over 7,000 GWh/year in the US
  - Per-unit annual savings for datacenter units > $1000
- Data center energy demands increasing
  - Double every ~5 years
  - UPS critical for efficiency
- Potential for Cost Savings
  - Approximately 2 – 3 years ROI
  - Varies by product size

Introduction: Why ENERGY STAR (cont'd)

- Pre-existing efficiency trend
  - Customer demand drives efficiency
  - Data centers are cautious
    - Due to "Eco-mode" history
  - ENERGY STAR can help:

Introduce Uniformity	Highlight Performance and Efficiency
• UPS efficiency testing, reporting • Aid customers in apples-to-apples comparisons	• Help customers find efficient products that satisfy their load protection needs • Generally, promote efficient UPSs

EPA

Activities To Date

- ENERGY STAR test method developed in 2010
  - Based on Appendix J of IEC standard 62040-3
- EPA announced data assembly in December 2010
  - Data assembly conducted January–March 2011
  - 8 manufacturers volunteered test results for 321 AC-output UPSs
- EPA analyzed the data and released a Draft 1 Specification on May 5, 2011
  - Stakeholder meeting on May 12 to present work and receive comment

Meeting Objectives

1. Resolve any remaining concerns regarding the test method
2. Explain data analysis and resultant Draft 1 Specification levels and provide opportunity for discussion
3. Provide opportunity to comment on other aspects of the UPS specification

Remote Attendees

- Audio provided via conference call in:

Call in:	+1-877-423-6338 (inside the US) +1-571-281-2578 (outside the US)
Code:	707-775

- Phone lines will default to mute during presentations, will default to open during discussion
  - Can be un-muted any time by pressing '*6'
- Please keep phone lines on mute unless speaking
- Please refer to the agenda for approximate discussion timing

Meeting Conduct

- Meeting sections correspond to topics addressed in the Draft 1 specification
- EPA and/or contractors will present work on each topic
  - Stakeholders are welcome to comment at any time
  - Additional time will be provided at the end of each section for broader discussion on each topic
  - Finally, open discussion on topics not covered during the presentation is scheduled at the end of the meeting (2:30–3:00 pm Eastern Time)

Comments

- In addition to making verbal comments during the meeting, stakeholders are strongly encouraged to submit written comments and data
- Please send all comments to:

ups@energystar.gov

Comment Deadline
Friday, May 27, 2011

Before We Begin…

- Anonymized test data to be released online
  - Seek comments on what should/should not be included in the data file
  - Allows review of levels, provide helpful suggestions
    - More eyes = better
- These slides will also be released online
- We are aware of a unit issue (kVA vs. VA) with the VFI line fit
- This is just the first draft
  - Estimate there will be two more drafts before final version
  - There will be more opportunities for comment and discussion
  - You can always call or email us if you have additional concerns

Phase 1 and Phase 2 Data Assembly

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Dataset Assembly Overview

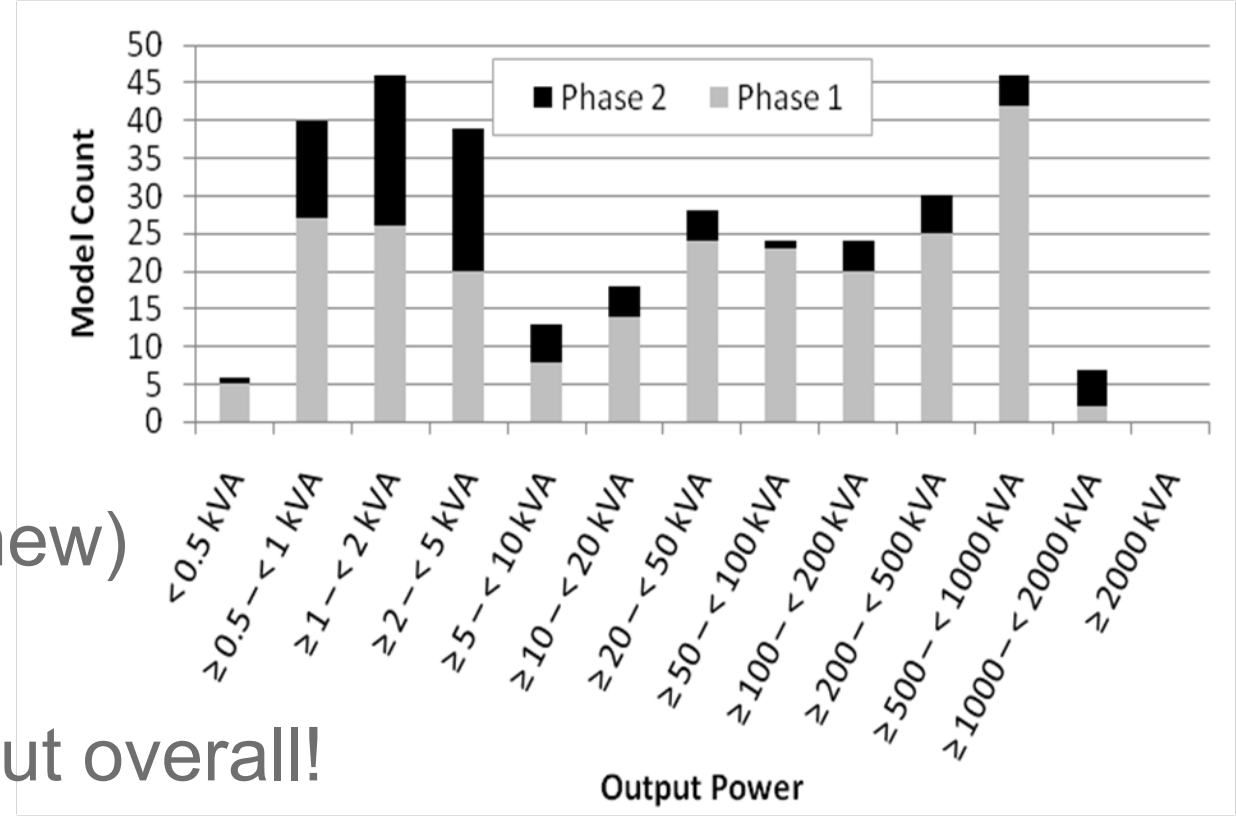
- UPS data added in two Phases

Phase 1

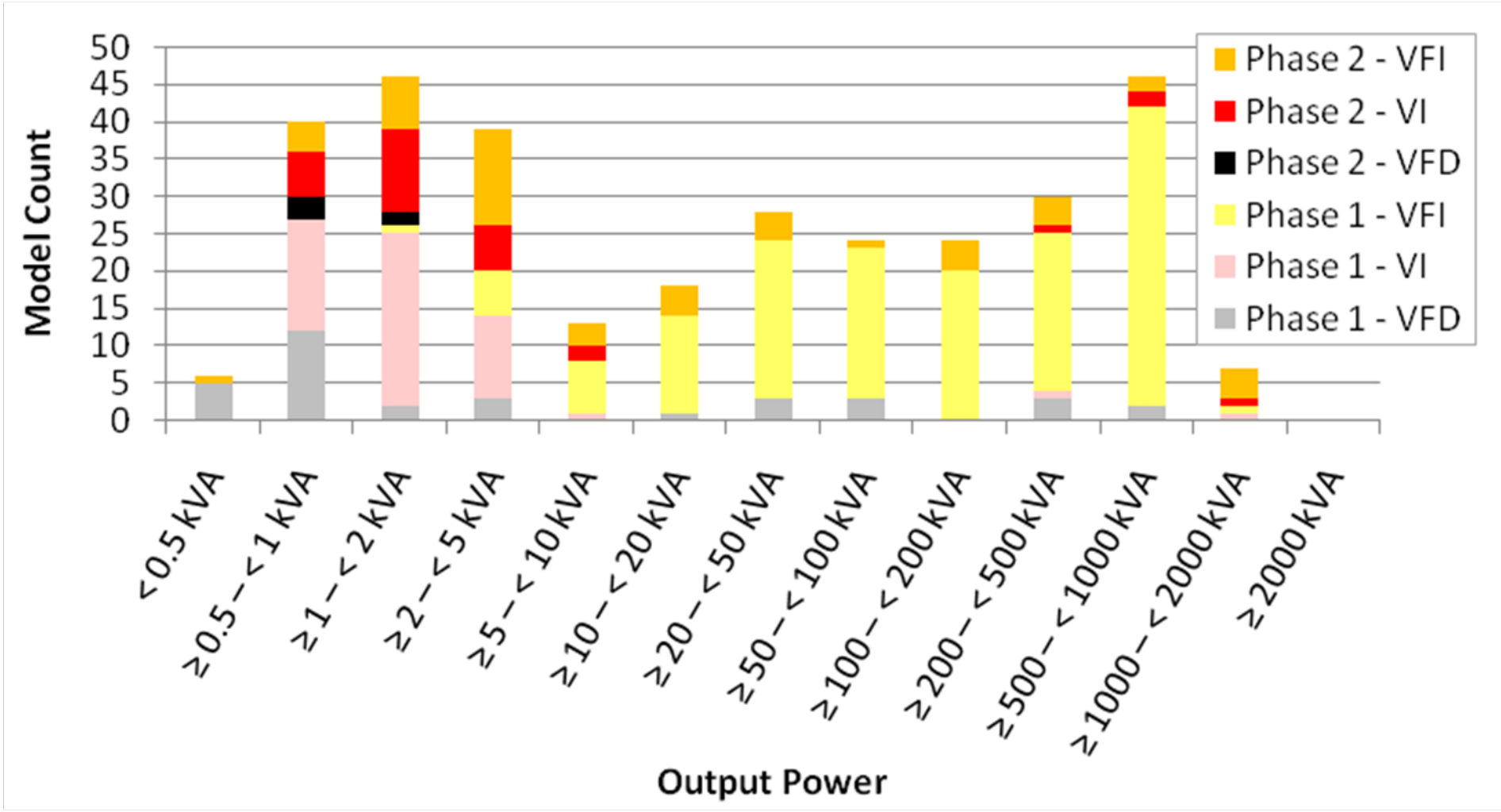
- 5 AC mfrs.
- 236 units

Phase 2

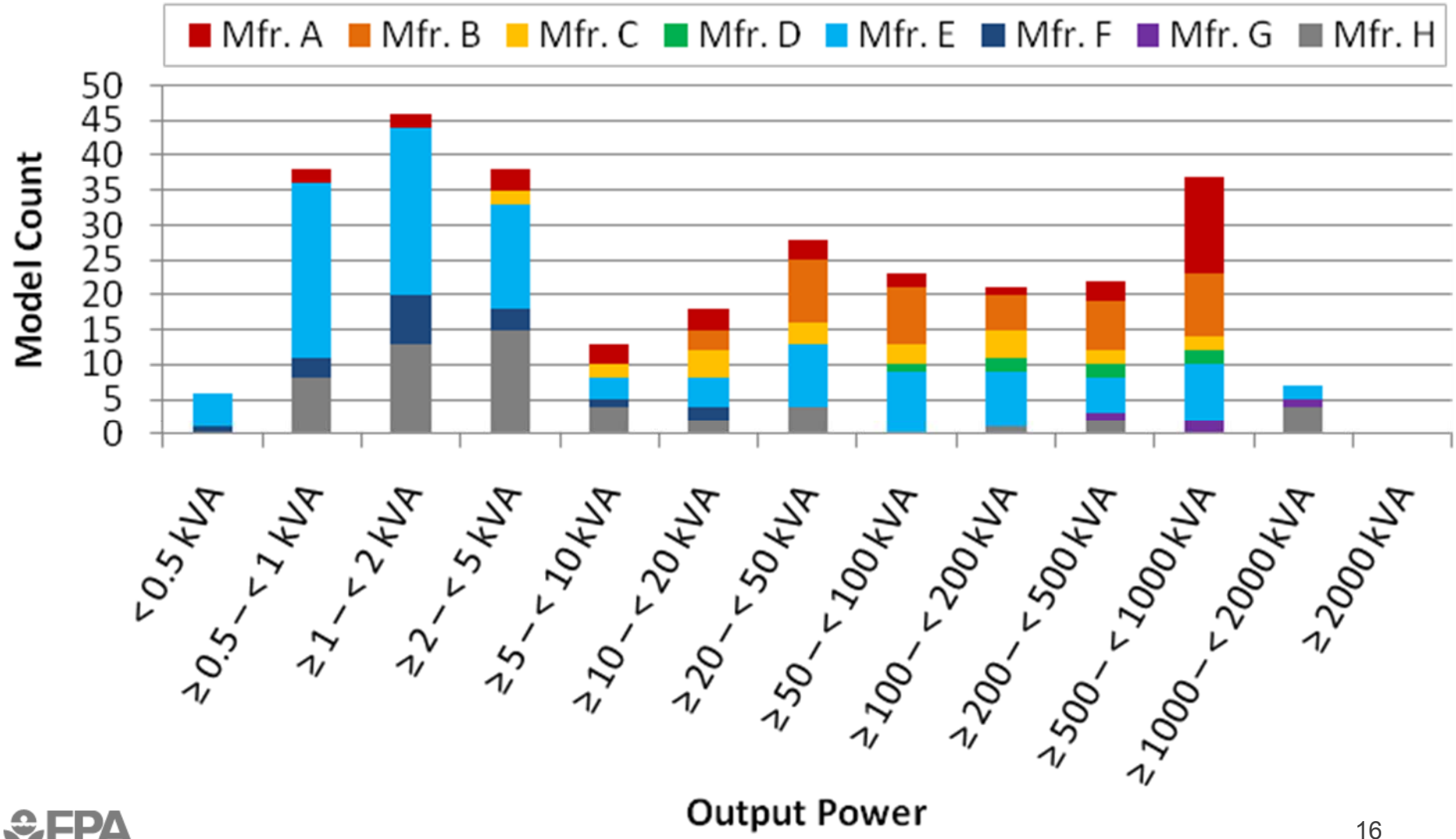
- 4 AC mfrs. (3 new)
- 85 units
- Excellent turnout overall!



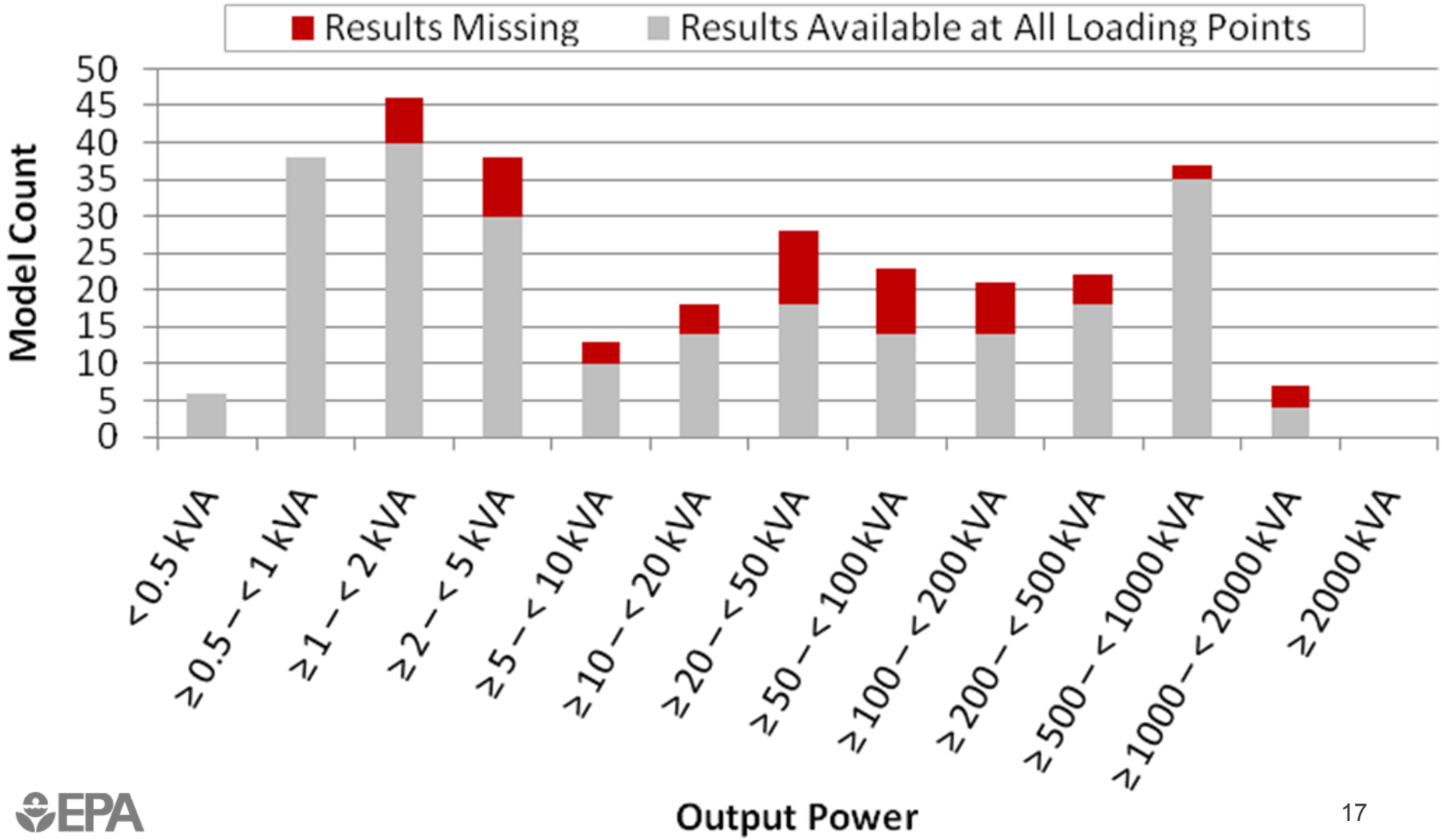
Dataset Assembly Overview: Additional Modes Tested



Dataset Assembly Overview: Additional Manufacturers



Dataset Assembly Overview: Additional Loading Points



Remaining Data Gaps

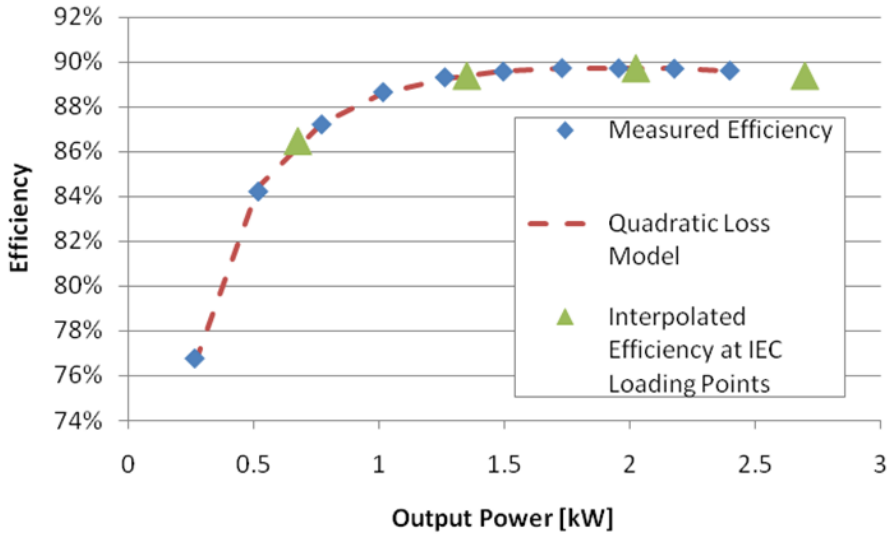
- Most gaps identified following Phase 1 have been resolved
  - Still missing DC-output and Rotary UPS tests
  - Would like more than one manufacturer's DC data
- Dataset is generally representative of the AC UPS market:
  - Based on: discussions with stakeholders and market reports

Data Validation

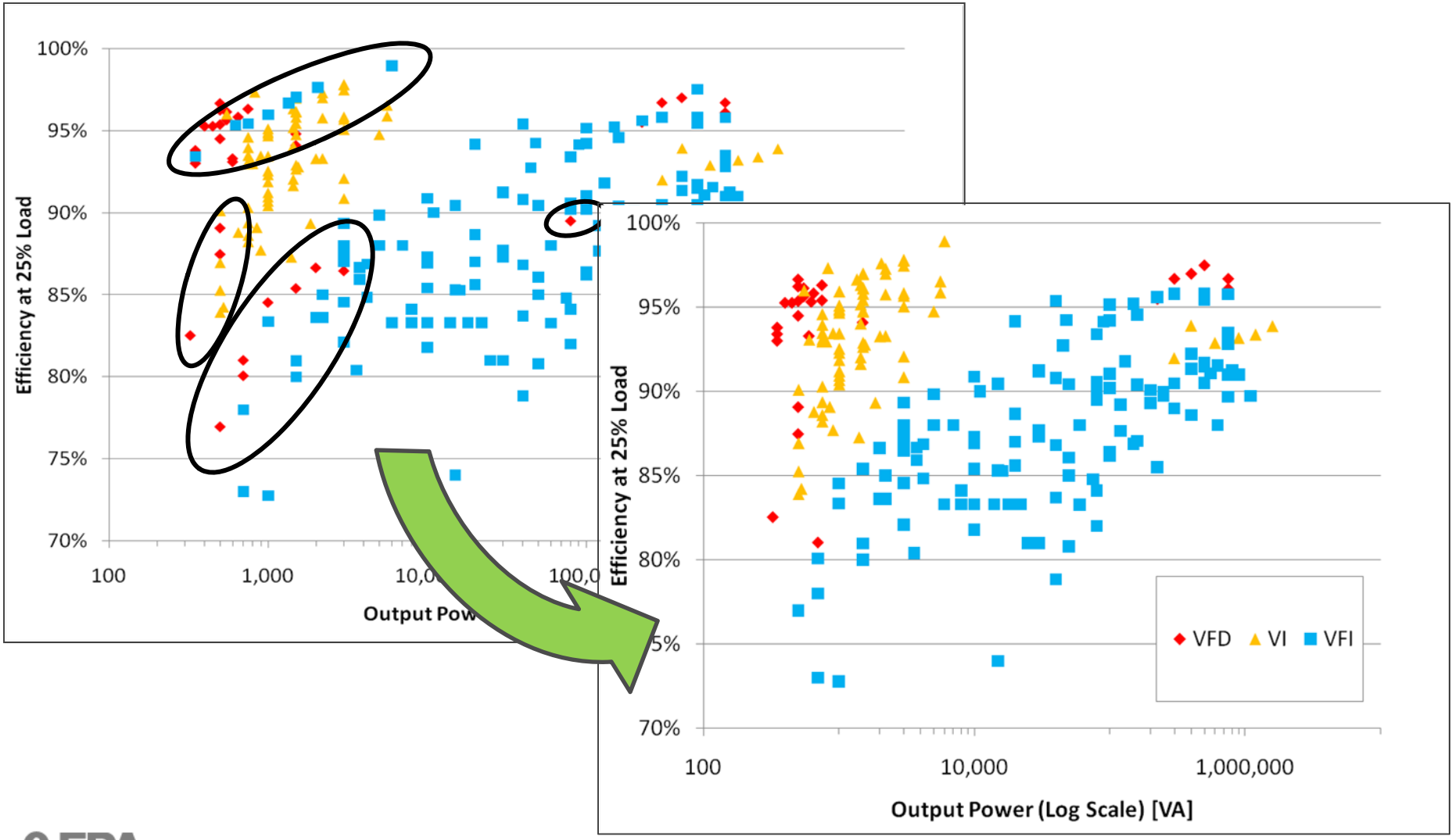
- Minor revisions:
  - Removed or added units of measurement (e.g., “250 kW” → “250”)
  - Changed the order of magnitude (e.g., data entered in kilowatts instead of watts, and vice-versa)
  - Entered the apparent power or real power for a unit when one or the other was missing, based on datasheets or the characteristics of other units within the same product series

Data Validation (cont.)

- Larger revisions:
  - Calculated the efficiency at the IEC 62040-3 loading points (i.e., 100%, 75%, 50%, and 25% of the reference linear load)
  - Eliminated duplicates—units with identical model numbers and test results
  - Corrected discrepancies in the reported topology (e.g., line-interactive) and input dependency characteristics (e.g., voltage and frequency dependent (VFD)) for some units, based on information in datasheets:
    - E.g., changed input dependence of line-interactive units to VI from VFD or VFI



Data Validation: Input Dependence



Data Validation: Input Dependence (cont.)

- Due to the number of units that were listed contrary to their topologies, EPA welcomes comment on appropriateness of classifying units by input dependence (i.e., VFI, VI, VFD)
  - 8 fully on-line double-conversion UPSs listed as VFD
  - 1 double-conversion UPS operating in an efficient, alternate “eco-mode” listed as VFI
  - 3 passive-standby listed as VFI
  - 6 line-interactive/AVR units listed as VFI
  - 2 line-interactive/AVR units listed as VFD

Future Data Validation Tasks

- EPA anticipates further data validation to increase representativeness of the dataset
- Examples include:
  - Remove test results for discontinued products (will decrease the number of test results in the dataset)
  - Perform interpolation from intermediate loading points for additional units (will increase the number of usable test results in the dataset)
- EPA welcomes comment on suggestions for further data validation to be performed

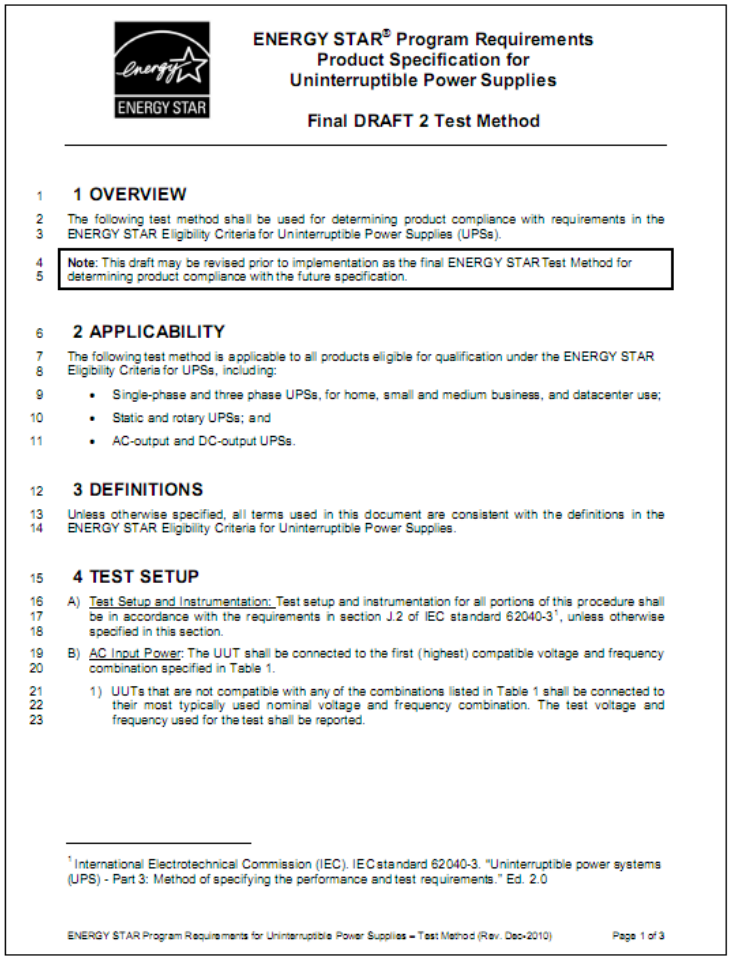
Releasing Anonymized Dataset for Review

- EPA plans to release an anonymized dataset and energy savings calculations for review and comment
- EPA intends to strip all identifying information and include only the following column headings:

- Topology
- Description of mode under test
- Maximum time to switch to VFI mode
- Redundancy
- Is UPS Modular?
- If so, min/max?
- Apparent Power (kVA)
- Active Power (kW)
- Nominal input voltage
- Input AC grounding
- Number of input phases
- Neutral available at input?
- Nominal output voltage for test
- Output AC grounding
- Number of output phases
- Neutral available at output?
- AAA = Input dependence
- BB = Voltage waveform
- CCC = Voltage variation
- Air handling or cooling reqs.
- Output Power, Efficiency, and Losses at available loading
- Average Loss Using Loading Profile (W)
- Input Power Factor at 100% Load

Remaining Test Method Issues

- Final Draft 2 Test Method was released with Draft 1 Spec
  - Moved definitions to spec
  - Updated references to Final IEC 62040-3 Ed. 2
- Some parameters remain unspecified
  - Thermal stability of UUT
  - Precision of testing instrument



ENERGY STAR® Program Requirements
Product Specification for
Uninterruptible Power Supplies

Final DRAFT 2 Test Method

1 OVERVIEW

The following test method shall be used for determining product compliance with requirements in the ENERGY STAR Eligibility Criteria for Uninterruptible Power Supplies (UPSs).

Note: This draft may be revised prior to implementation as the final ENERGY STAR Test Method for determining product compliance with the future specification.

2 APPLICABILITY

The following test method is applicable to all products eligible for qualification under the ENERGY STAR Eligibility Criteria for UPSs, including:

- Single-phase and three phase UPSs, for home, small and medium business, and datacenter use;
- Static and rotary UPSs; and
- AC-output and DC-output UPSs.

3 DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions in the ENERGY STAR Eligibility Criteria for Uninterruptible Power Supplies.

4 TEST SETUP

A) Test Setup and Instrumentation: Test setup and instrumentation for all portions of this procedure shall be in accordance with the requirements in section J.2 of IEC standard 62040-3[1], unless otherwise specified in this section.

B) AC Input Power: The UUT shall be connected to the first (highest) compatible voltage and frequency combination specified in Table 1.

1) UUTs that are not compatible with any of the combinations listed in Table 1 shall be connected to their most typically used nominal voltage and frequency combination. The test voltage and frequency used for the test shall be reported.

[1] International Electrotechnical Commission (IEC). IEC standard 62040-3. "Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements." Ed. 2.0

Test Method: Thermal Stability

- Section J.2.2 c) specifies that:

c) the UPS and the load shall have been operated for a sufficient length of time to reach steady state conditions. The length of time determined during temperature rise type tests plus 25 % is considered sufficient. Alternatively, trend variation of less than 2 ˚C temperature variation over not less than three consecutive readings with no less than 10 min interval may be considered steady-state for the purpose of this annex;

- Location of thermocouples remains unspecified

Test Method: Instrument Precision

- Appendix J of IEC 62040-3 Ed. 2 specifies uncertainty:
  - Shall be ≤ 0.5% at 95% confidence level

- Sufficiently stringent?
- Is there a need for other parameters?
  - Resolution?
  - Frequency response?
  - IEC 62301 Ed. 2.0 requirements?

Open Comment

- EPA would now like to open the floor for any comments from stakeholders pertaining to:
  - (Please remember, your line may be on mute)

Phase 1 and 2 Data Assembly and Test Method Issues

Energy Savings Potential and Draft 1 Specification Levels

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Energy Savings Potential and Draft 1 Specification Levels

- Drafting of specification levels proceeded in three stages:
  1. UPS test results were divided based on characteristics with a perceived impact on efficiency
  2. Specification levels corresponding to the top 20% of models were calculated for each division
  3. Best-fit lines were selected to ease presentation of the specification

UPS Analytical Divisions Recommended by Stakeholders

- Output power
- Modularity
- Engineered v. off-the-shelf
- Form factor (rack v. tower)

Market segment (e.g., consumer, business, industrial, medical)
Cord-connected v. hardwired
Number of phases
Internal versus external battery

- Performance (per IEC 62040-3 classification)
- Output voltage
- Parallel operation/redundancy
- Stakeholders also warned against using
  - Topologies or technologies: May evolve over time
  - Redundancy:
  - Number of phases:

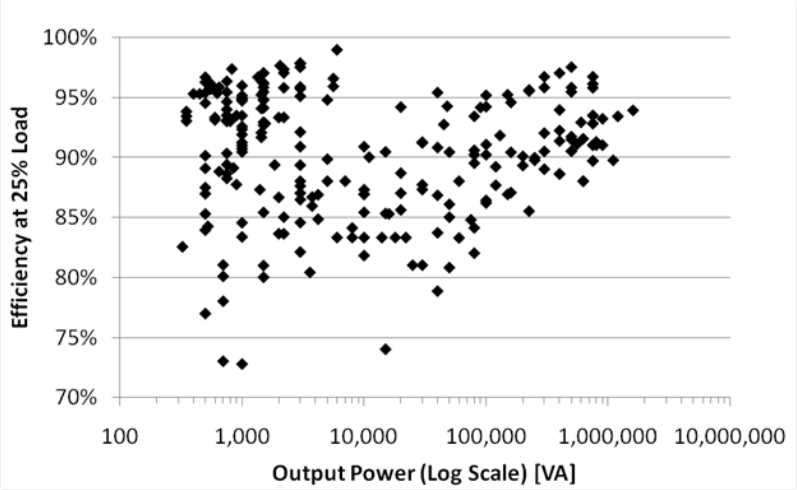
Too many variations; would lead to excessive testing burden

Other Precedents for Analytical Divisions

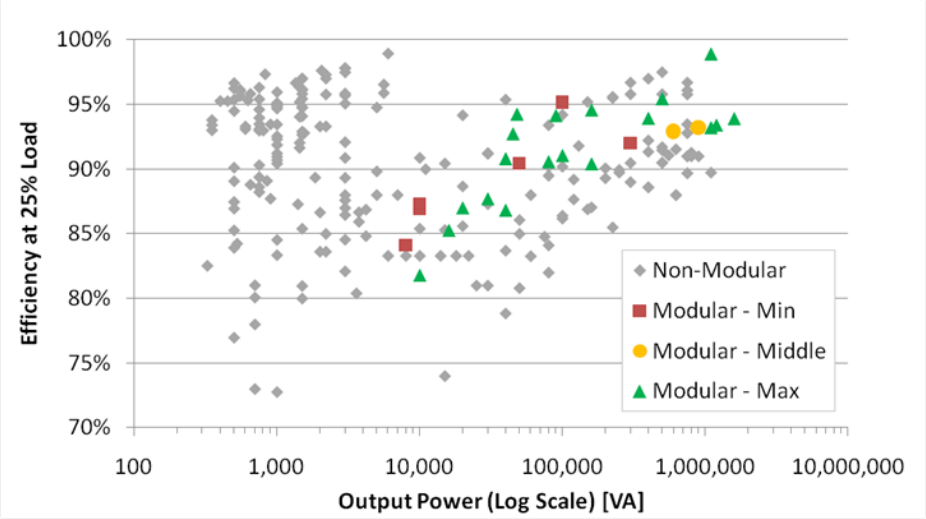
- EU Code of Conduct for UPSs
  - Output power
  - Input dependence
  - Output waveform
- Appendix I to IEC Standard 62040-3
  - Output power
  - Output Voltage
  - Input dependence
  - Output waveform

Voltage V	Load %	UPS rating kVA			
		≥ 10 to < 20	≥ 20 to < 40	≥ 40 to < 200	≥ 200
120/208	25	78,9 %	80,2 %	83,3 %	86,4 %
	50	86,4 %	87,0 %	88,2 %	90,1 %
	75	88,2 %	88,8 %	90,1 %	91,3 %
	100	88,8 %	89,5 %	90,1 %	91,3 %
230/400	25	83,0 %	84,0 %	86,5 %	89,0 %
	50	89,0 %	89,5 %	90,5 %	92,0 %
	75	90,5 %	91,0 %	92,0 %	93,0 %
	100	91,0 %	91,5 %	92,0 %	93,0 %
277/480	25	84,7 %	85,6 %	87,9 %	90,1 %
	50	90,1 %	90,6 %	91,5 %	92,8 %
	75	91,5 %	91,9 %	92,8 %	93,7 %
	100	91,9 %	92,4 %	92,8 %	93,7 %

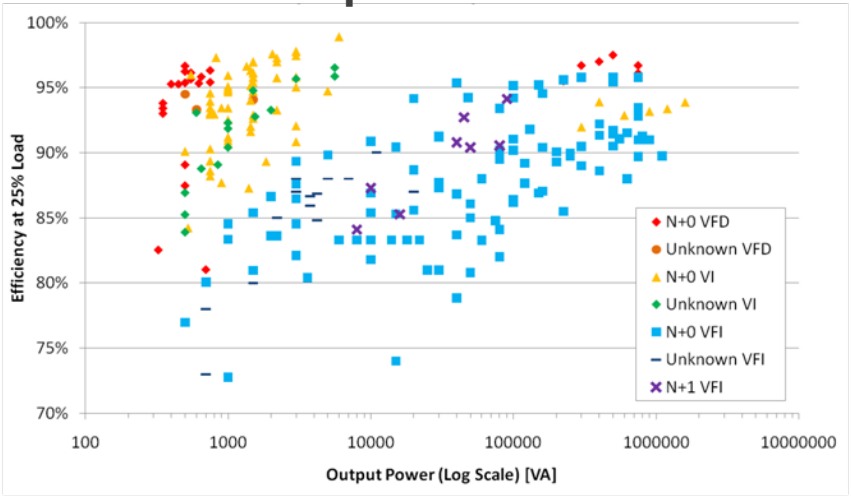
EPA Evaluated All Suggestions and Precedents



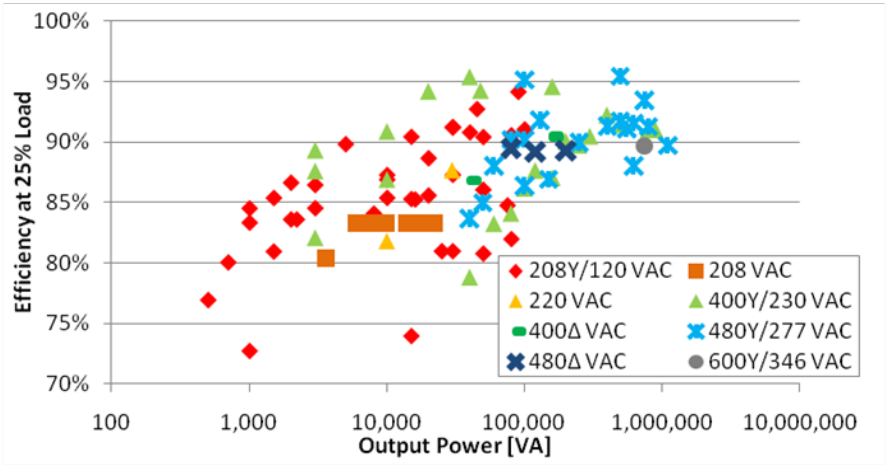
Output Power



Modularity

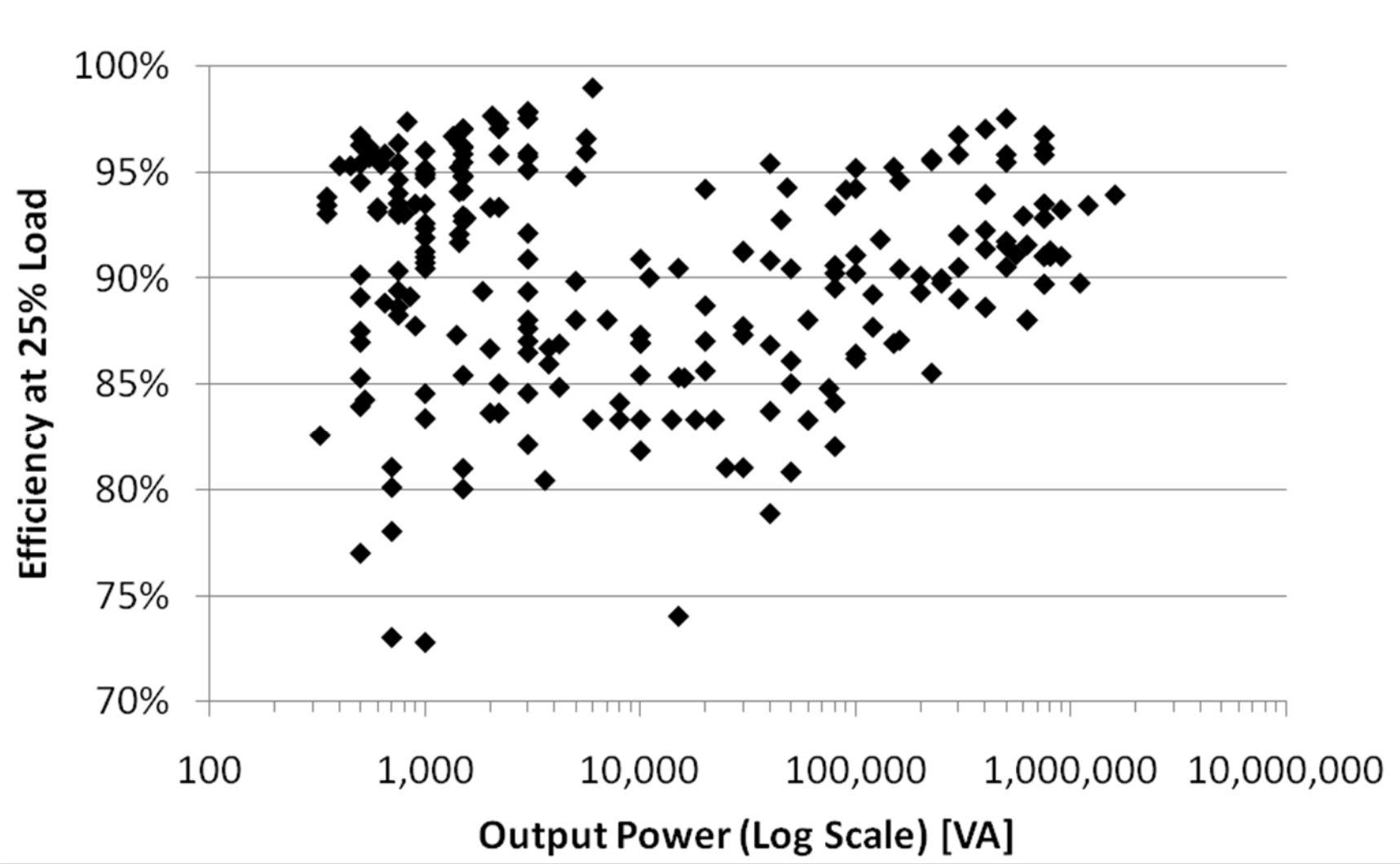


Redundancy

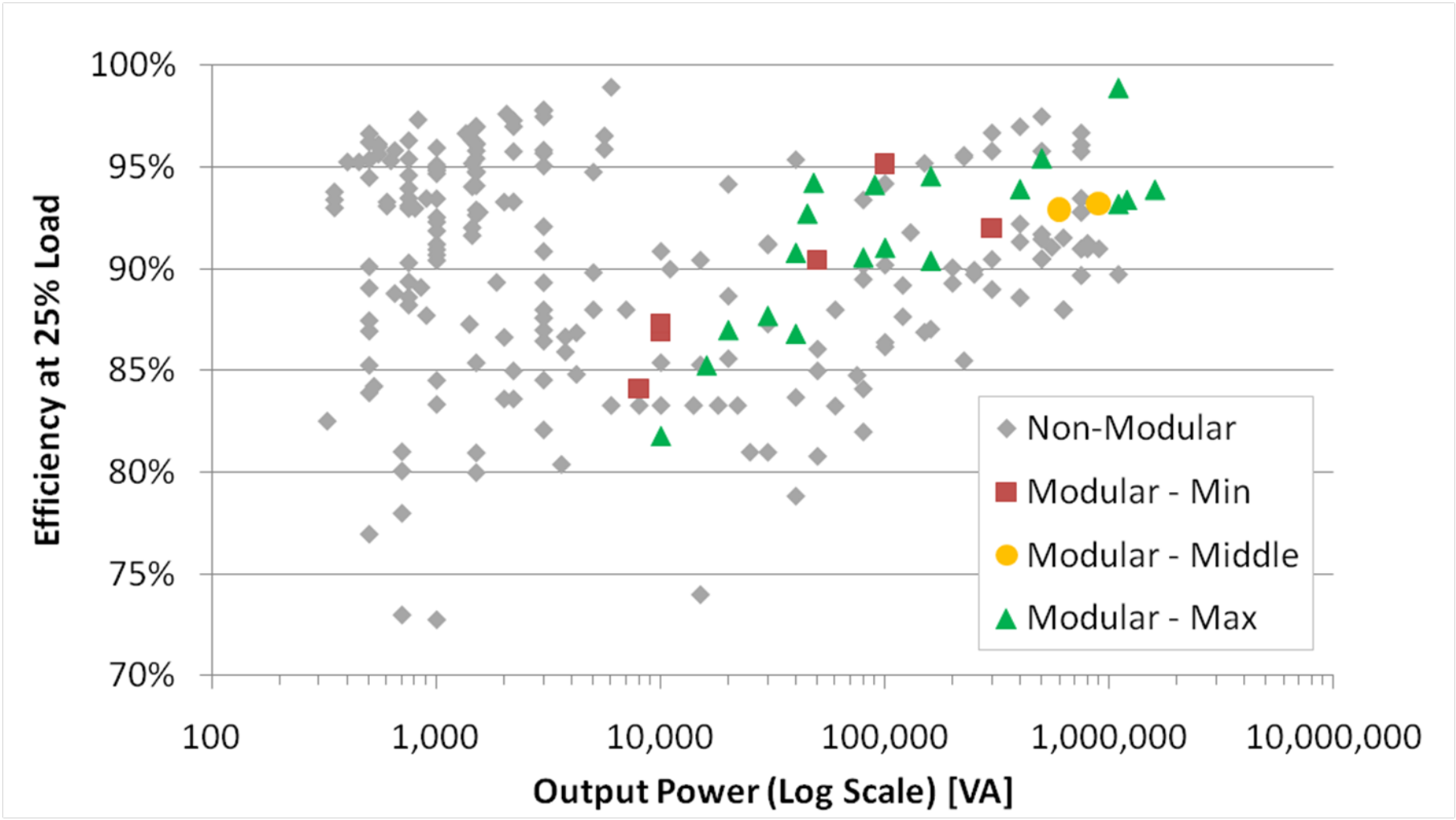


Output Voltage

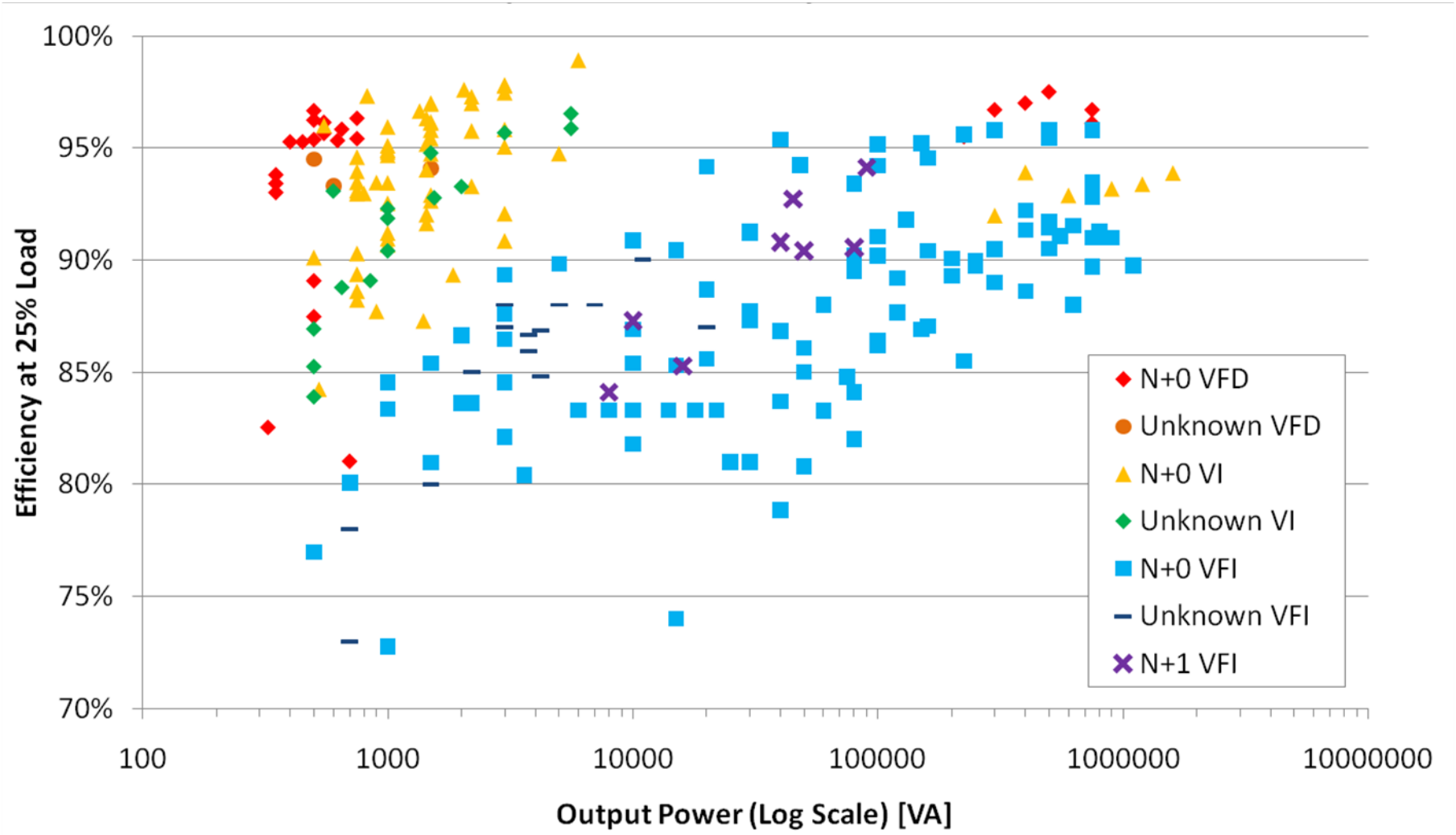
Output Power



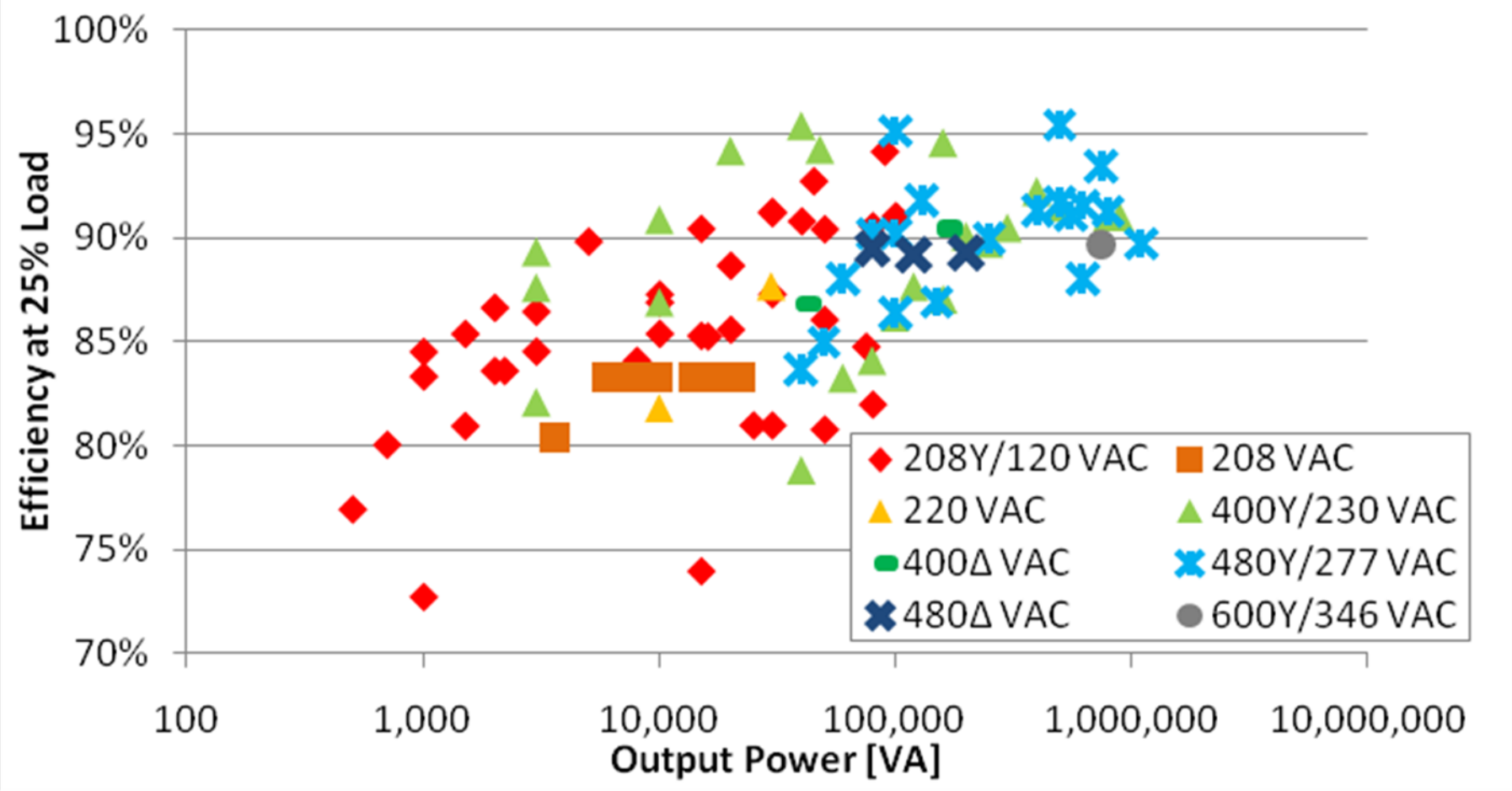
Modularity


100%
95%
90%
85%
80%
75%
70%
Efficiency at 25% Load
100
1,000
10,000
100,000
1,000,000
10,000,000
Output Power (Log Scale) [VA]
Non-Modular
Modular - Min
Modular - Middle
Modular - Max

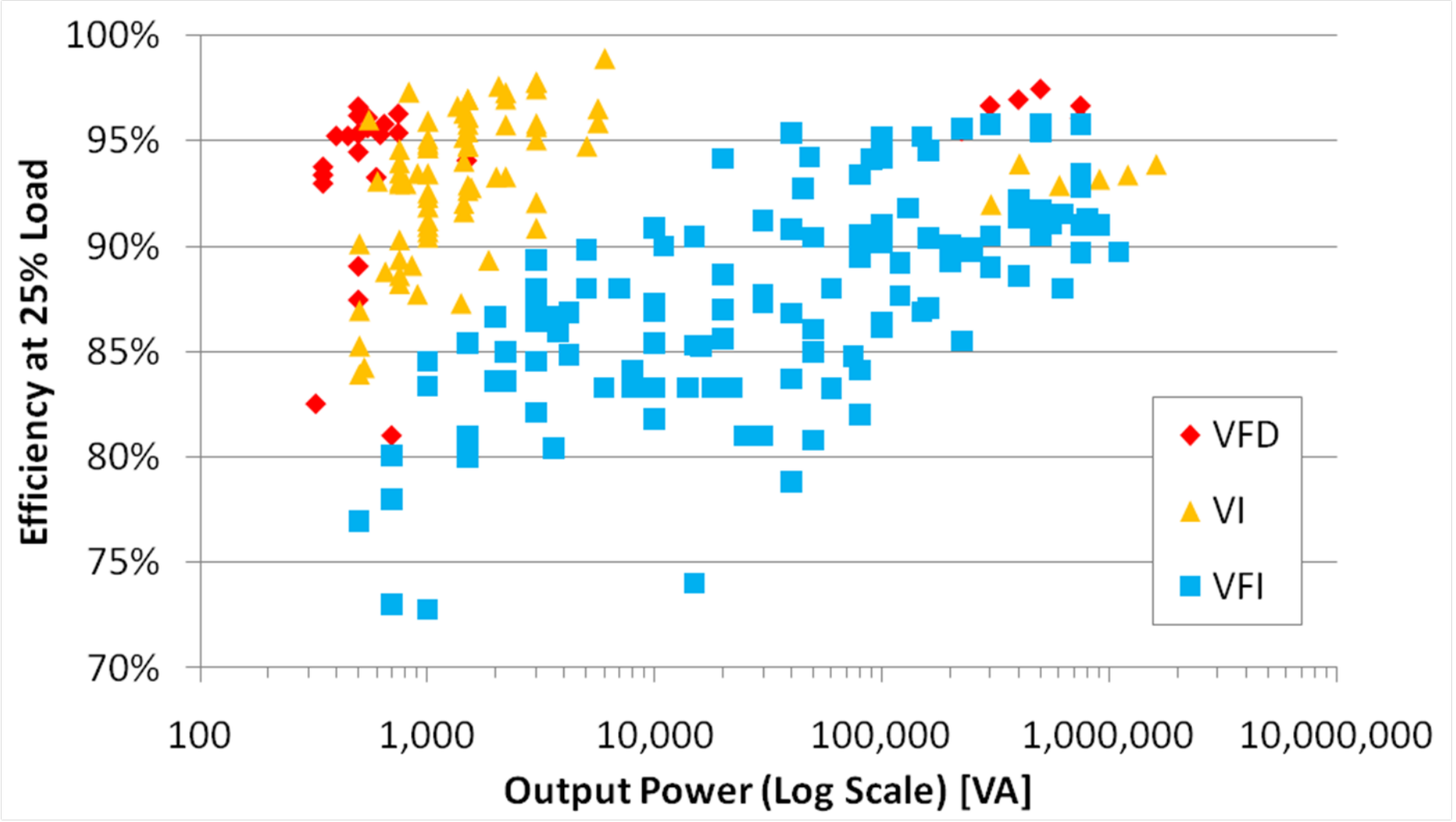
Redundancy


100%
95%
90%
85%
80%
75%
70%
Efficiency at 25% Load
100
1000
10000
100000
1000000
10000000
Output Power (Log Scale) [VA]
N+0 VFD
Unknown VFD
N+0 VI
Unknown VI
N+0 VFI
Unknown VFI
N+1 VFI

Output Voltage

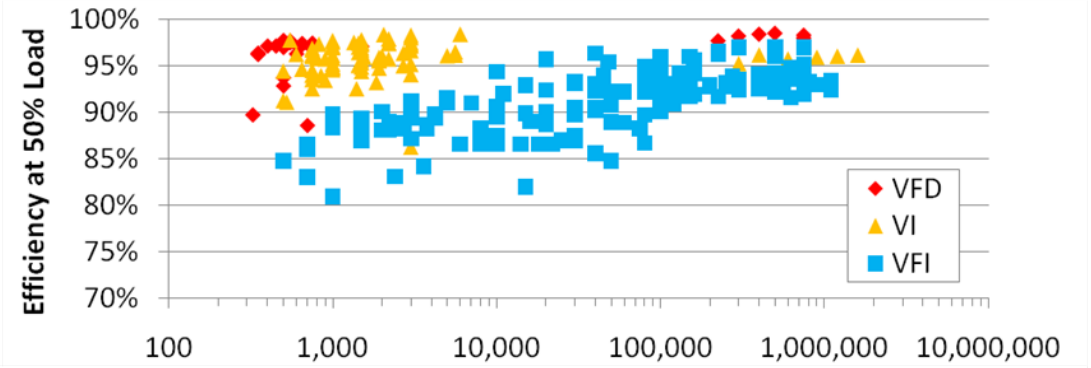


Output Power, Input Dependence Impact Efficiency

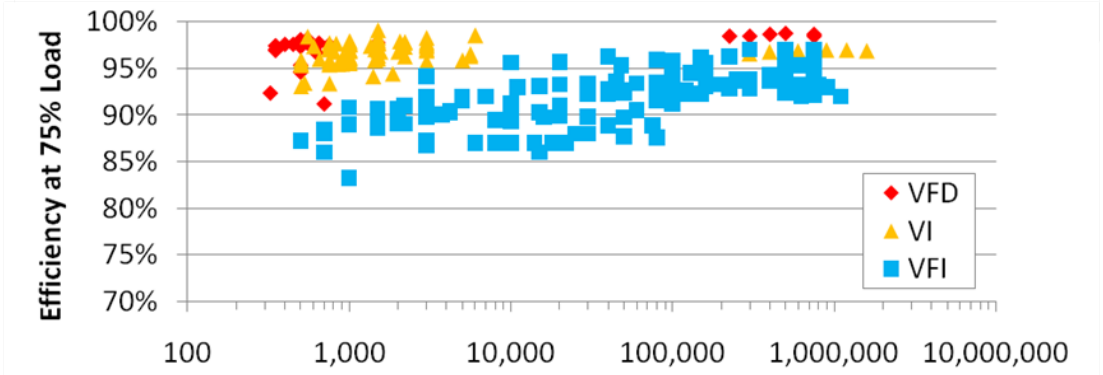


Output Power, Input Dependence Impact Efficiency (cont.)

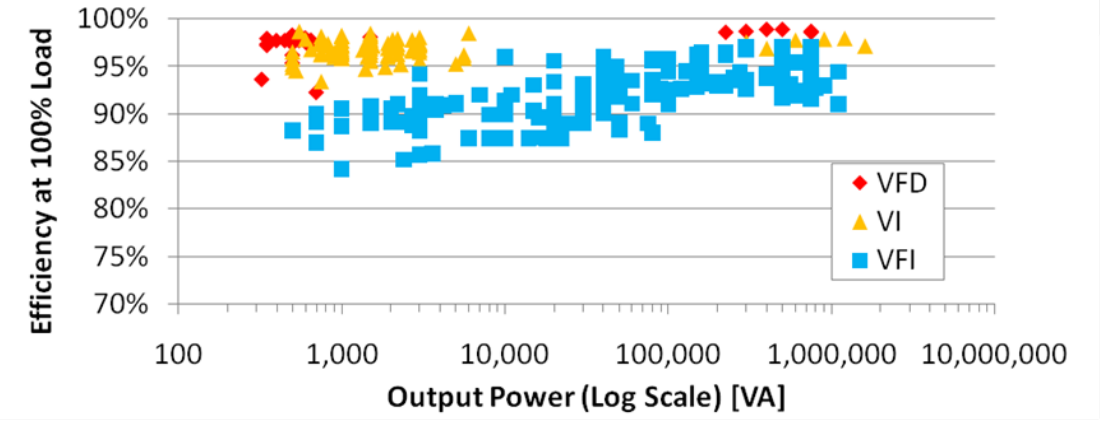
50% Load:



75% Load:



100% Load:



Usable Test Results in Each Analytical Division

- All 4 loading points available:

Output Power	VFD	VI	VFI	Grand Total
0.3 – 0.8 kVA	20	17	4	41
0.8 – 1.5 kVA	0	25	3	28
1.5 – 3.5 kVA	1	26	14	41
3.5 – 5 kVA	0	0	5	5
5 – 10 kVA	0	4	6	10
10 – 20 kVA	0	0	14	14
20 – 40 kVA	0	0	11	11
40 – 200 kVA	0	0	33	33
200 – 10000 kVA	6	6	38	50
Grand Total	**27**	**78**	**128**	**233**

Loading Assumptions

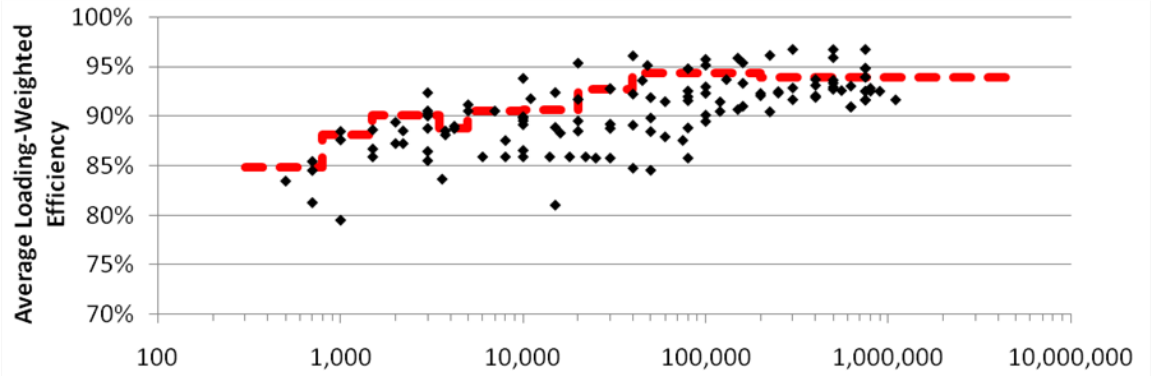
- Average Efficiency Calculated Based on Expected Datacenter Loading:

Proportion of Full Load	Proportion of Units Operating at Given Load	Justification
100%	0%	
75%	25%	• Growing popularity of virtualization • UPS modularity/N+1 redundancy
50%	50%	• 2N redundant operation
25%	25%	• Delayed datacenter build-out • Over-provisioning
0%	0%	
Total	**100%**	

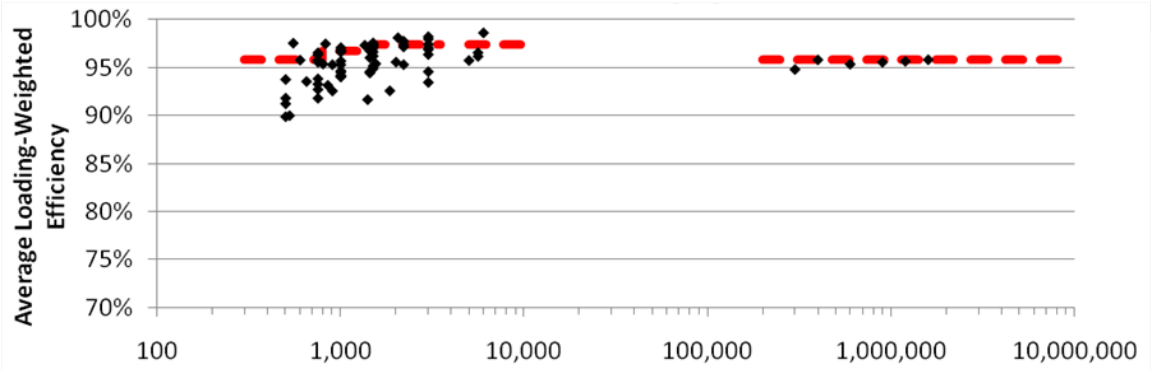
- EPA seeks comment on loading assumptions that may be more appropriate for smaller UPSs

20% Line for Each Division: Avg. Loading-Weighted Efficiency

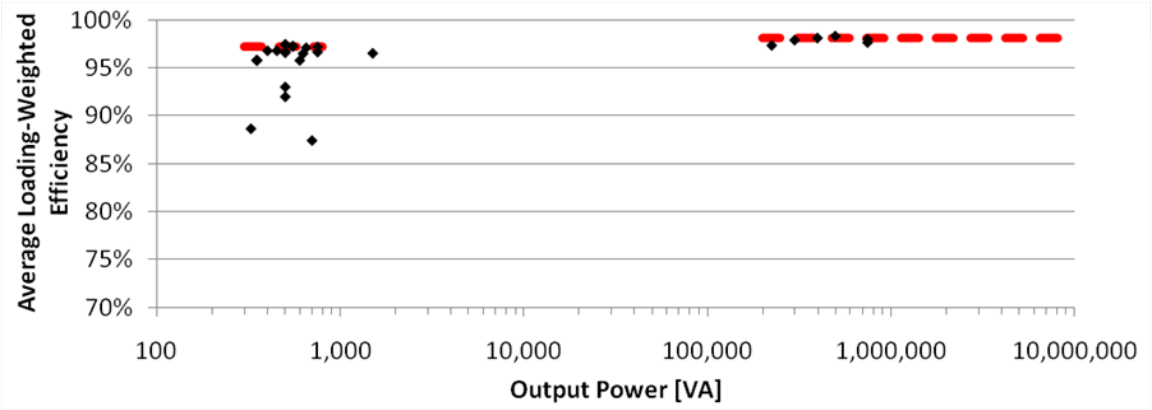
VFI:



VI:



VFD:



ENERGY STAR Requirement Interpolated

:

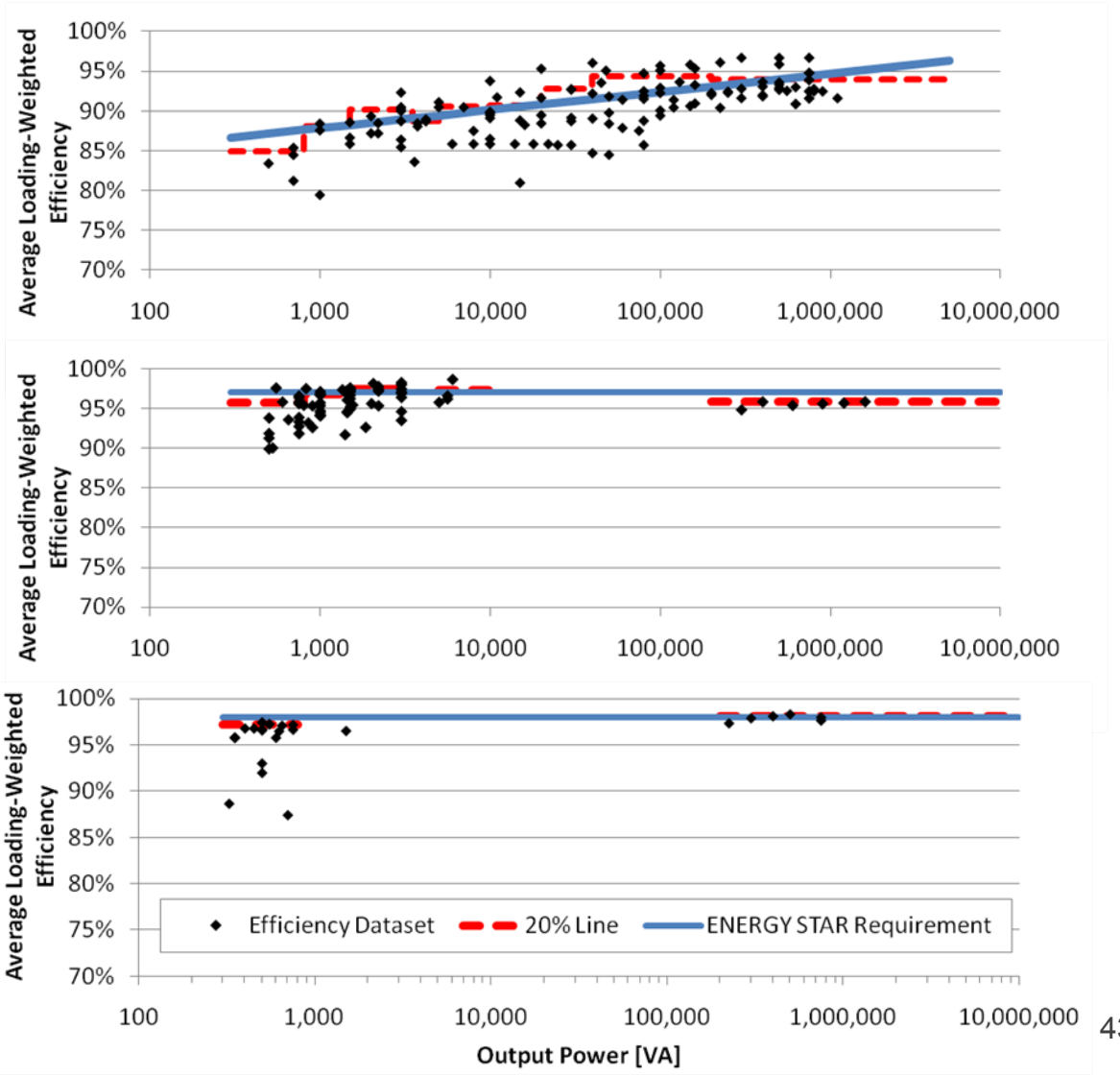
0.0099 × ln(*P*) + 0.81

VI:

$Eff_{AVG} \geq 0.97$

VFD:

$Eff_{AVG} \geq 0.98$



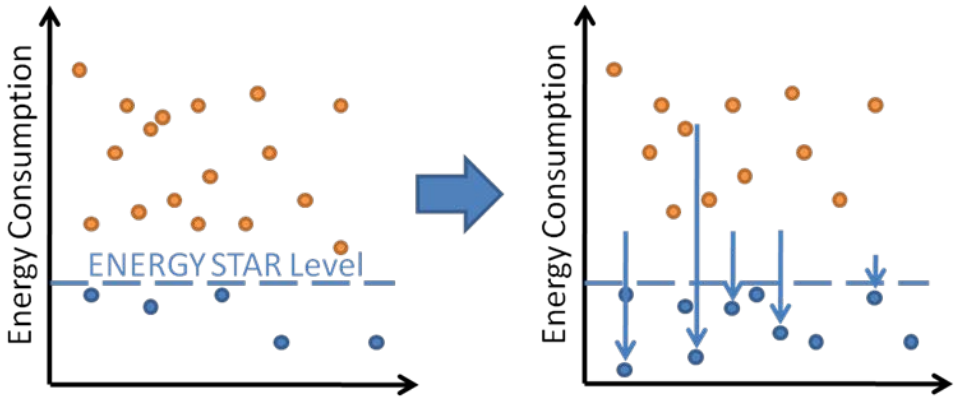
Energy Savings Calculation: Average Per-Unit Savings

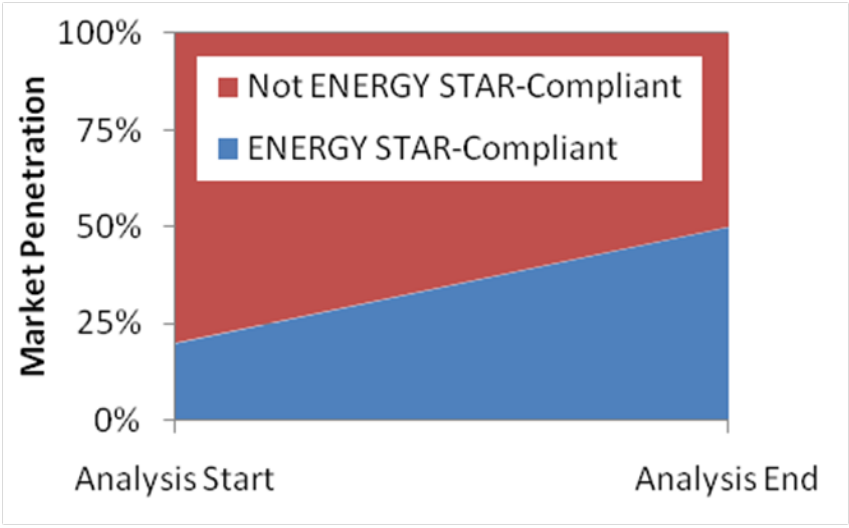
- EPA calculated average per-unit savings by contrasting the losses of units falling above and below the 20% line

Output Power Category	Avg. Active Power (W)	Avg. Per-Unit Savings from Meeting 20% Level for Average Efficiency (W)	Percentage Per-Unit Savings from Meeting 20% Level for Average Efficiency	Avg. Per-Unit Savings from Meeting 20% Level for Average Efficiency (kWh/yr)	Avg. Per-Unit Cost Savings from Meeting 20% Level for Average Efficiency (US$/yr)
≤ 1.5 kVA	530	8	47%	68	$7
1.5–20 kVA	4,011	87	41%	766	$73
≥ 20 kVA	321,040	5,294	45%	46,374	$4,419

Energy Savings Calculation: Cumulative Energy Savings

- EPA calculated the cumulative savings as the result of the proportion of ENERGY STAR-compliant shipments increasing:
  - From 20% today, to
  - 50% by the end of the analysis





Energy Savings Calculation: Cumulative Energy Savings

- The stock of products in each division was multiplied by the average energy consumption of units in that division with a 20–80 distribution of ENERGY STAR-compliant units (start of analysis)
- Then compared to stock multiplied by a 50-50 distribution of ENERGY STAR units (result at end of analysis)

Output Power Category	2008 Installed Base ('000s)	Cumulative Energy Consumption at Start of Analysis (20% MP) (GWh/yr)	Cumulative Energy Consumption at End of Analysis (50% MP) (GWh/yr)	Cumulative Energy Savings from Moving from 20% MP to 50% MP (GWh/yr)	Cumulative Carbon Dioxide Savings from Moving from 20% MP to 50% MP (MMT/yr)
≤ 1.5 kVA	41,400	5,374	4,564	810	0.6
1.5–20 kVA	10,467	15,851	13,678	2,174	1.5
≥ 20 kVA	653	44,948	37,156	7,792	5.4

Energy Savings Calculation: Assumptions

- Shipments assumptions based on:
  - DOE, 2010 Preliminary Analysis of Standards for Battery Chargers and External Power Supplies (for UPSs ≤ 1.5 kVA)
  - LBNL, "High Performance Buildings: Data Centers: Uninterruptible Power Supplies (UPSs)"
  - VDC Research Group, "2008 Power Protection: Global Market Demand Analysis"
- Stock calculated by multiplying shipments by lifetime

Output Power Category	Assumption				
	Operating Hours/Year	2008 Shipments	Shipments Growth	Average Lifetime	2008 Installed Base ('000s)
≤ 1.5 kVA	8760	6,900,000	0%	6	41,400
1.5–20 kVA	8760	1,500,000	0%	7	10,467
≥ 20 kVA	8760	42,000	0%	16	653

Open Comment

- EPA would now like to open the floor for any comments from stakeholders pertaining to:

Energy Savings Potential and Draft 1 Specification Levels

Product Families and Modularity

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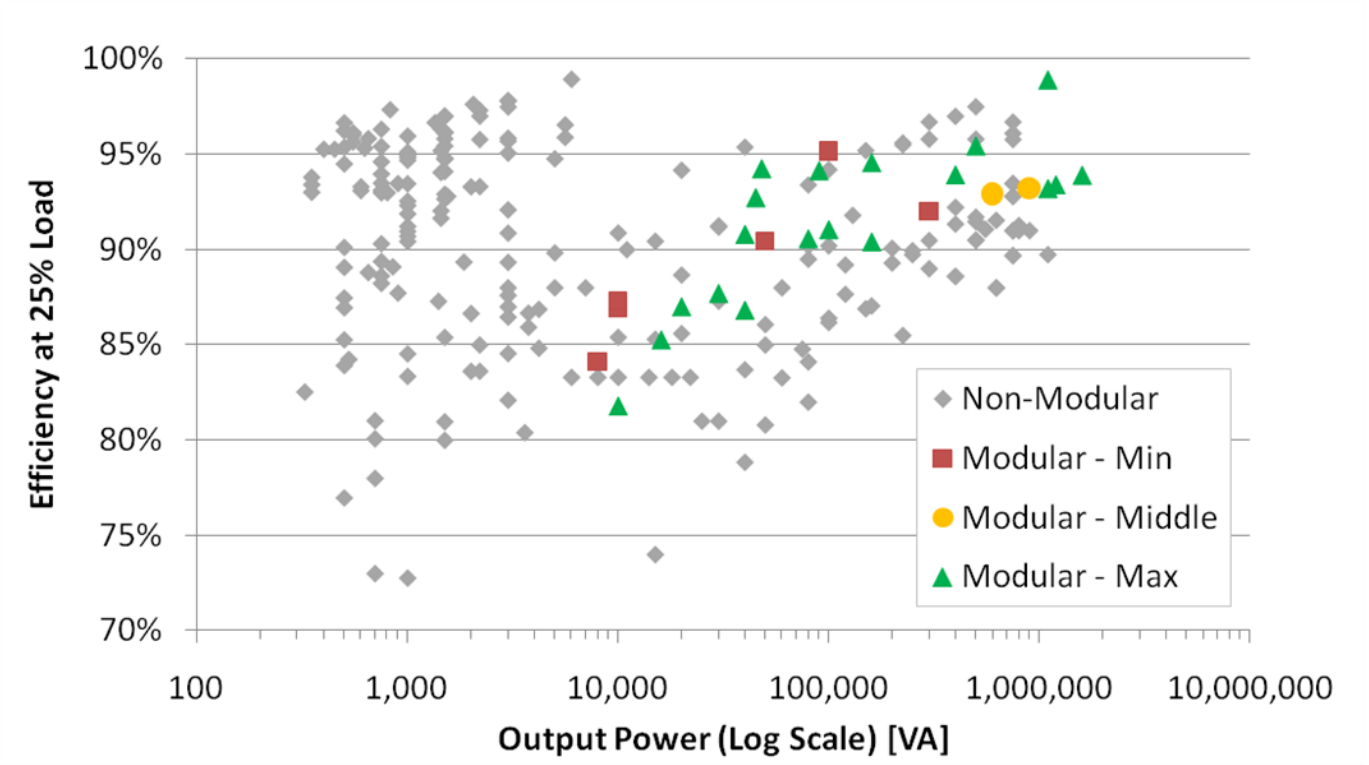
1:30-2:15	Power and Performance Datasheet
2:15-3:00	Additional Issues

Modularity

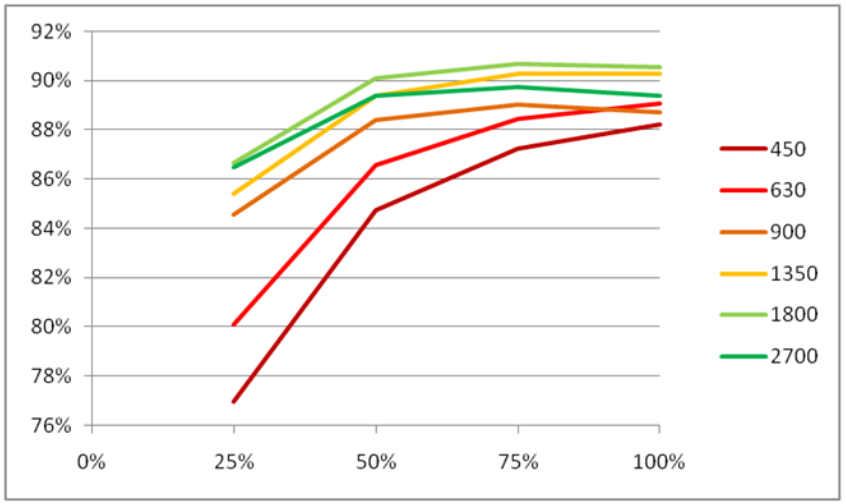
- EPA did not find a relationship btw. modularity and efficiency
- EPA is therefore proposing to qualify modular units to the same specifications as non-modular units
  - Intermediate units would qualify if min. and max. units do

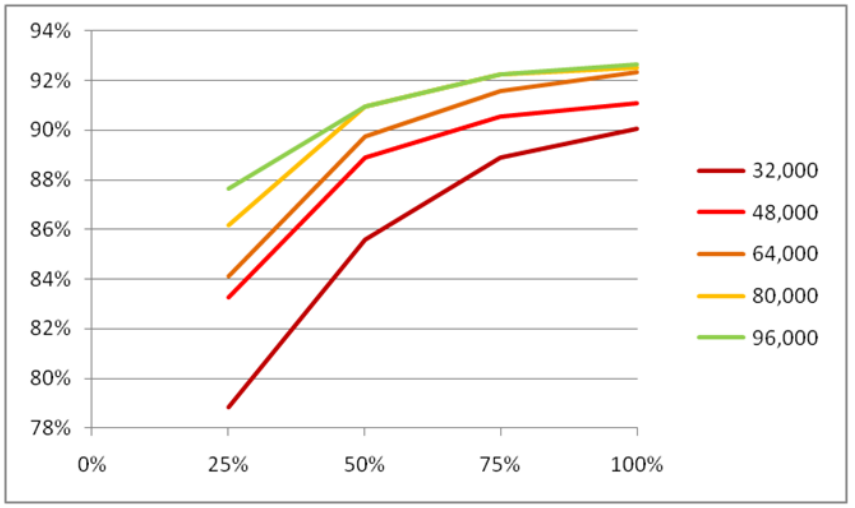


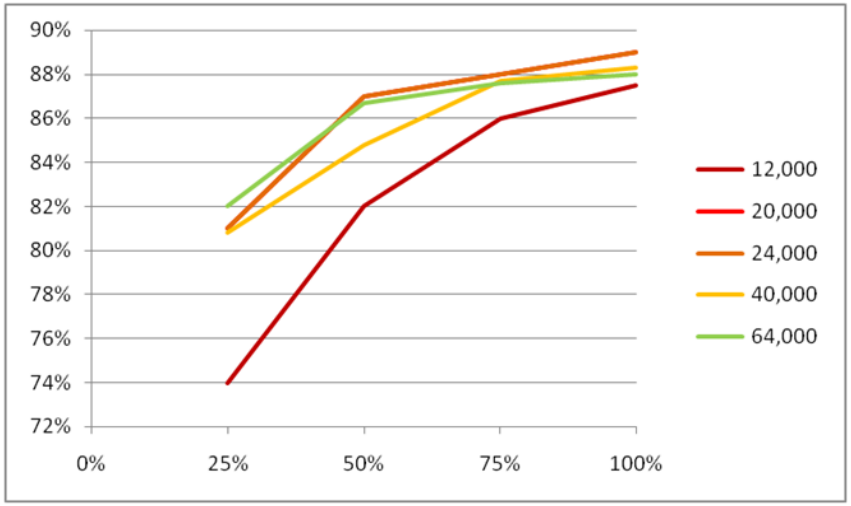
Modularity and Product Families

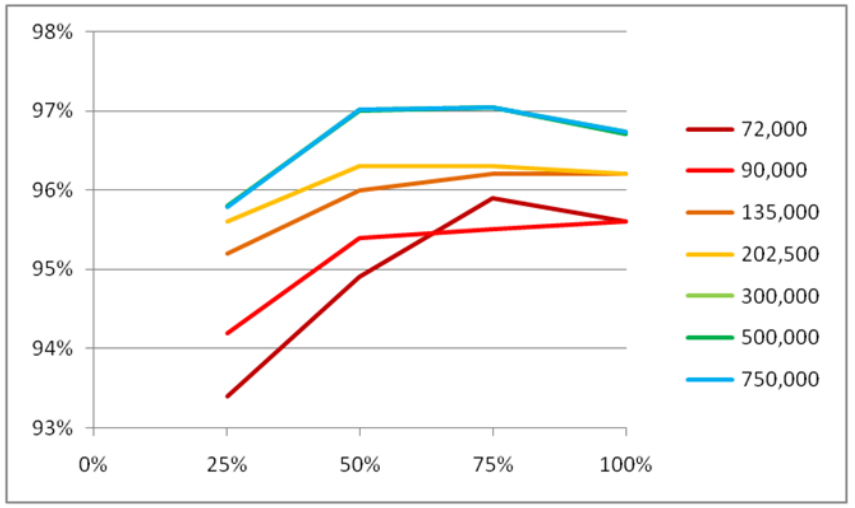
- EPA is also investigating a family approach for other UPSs:
  - Testing only the minimum and maximum output power models in a family
  - All intermediate models would then qualify

Efficiency Comparisons Between UPSs in the Same Family (VFI)

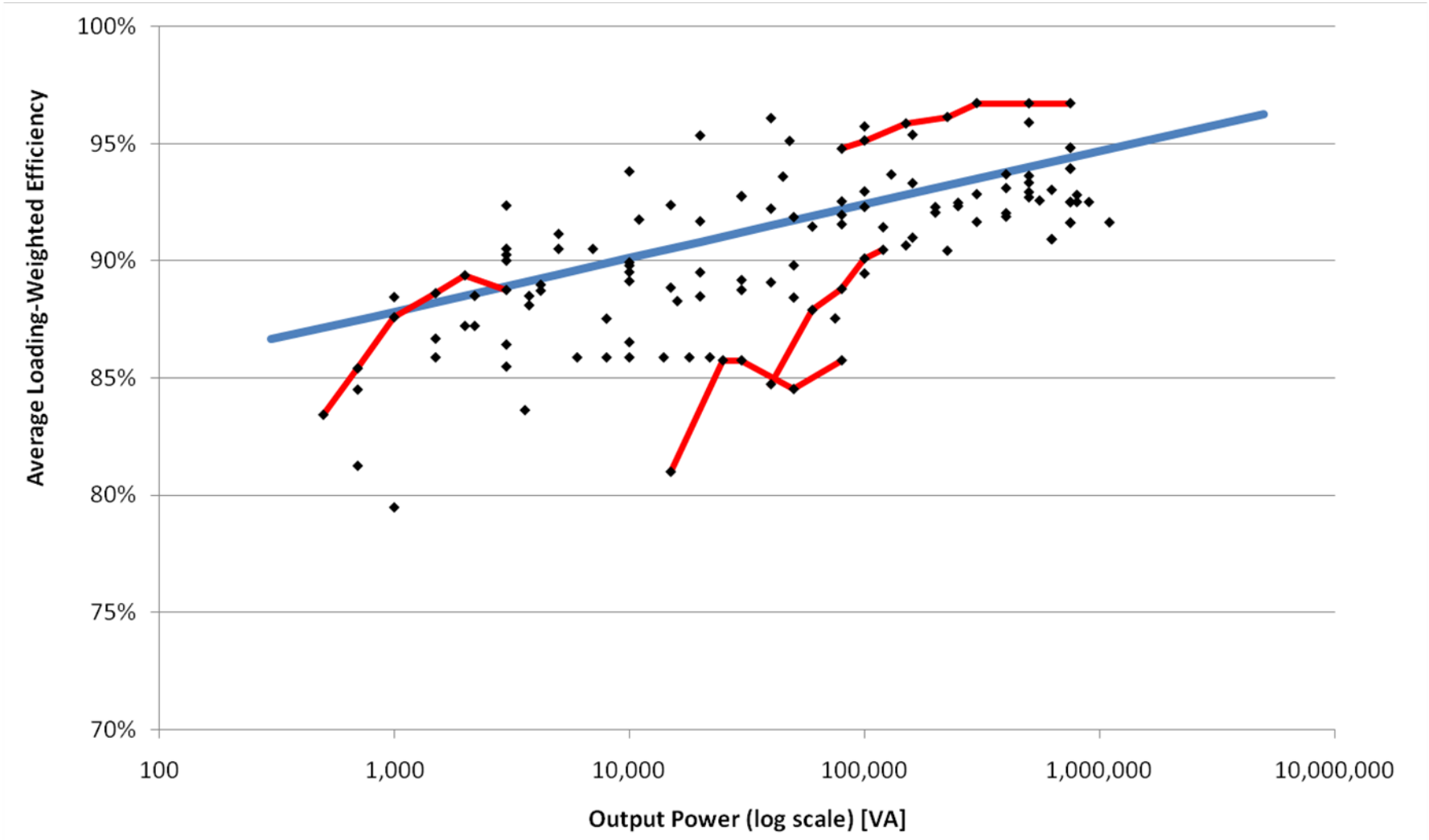








Efficiency Comparisons Between UPSs in the Same Family (VFI)



Open Comment

- EPA would now like to open the floor for any comments from stakeholders pertaining to:

Product Families and Modularity

DC Output UPSs

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1:30-2:15	Power and Performance Datasheet
2:15-3:00	Additional Issues

DC Output UPS: Market Overview

- Growing market primarily used by telecommunications industry
  - Approximately four primary suppliers in the US
- 48V DC equipment is widely available and deployed in telecom data centers
- DC Output UPSs are expected to enter the IT data center industry with higher output voltages (380 V)
  - Industry groups have been formed to speed adoption

DC Output UPS: Data Assembly and Draft Specification

- After the publication of the Draft 1 Test Method, EPA was encouraged to include additional voltages for testing DC Output UPS
  - The Final Draft Test Method includes provisions for testing at 380 VDC, 48 VDC, 60 VDC, and 24 VDC
- During the data assembly period, EPA received information for a small number of DC-Output UPSs
  - EPA would ideally like to have substantial data from at least 2 manufacturers prior to determining performance levels
- EPA continues to investigate the inclusion of DC output UPSs based on potential energy savings enabled and stakeholder feedback on applicability
- Stakeholders are encouraged to share additional DC UPS data

Open Comment

- EPA would now like to open up the line for any comments from stakeholders pertaining to:

DC-Output UPSs

Lunch

Time (Eastern Time)	Topic
9:00- 9:15	Meeting Introduction
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Communications and Measurement

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1:30-2:15	Power and Performance Datasheet
2:15-3:00	Additional Issues

Communications and Measurement

- Variation in measurement and communication capabilities
  - Size
  - Usage
- No standardized requirements in industry for defining reported data
- Efficiency data may be extrapolated via the manufacturer's communication port

Image courtesy of APC by Schneider Electric.

Communications and Measurement

- End-user needs for UPS monitoring and reporting capabilities
  - Open communication pathways
  - “Billing grade” metering:
    - Cost of $1-2k per meter
- Manufacturer information reporting customization
  - What are end-users requesting?

EPA would like to open the line for manufacturers to comment regarding typical end-user requests for communication and measurement capabilities

ENERGY STAR Buildings

Data Center Industry Leaders Reach Agreement on Guiding Principles for Energy Efficiency Metrics
February 1, 2010

As business demands and energy costs for data centers rise, owners and operators have focused on the energy efficiency of the data center as a whole, frequently using energy efficiency metrics. However, the metrics are not always applied clearly and consistently. To address these inconsistencies, a group of leaders from across the industry met on January 13, 2010 to agree on data center energy efficiency measurements, metrics, and reporting conventions. Organizations represented were the 7x24 Exchange, ASHRAE, The Green Grid, Silicon Valley Leadership Group, U.S. Department of Energy's Save Energy Now and Federal Energy Management Programs, U.S. Environmental Protection Agency's ENERGY STAR Program, U.S. Green Building Council, and Uptime Institute.

The following guiding principles were agreed to:

- Power Usage Effectiveness (PUE) using source energy consumption is the preferred energy efficiency metric for data centers. PUE is a measurement of the total energy of the data center divided by the IT energy consumption.
- When calculating PUE, IT energy consumption should, at a minimum, be measured at the output of the uninterruptible power supply (UPS). However, the industry should progressively improve measurement capabilities over time so that measurement of IT energy consumption directly at the IT load (i.e. servers) becomes the common practice.
- For a dedicated data center, the total energy in the PUE equation will include all energy sources at the point of utility handoff to the data center owner or operator. For a data center in a mixed-use building, the total energy will be all energy required to operate the data center, similar to a dedicated data center, and should include IT energy, cooling, lighting, and support infrastructure for the data center operations.

This guidance is meant to help the industry have a common understanding of energy efficiency metrics that can generate dialogue to improve data center efficiencies and reduce energy consumption. Member organizations are committed to applying and promoting these guidelines to their programs.

A task force, consisting of the organizations listed below, has been created to further refine these metrics and to identify a roadmap for the future. The group also aspires to address IT productivity and carbon accounting in the future.

If you are a member of one of groups listed below, please contact them directly for further details.

- 7x24 Exchange: http://www.7x24exchange.org/eemetrics.html
- ASHRAE: http://tc99.ashraetcs.org/
- The Green Grid: gdcmetrics@lists.thegreengrid.org
- Silicon Valley Leadership Group: tim.crawford@datacenterpulse.org
- U.S. Department of Energy Save Energy Now Program: http://www1.eere.energy.gov/industry/datacenters/contacts.html
- U.S. Environmental Protection Agency's ENERGY STAR Program: ENERGYSTARdatacenters@icfi.com
- U.S. Green Building Council: leedinfo@usgbc.org
- Uptime Institute: http://www.uptimeinstitute.org

Harmonizing Global Metrics for Data Center Energy Efficiency

The United States of America, European Union and Japan Reach Agreement on Guiding Principles for Data Center Energy Efficiency Metrics
February 2, 2010

As business demands and energy costs for data centers rise, owners and operators have focused on the energy efficiency of the data center as a whole, frequently using energy efficiency metrics. However, the metrics are not always applied clearly and consistently at a global level. To address these inconsistencies, a group of global leaders met on February 2, 2010 to agree on data center energy efficiency measurements, metrics, and reporting conventions. Organizations represented were the U.S. Department of Energy's Save Now and Federal Energy Management Programs, U.S. Environmental Protection Agency's ENERGY STAR Program, European Commission JRC Code of Conduct, Japan's Ministry of Economy, Trade and Industry, Japan's Green IT Promotion Council, and The Green Grid.

Goal:
Share global lessons and practices with an objective of arriving at a set of metrics, indices, and measurement protocols which can be formally endorsed or adopted by each participant organization to improve data center energy efficiency globally. This includes the following specific goals:

1. Identify an initial set of metrics
2. Define each metric
3. Define the process for measurement of each metric
4. Establish on-going dialog for development of additional metrics

Desired Outcomes:
Effective energy efficiency metrics that:

1. Measure the actual IT work output of the data center compared to actual energy consumption. It is of note that in the process to define IT work output, the following interim measurements are being defined and / or validated:
   a. IT - Measure the potential IT work output compared to expected energy consumption; and measure operational utilization of IT equipment
   b. Data center facility and infrastructure - Measure the data center infrastructure efficiency (PUE)
2. Measure renewable energy technologies and re-use of energy to reduce carbon

Open Comment

- EPA would now like to open up the line for any comments from stakeholders pertaining to:

Communications and Measurement and Issues Raised by ENERGY STAR Buildings

Power and Performance Datasheet

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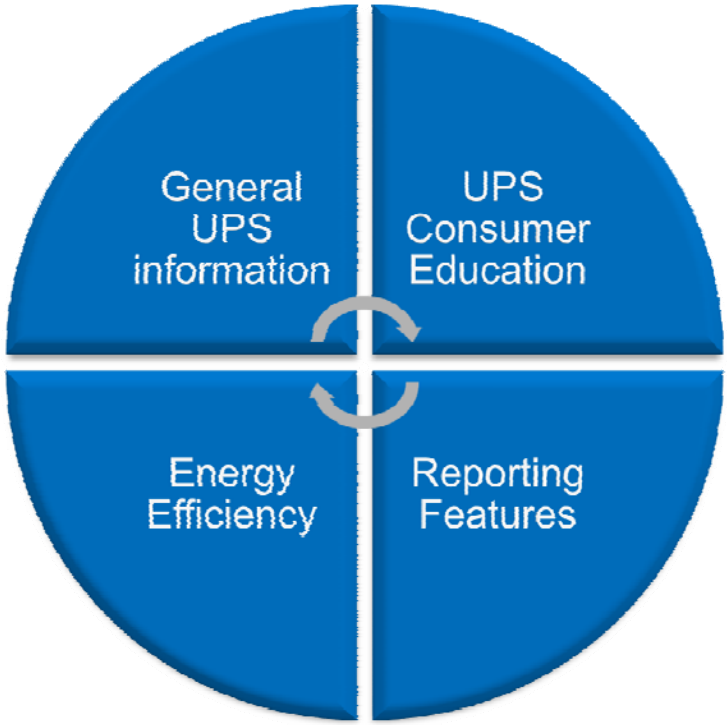
2:15-3:00	Additional Issues

ENERGY STAR UPS Power and Performance Data Sheet (PPDS)

- One-stop-shop for standardized energy performance data and important details about hardware and software configuration for all qualified UPS products
  - Helps end-users make informed decisions when purchasing their UPS systems
  - Standard Information Reporting
  - Encourages the adoption of more efficient UPSs



ENERGY STAR UPS PPDS and Data Centers

- Data center product PPDSs facilitate efficient design and operation of data centers

- PPDS for UPSs assists in:
  - Proper capacity planning
  - Procurement of efficient UPSs
  - Efficient operation of UPSs

ENERGY STAR UPS PPDS Development Status

- EPA has been collaborating with several end-users in confirming the relevance and value of the UPS PPDS
  - EPA invites all stakeholders, in particular end-users, to participate in the UPS PPDS inception
- A Draft PPDS is under development
  - Upon completion, it will be published for stakeholder review and comment
- EPA welcomes feedback on proposed formulation of the PPDS as depicted in the Draft ENERGY STAR Specification for UPSs

Lifecycle carbon assessment (LCA) standard (IEC 62040-4)

- International Electrotechnical Commission (IEC) lifecycle carbon assessment (LCA) standard (IEC 62040-4)
  - Promote the reduction of environmental impact during the UPS unit life cycle
- EPA supports this effort and would like to facilitate further discussion of the relevant reporting aspects beneficial for inclusion in an ENERGY STAR PPDS

Open Comment

- EPA would now like to open up the line for any comments from stakeholders pertaining to:

The Power and Performance Data Sheet

Additional Issues

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Refurbished Uninterruptible Power Supplies

- EPA invites stakeholders to comment on:
  - Refurbished UPS market share and potential
  - Usual refurbished UPS end-users
  - The typical process for refurbishing UPS units
  - Benefit of an ENERGY STAR label for refurbished UPSs

DOE Battery Charger Test Method

- The US Department of Energy (DOE) is considering covering small UPSs under its battery charges standard
  - Preliminary Analysis of Energy Conservation Standards for Battery Chargers and External Power Supplies
  - Consumer UPSs may potentially be required to meet minimum standards when tested in accordance with DOE's test method

- EPA seeks comment on whether consumer UPSs should be tested and qualified using only the DOE test method
  - Affects UPSs with output power ≤ 1.5 kVA
  - In contrast to the ENERGY STAR Test Method, the DOE test method does not measure efficiency in normal mode

ENERGY STAR Certification Bodies (CBs) for UPSs

- EPA encourages interested Certification Bodies (CBs) to participate in the specification development process
  - Upon completion of the specification, new UPSs that meet the specification criteria must be certified by an EPA-recognized Certification Body (CB) before the UPSs can be labeled with the ENERGY STAR mark
- Early participation in the specification development process is critical in addressing any future concerns with certifying UPSs

Open Comment

- EPA would now like to open up the line for any general comments from stakeholders.

Meeting Adjourn

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References and Resources

- Energy Star UPS specification development:
  Go to www.energystar.gov/NewSpecs and Click on “Uninterruptible Power Supplies”
- Energy Star Data Center efficiency initiatives:
  http://www.energystar.gov/index.cfm?c=prod_development.server_efficiency
- US Task Force Leaders Agreement on Measuring Efficiency in a Data Center (energy must be measured at output of UPS):
  http://www.energystar.gov/ia/partners/prod_development/downloads/DataCenters_AgreementGuidingPrinciples.pdf
- Global Task Force Leaders Agreement on Measuring Efficiency in a Data Center (energy must be measured at output of UPS):
  http://www.energystar.gov/ia/partners/prod_development/downloads/Harmonizing_Global_Metrics_for_Data_Center_Energy_Efficiency.pdf

Future Steps

- May:
  - Receive comment on Draft Specification and revised Test Method (5/27)
- June:
  - Complete Draft 1 revisions
  - Publish Draft 2 Specification
    - Ideally, would like to have finalized the test method
  - Stakeholder Webinar
- July:
  - Receive comment on Draft 2 Specification
  - Draft 2 revisions
  - Publish Final Draft Specification
- August:
  - Stakeholder Webinar
  - Receive comment on Final Draft Specification
  - Final Specification Published (~9/1)

Comments

- In addition to making verbal comments during today's meeting, stakeholders are strongly encouraged to submit written comments and data
- Please send all comments to: ups@energystar.gov

Comment Deadline
Friday, May 27, 2011

Thank You!

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