



May 10, 2017

United States Environmental Protection Agency
Office of Air and Radiation
Washington, D.C. 20460

Regarding: Stakeholder Comments on ENERGY STAR® for UPS Draft 1 Version 2.0 Eligibility Criteria

Dear Mr. Fogle,

We at Schneider Electric understand that revising the ENERGY STAR for UPS specification is necessary, as it has been almost 5 years since the publication of the Version 1.0 specification. However, when revising the specification, we believe that the following principles should be followed:

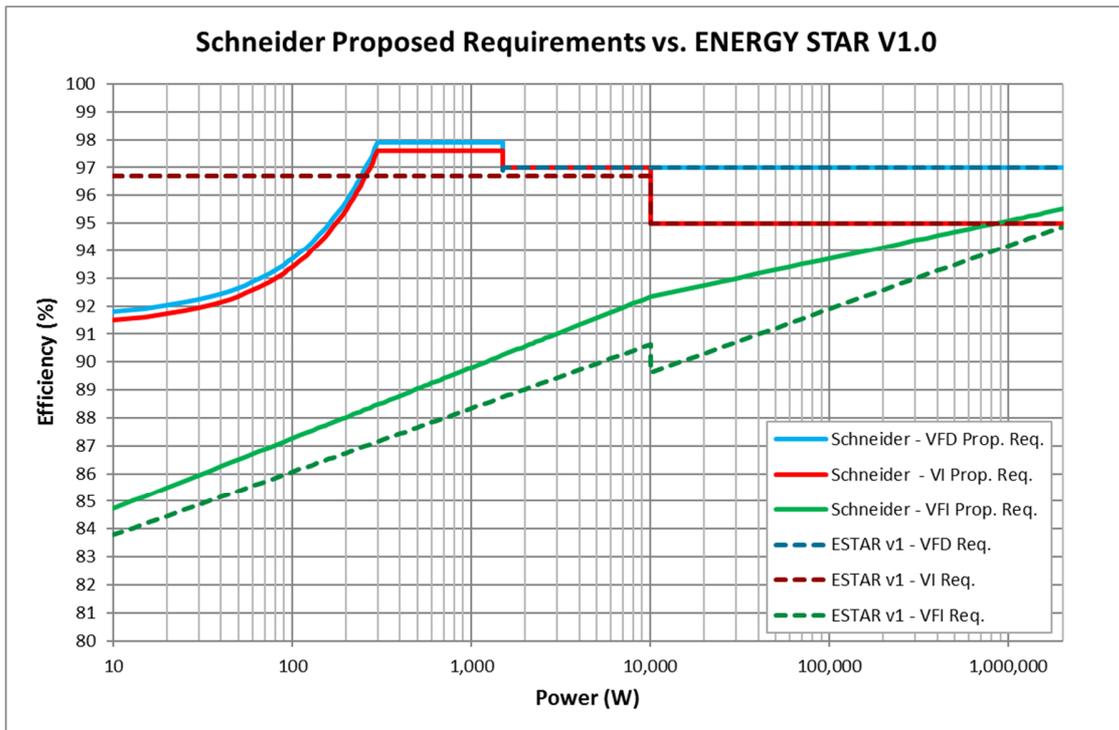
1. Requirements should be established at levels that would allow the upper 25% of the entire market to qualify (not just the upper 25% of ENERGY STAR qualified products). Therefore, we recommend that EPA should again undertake a market study to determine the performance characteristics of the entire market before establishing the Version 2.0 requirements. In addition, there are still many improperly categorized products and other errors in the current ENERGY STAR data set. These issues should be corrected before the data is utilized to inform the specification revision process.
2. Given that the ENERGY STAR for UPS Program is implemented in the EU, the performance on non-US products should also be considered as ultimately, Version 2.0 will be used in the Canada and the European Union and perhaps eventually in other partner geographies.
3. Requirements should be established at levels that would allow at least some existing products of every individual power rating and input dependency to qualify. Note that the proposed Draft 1 Version 2.0 requirements would effectively disqualify all VFI UPSs rated greater than 500kW from the program. This is a key market for large data centers and we believe that these products should not be categorically excluded by requirements that continuously increase proportional to power rating.
4. Requirements should only be adjusted in size ranges and categories where greater than 35% market penetration can conclusively be proven. There is nearly a factor of 2 variation in the size of the market as reported by various research or market reports. Until the true size of the market is known, it is impossible to assess ENERGY STAR market penetration in each category. We note that the report used by ENERGY STAR shows a marketplace of almost half the size of the report the Department of Energy used to justify the UPS systems rulemaking that has yet to take effect. Consequently, in categories where there is doubt, no changes should be made.
5. Given that the US DOE Final Rule for consumer UPS Efficiency has not yet been, and may never be, published, the requirements therein should not be considered as US market minimums when establishing the Version 2.0 requirements. Even if the DOE regulations had been published, the Version 2.0 specification would likely be effective before the DOE regulations which could result in the UPS program swinging from having too many qualified products in certain categories to far too few or even none. Consequently, EPA should consider lower requirements for Version 2.0 or you should delay Version 2.0 until there is certainty about DOE regulations.

6. Available test equipment is approximately 0.5% accurate, manufacturers need margin for manufacturing variations and we all benefit from a simple program free of allowances. Consequently, the requirements should be set no higher than 0.5 – 1.0% below the top performance levels seen in the market.
7. VFD and VI UPSs rated below 200W are starting to appear on the market, targeting lower power applications such as protecting home networking equipment. Often these products are designed to support VOIP gateways and consequently they have atypically large batteries to provide several hours (rather than a few minutes) of runtime. Combining correspondingly larger chargers with essentially the same controls and communications as would be found in a much higher power UPS results in an inherent lowering of achievable efficiency in these products and the VFD and VI requirements need to reflect this. For example, a 98% efficient 300W VFD UPS has approximately 6W of losses, nearly all of which are tare losses. A 50W VFD UPS (an example of a system used for VoIP backup in the home) with the same battery and controls would only be about 89% efficient! If you review the marketplace, you will see that customization for specific applications is becoming the norm.
8. Fundamentally, a UPS with less power processing circuitry and fewer features will be more efficient than a similar power UPS with more power processing circuitry and a greater feature set. Consequently, VFD UPSs are inherently more efficient than VI UPSs which are again inherently more efficient than VFI UPSs. Therefore, the efficiency requirements for VFD should be higher than those for VI which in turn should be higher than those for VFI.

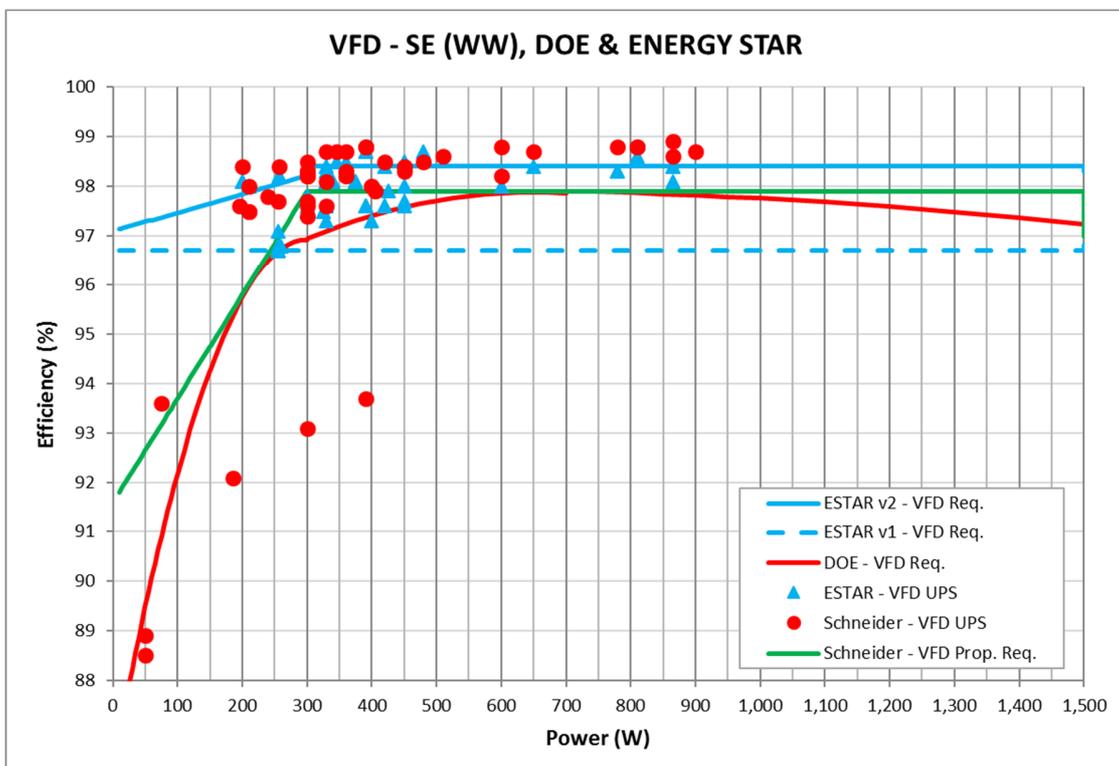
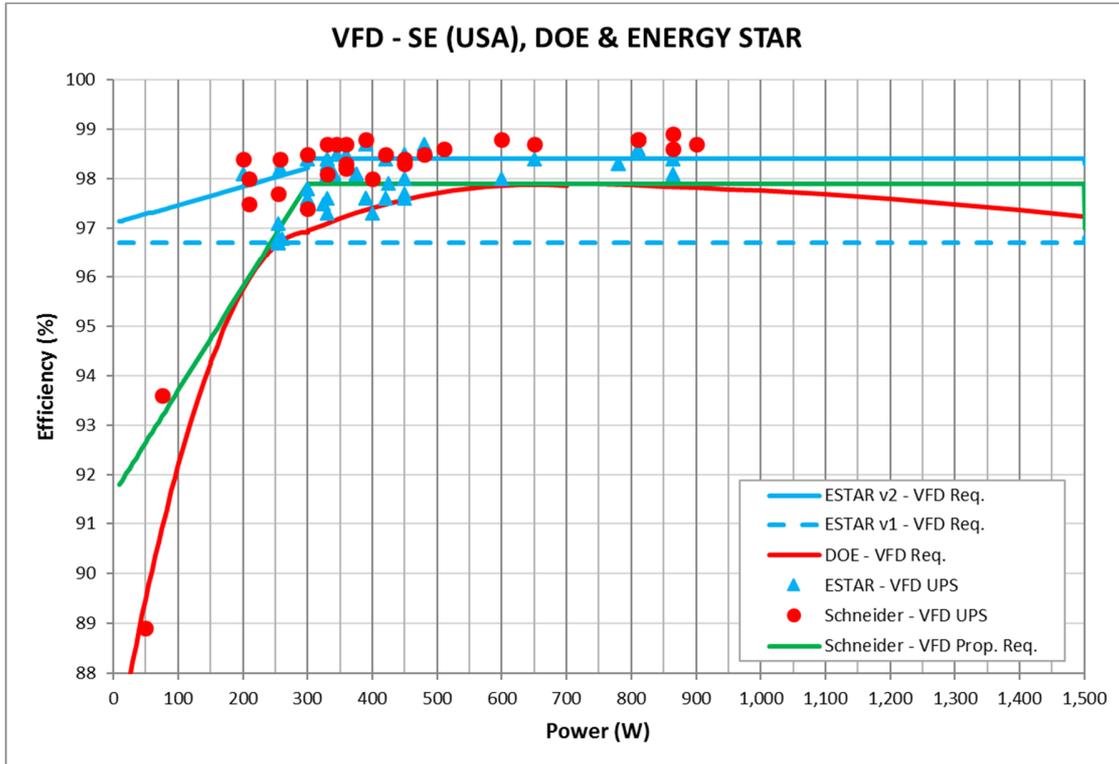
In accordance with the above principles, we propose the following requirements for Version 2.0.

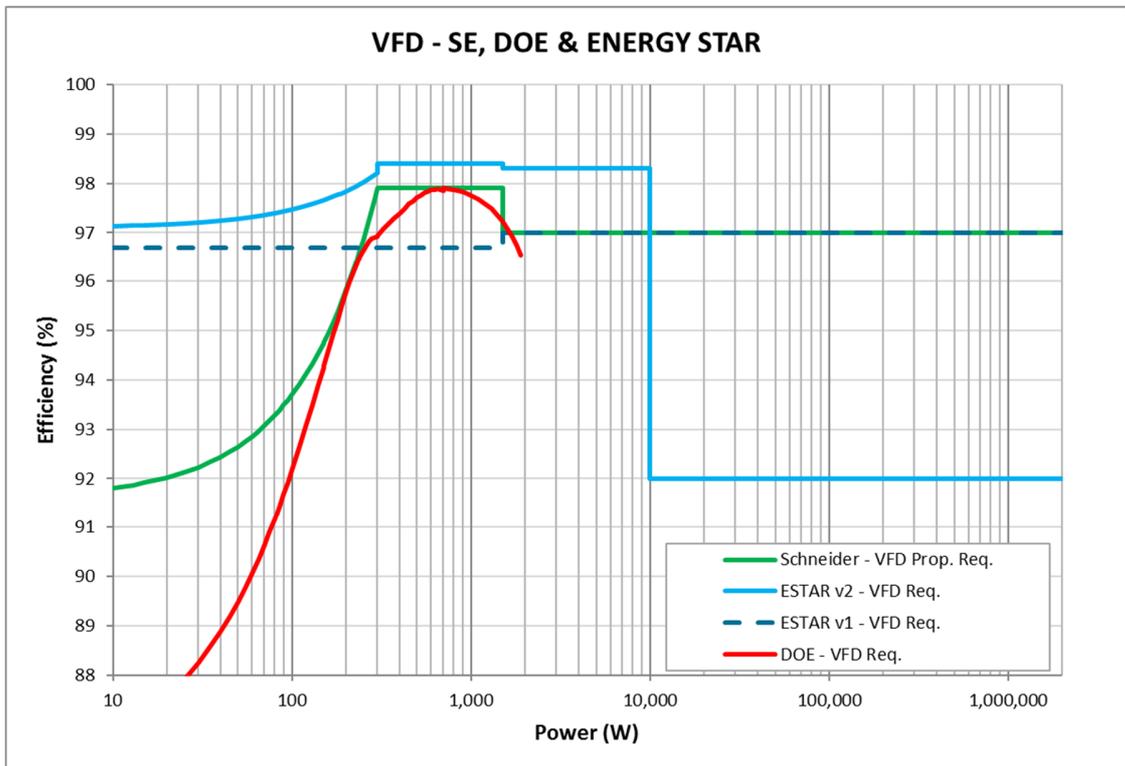
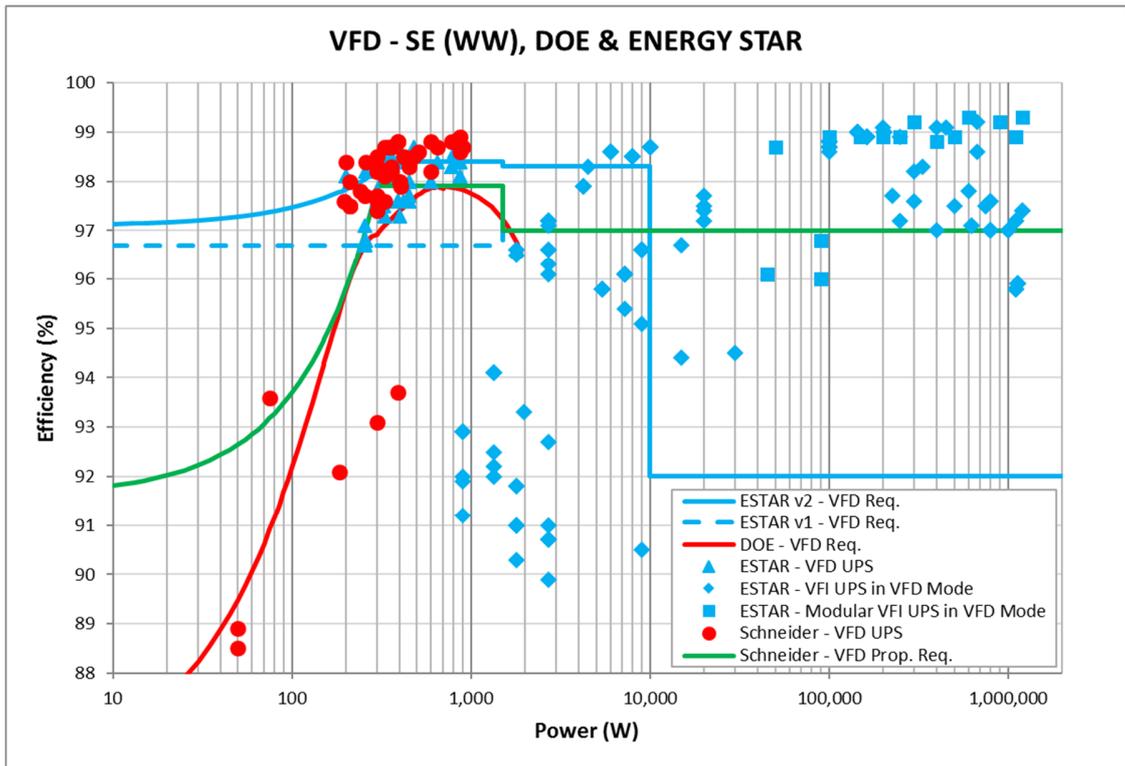
Table 1: Ac-output UPS Minimum Average Efficiency Requirement

Rated Output Power	Input Dependency Characteristic		
	VFD	VI	VFI
$P \leq 300 \text{ W}$	$0.00021 \times P + 0.916$	$0.00021 \times P + 0.913$	$0.011 \times \ln(P) + 0.822$
$300 \text{ W} < P \leq 1500 \text{ W}$	0.979	0.976	
$1500 \text{ W} < P \leq 10,000 \text{ W}$	0.970	0.970	$0.011 \times \ln(P) + 0.822 - E_{MOD}$
$P > 10,000 \text{ W}$		0.950	$0.006 \times \ln(P) + 0.868$

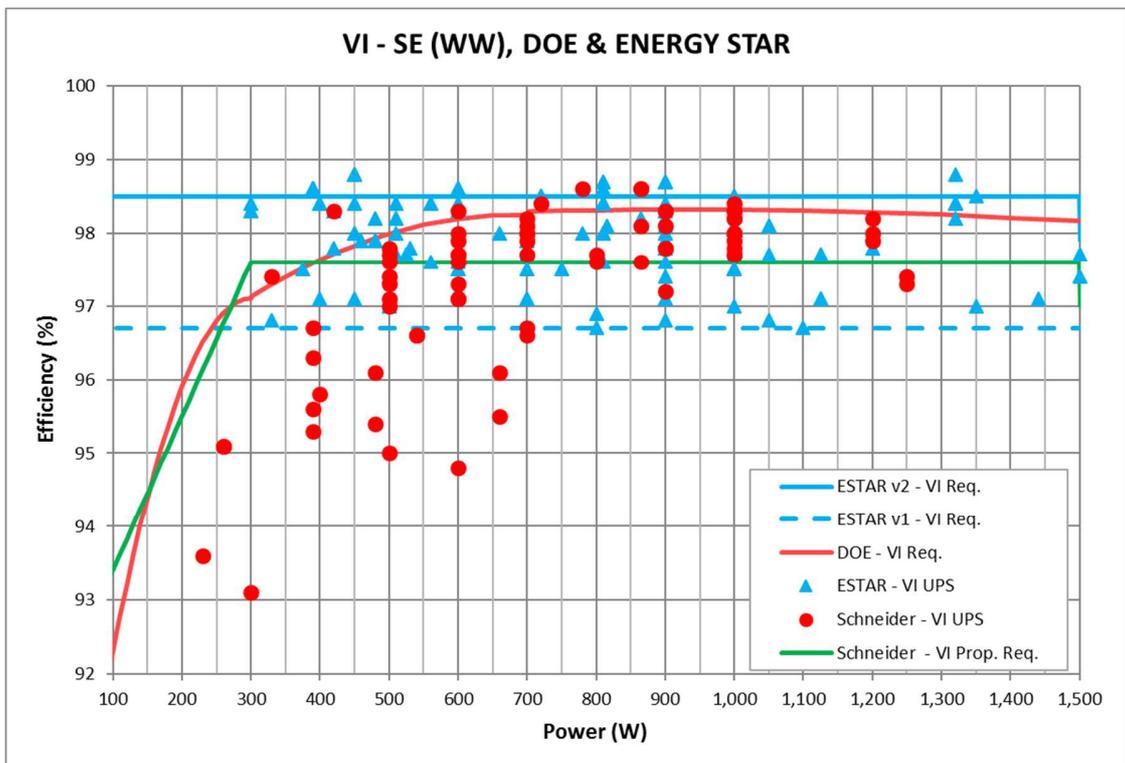
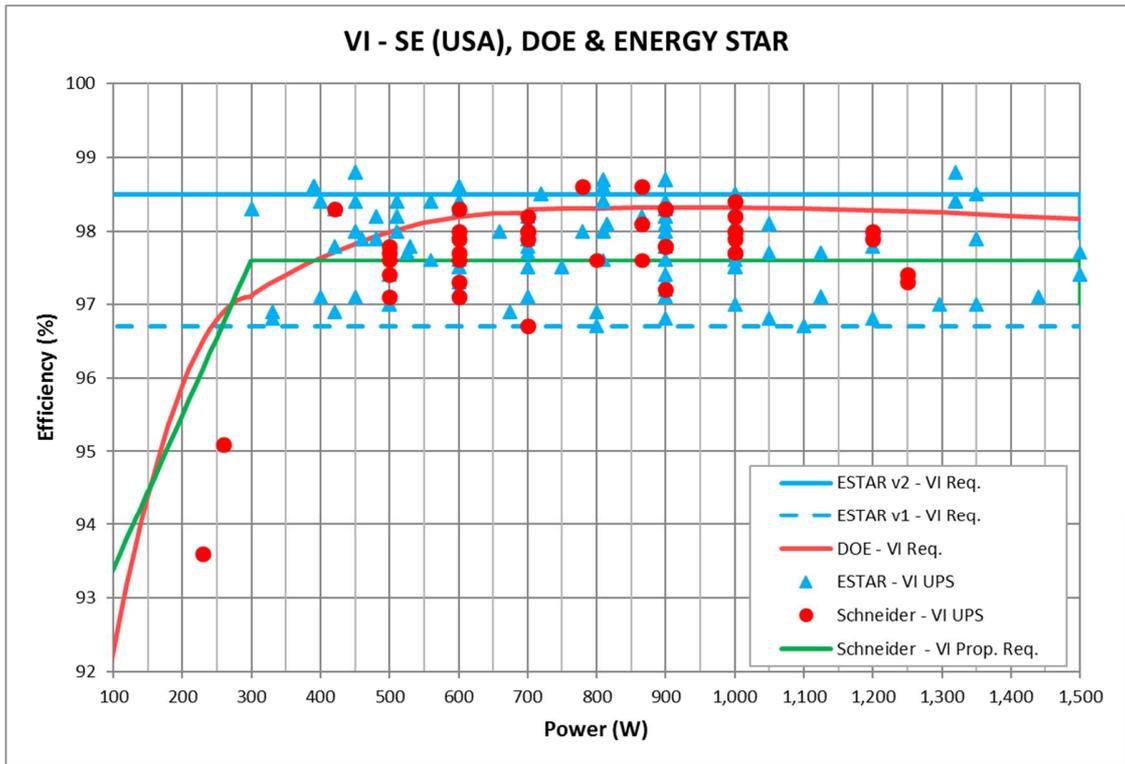


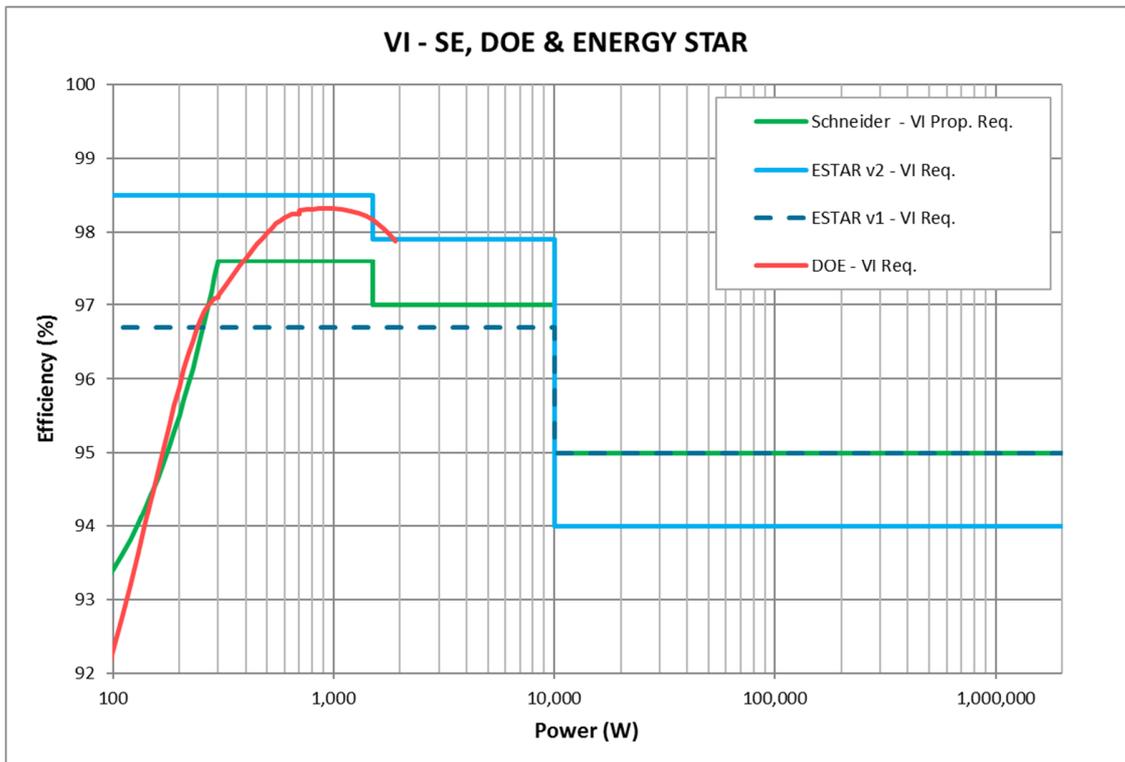
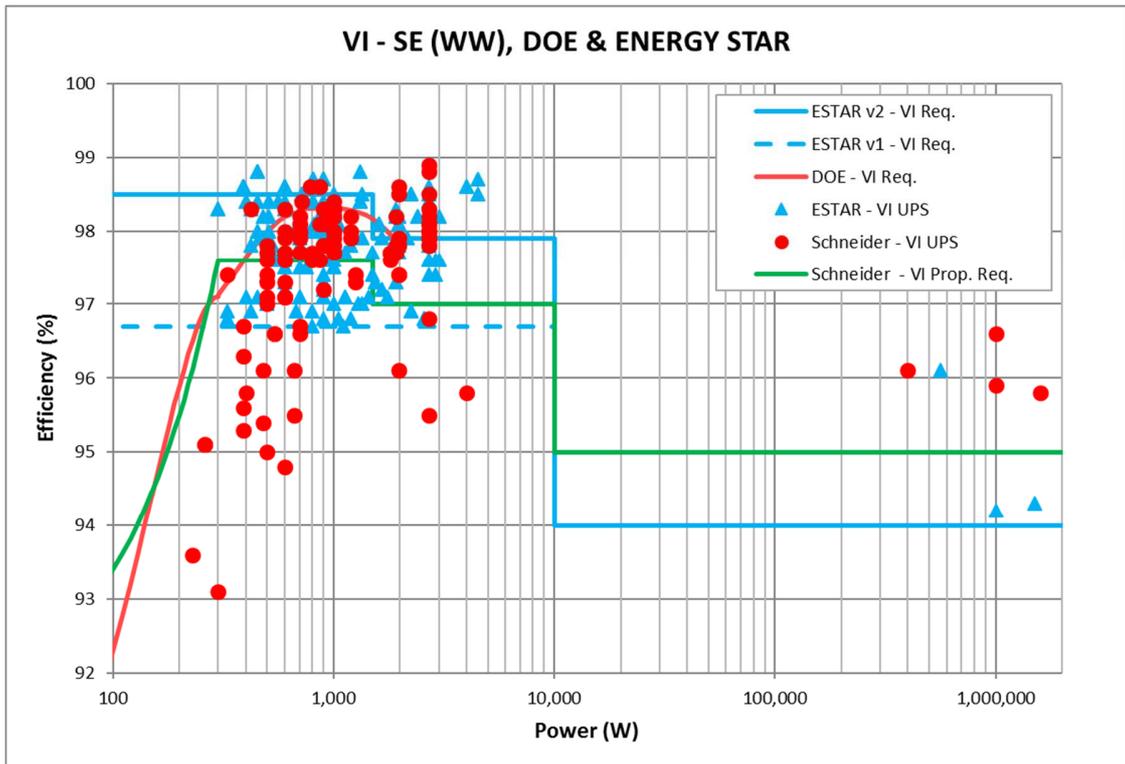
The following charts illustrate our proposed VFD requirements in the context of the Draft 1 Version 2.0 requirements, the Version 1.0 requirements, DOE requirements, ENERGY STAR QPL performance data and Schneider Electric (SE) USA and Worldwide (WW) UPS performance data. Given that there are no identified VFD UPSs on the market rated at greater than 1kW, we used ENERGY STAR QPL data from multimode UPSs as a proxy of what could be achieved by a large dedicated VFD UPS.



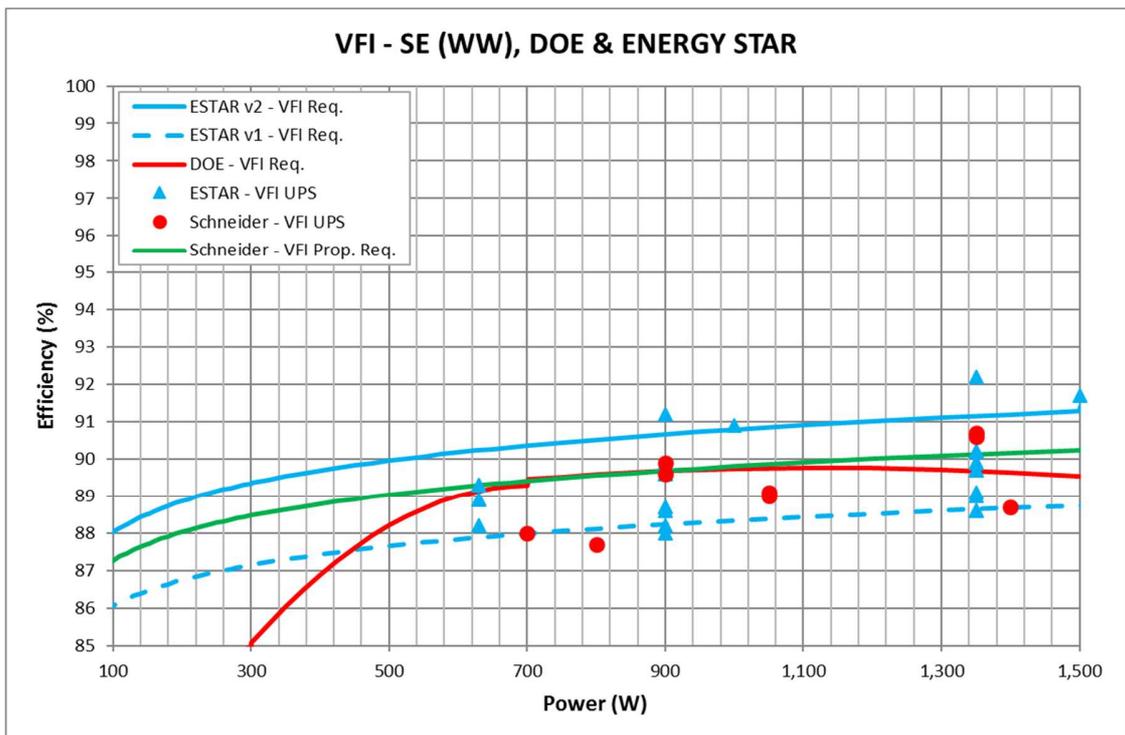
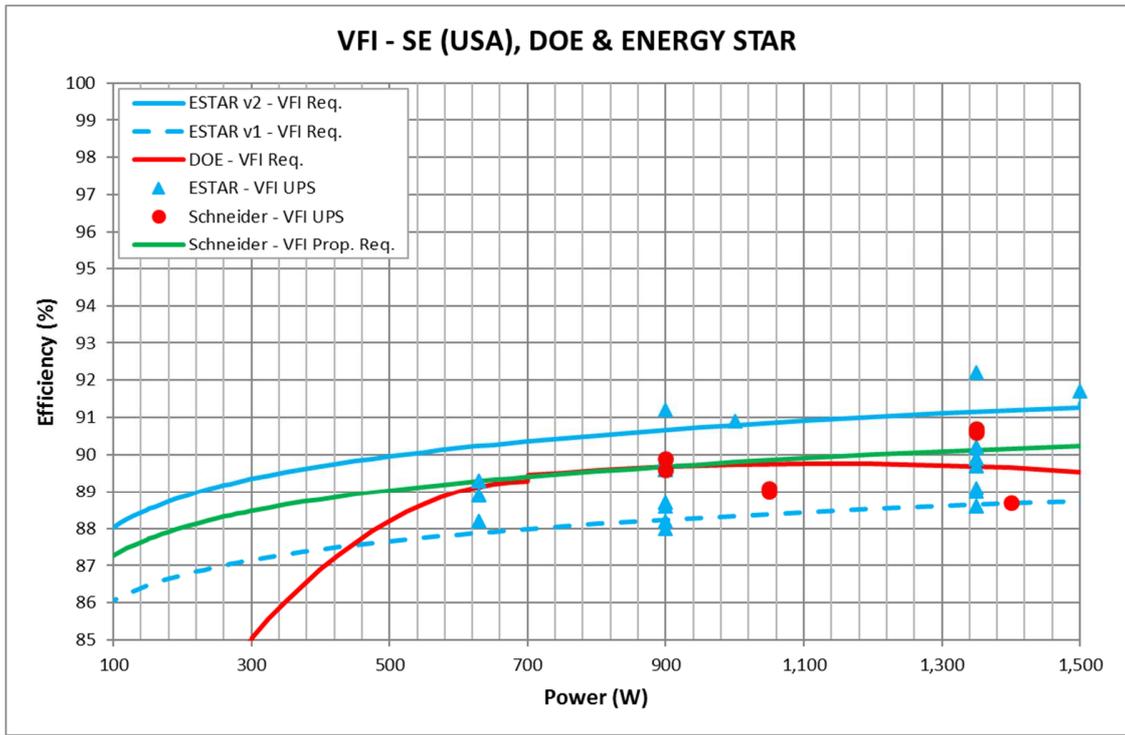


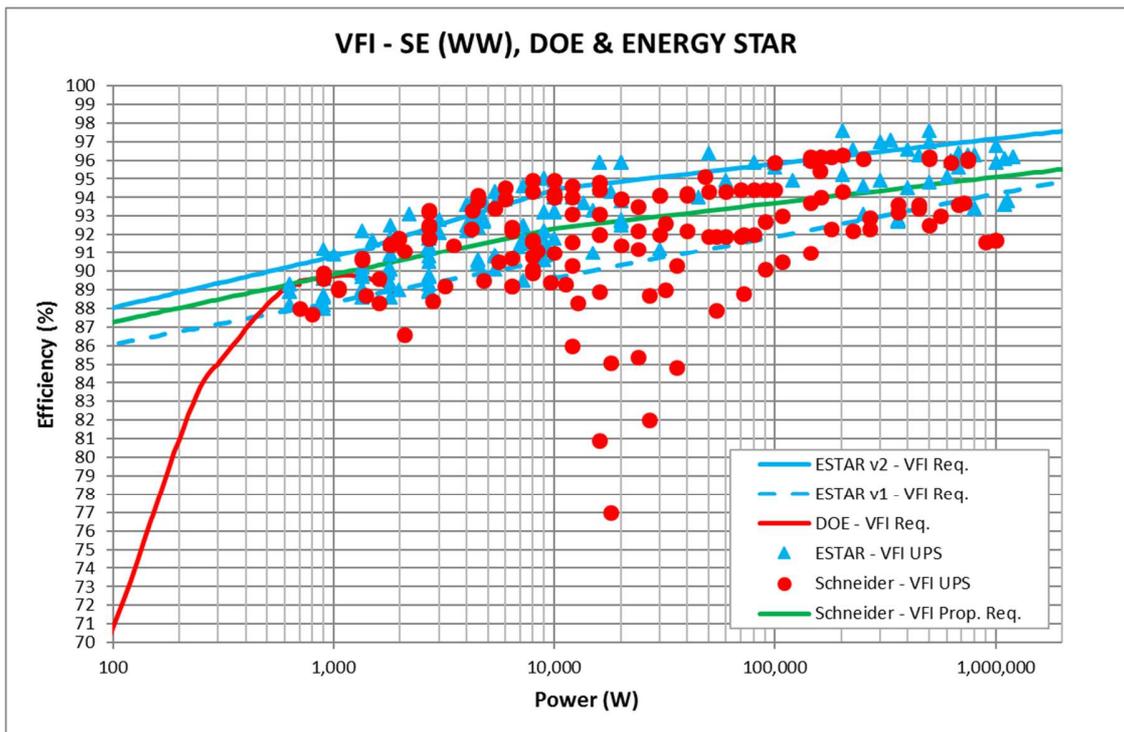
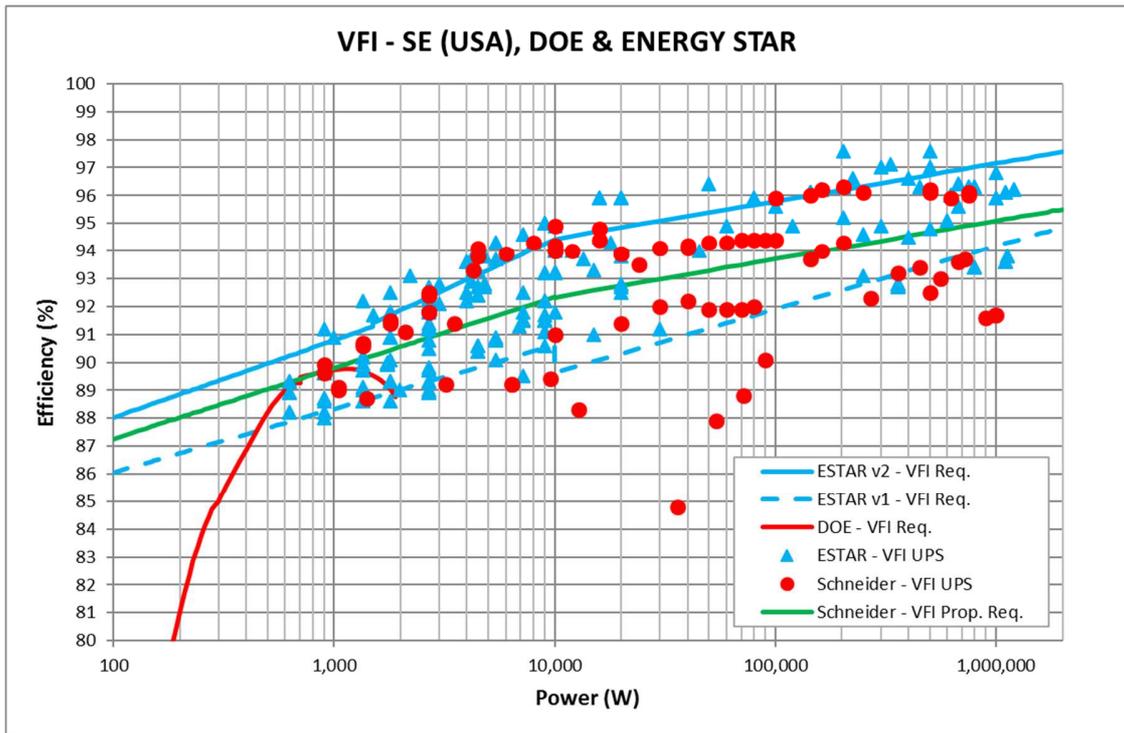
The following charts illustrate our proposed VI requirements in the context of the Draft 1 Version 2.0 requirements, the Version 1.0 requirements, DOE requirements, ENERGY STAR QPL performance data and Schneider Electric (SE) USA and Worldwide (WW) UPS performance data.

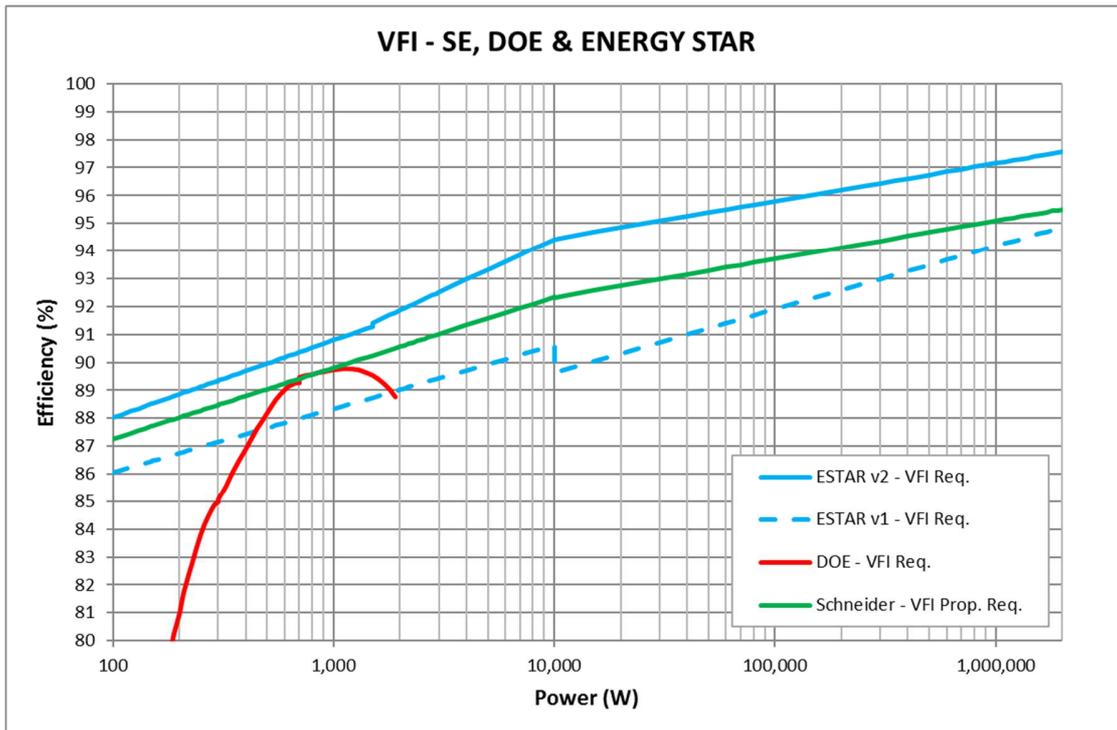




The following charts illustrate our proposed VFI requirements in the context of the Draft 1 Version 2.0 requirements, the Version 1.0 requirements, DOE requirements, ENERGY STAR QPL performance data and Schneider Electric (SE) USA and Worldwide (WW) UPS performance data.







Our comments regarding other aspects of the Draft 1 Version 2.0 specification are as follows.

We disagree with EPA’s assessment that the ENERGY STAR for UPS program is near 100% market penetration. After engaging with the Department of Energy for the recent UPS rulemaking, it is obvious that both agencies have radically different estimates of the size of the UPS market, and we believe that both understate the size of the marketplace. The GRIMM model utilized an annual shipment volume of almost twice the ENERGY STAR market size estimate. The concern we have is the market size information is used to determine national metrics and potential energy savings. The fact that two agencies in the same government utilize significantly different market estimates for portions of or the complete UPS marketplace causes industry to justifiably question the savings and the methodology used to determine market size.

As the data above illustrates, we currently manufacture and sell UPSs in every category, both in the USA and globally, that do not meet the ENERGY STAR Version 1.0 requirements. This fact is most obvious in the Data Center VFI market above 10kW. Consequently, we know with certainty that broad assertions of market penetration approaching 100% are not accurate.

We are also concerned that the ENERGY STAR program assumes the DOE Final Rule will be implemented in its current form in approximately 2 years, which after the change of administration is not at all a certainty. Assuming, DOE chooses to move forward and the requirements do come into force, the timing proposed by EPA would require implementation of ENERGY STAR for UPS Version 2.0 in advance of the DOE rulemaking implementation. We strongly recommend that the ENERGY STAR for UPS Version 1.1 be implemented, and that Version 2.0 be delayed until after the impact of the DOE rulemaking is known.

As we reviewed in the webinar, setting requirements as high as the Draft 1 Version 2.0 proposal, risks the viability entire ENERGY STAR for UPS program. Some margin is required to allow for manufacturing tolerances and test instrumentation gauge R&R; including accuracy, precision, and variation. We would caution that driving market penetration from a claim

of nearly 100%, to single digits in the space of 270 days is not consistent with other appliance categories with ENERGY STAR specifications.

If EPA does insist on efficiency increases beyond our recommendations, we request that EPA review the allowances table provided to the Department of Energy in our comments regarding the last rulemaking notice. Found at <https://www.regulations.gov/document?D=EERE-2016-BT-STD-0022-0017>

We previously commented to Department of Energy in the most recent rulemaking regarding hybrid UPS systems, those that produce a large percentage of output in both AC and DC. Currently the existing test procedure, and requirements do not adequately reflect UPS systems requirements for these complex hybrid systems. Principally as the output of AC and DC approach 50/50% one output unloaded will not allow the system to pass. As we wish to exclude USB charging ports from the specific consideration, a potential solution to this challenge is that when an output capable of more than 10% of the total rated power is available, loading AC and DC outputs, simultaneously.

As controlling humidity in a test environment can be difficult and because humidity has no impact on efficiency, we request that the specification explicitly state that there are no humidity requirements for testing.

Because both Rotary and solid-state UPS systems can deliver VI performance, lowering the requirement for VI > 10kW just to ensure Rotary models can qualify is inconsistent with the goals of the ENERGY STAR program. We therefore request that the Version 1.0 requirement be maintained for this category.

Similarly, lowering the requirement for VFD > 10kW, especially to a level below the proposed requirements for VI and VFI, is inconsistent. We therefore request that the Version 1.0 requirement be maintained for VFD > 1.5kW.

Schneider Electric has proposed on more than one occasion to the ENERGY STAR program that numerous outliers in the qualified products database exist. We have identified the same issues to the Department of Energy during the UPS rulemaking. In addition we have also provided our concerns to Natural Resources Canada, and CSA as we have seen no action taken to resolve the outliers in the ENERGY STAR qualified products database. We would again reemphasize that cleaning up this database will place ENERGY STAR program in a position to gain agreement from the industry on establishing reasonable requirements.

We believe that DOE's definition of VI UPSs is inconsistent with the definition found in IEC 62040-3 Ed. 2 and we therefore would either like EPA to not incorporate it in the ENERGY STAR for UPS Specification Version 2.0, or only use it for models that are in scope for the DOE rulemaking. Our specific concern is that the definition would seem to categorize UPSs that can correct for either under-voltages or over-voltages as VI, whereas the IEC definition requires that a UPS correct for both under-voltages and over-voltages to be classified as VI. This divergence in definitions would not be very significant if EPA was not proposing a higher requirement for VI than VFD in the below 1500W power range.

Regarding loading assumptions for all UPSs, in the absence of broad and credible field data on UPS loading, we recommend that weighting factors be maintained as they are for all UPS sizes and categories. We hope that in the coming years as cloud connected UPSs become more common that we will be in a better position to share such data with EPA to inform a future revision of the specification.

Regarding adjusting the average efficiency calculation for multimode UPSs to include a term for a third operational mode, Schneider Electric is unaware of any tri-mode UPSs in the US market and furthermore, if such products do exist, they are likely to spend the vast majority of their time in one of the two modes already comprehended in the formula.

Conclusion

We very much appreciate the cooperation demonstrated by the ENERGY STAR program in the UPS specification development process. As you can see it took considerable effort to categorize and represent the data as formatted in the graphs of this comment. In conclusion, we would like to restate some of our major concerns.

As a leading supplier of UPS products of all sizes and types, Schneider Electric intimately understands the markets we serve. Therefore, we have strong concerns regarding EPA and DOE utilizing inconsistent market research reports as the basis of determining market size. If the variations between reports were minor our concerns would be smaller, but given that one report assesses the US market to be approximately twice as large as the other, both must be viewed with skepticism. Accordingly, Schneider Electric supports the efforts of NEMA in performing a market survey to be used to inform the ENERGY STAR for UPS program.

Schneider Electric anticipates that it is highly unlikely that the Department of Energy's Final Rule on UPS systems will ever become effective in its current form, regardless of the announced lawsuits. Therefore, we encourage the EPA to ignore the DOE requirements when establishing Version 2.0 requirements or delay the specification revision process until the impact of DOE's Final Rule is clear.

The above graphs are the representation of the requirements for the DoE proposed rulemaking, ENERGY STAR for UPS 1.0 and proposed ENERGY STAR for UPS 2.0 requirements. Considerable effort was expended to develop this information for the ENERGY STAR program, and the raw data can be made available to the ENERGY STAR program under a non-disclosure agreement if desired.

As a participant in the marketplace we value the ENERGY STAR program. Our contributions are focused upon what we consider items to bring value to this program, as well as a willingness to work with the EPA in establishing criteria, test specifications, and other requirements to distinguish products that excel in electrical efficiency. We thank you for the opportunity to comment and we remain available for further discussions on the topic.

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