

ENERGY STAR® for UPS - APC Comments on Metering

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APC by Schneider Electric

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Thank you for the opportunity to comment!

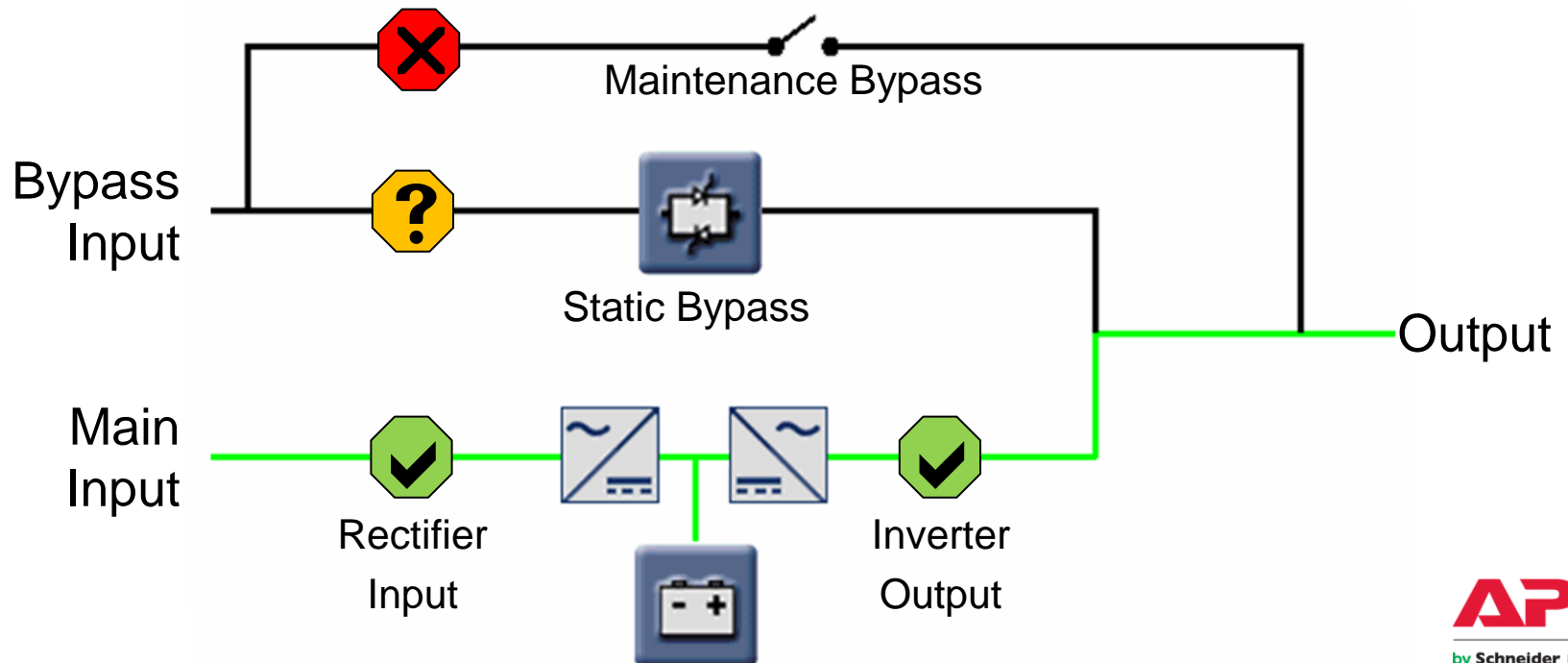
- The UPS spec development process continues to work well
- We look forward to continued dialog and cooperation with EPA
- We will submit more detailed written comments on Draft 2 by August 11

Measuring PUE is Important

- We agree that measuring PUE, and working to lower it are universally beneficial and that both should be encouraged by EPA
- We recognize that building managers do not necessarily work in the company or organization as data center operators
- We believe that stand alone meters are simpler, lower cost, easier to retrofit and more effective than UPS based metering.

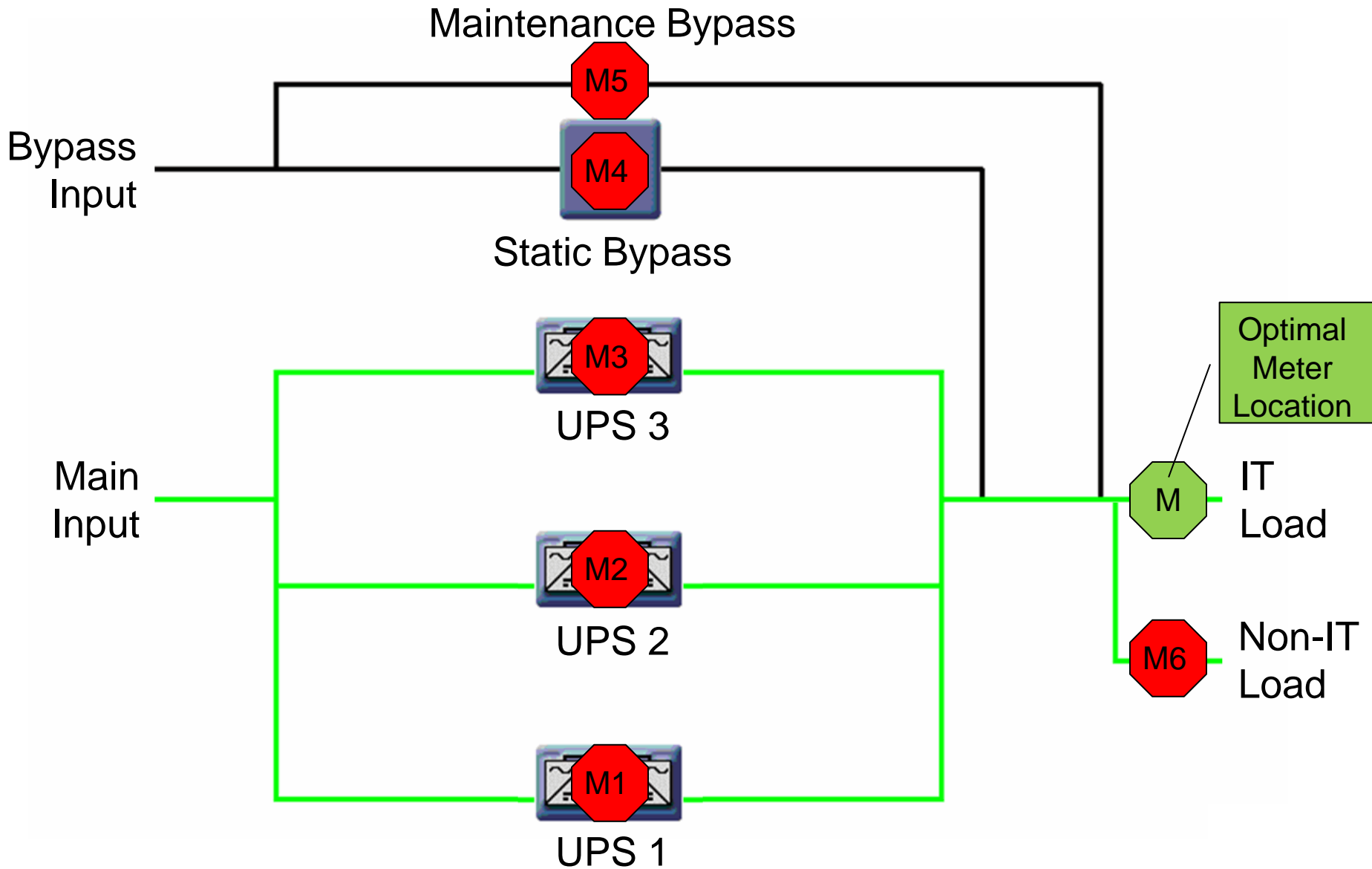
UPS Metering Philosophy and Locations

- UPSs measure only the electrical parameters that they need to operate and protect themselves
 - Typically voltage, current and power; but rarely energy
- Typical Accuracy (at > 10% load)
 - Voltage 1-2%, Current 2-5%, Power ~5%
- Output Power may not be measured in all modes
 - Static bypass and/or Maintenance bypass



Typical Data Center Power Distribution

Simplified parallel UPSs – Single power path



Complexity of Multiple Meters

- If each UPS measured energy, users with multiple UPSs and/or separately metered bypass paths would need to manually or programmatically read and add multiple meter readings to measure IT Load
 - Readings would need to be nearly simultaneous to be accurate
- Data center operators with non-IT load on their UPSs (e.g.: lights, CRACs, CRAHs) will have to sub meter and manually or programmatically subtract these loads
- Conversely, data centers with one meter per feed, placed after break out of non-IT loads, would only need to read 1 or 2 meters to determine IT Load

Accuracy Is Expensive

- Customers will expect (and PE's certifying PUE will demand) revenue grade meters
- Typical revenue grade meters and transducers are 0.1-0.5% accurate (vs. ~5% internal UPS metering)
- A 500kVA 480V UPS, measuring 3 phases in 3 places requires 3 meters and 9 current transformers, each rated at 600A

Security Concerns

- Meters built into UPSs are accessed via the same network interfaces as UPS Controls
- Data center operators are unlikely to allow building managers access
 - Could read confidential (non-energy) data
 - Could potentially change a setting or control the UPS
- Feeding meter data into independent systems (data center console and building management system) difficult
 - Modbus typically communicates only with a single master
 - Securely sharing data across data center and building LANs is difficult

Stand Alone Meters Make More Sense

- Easily and cost effectively retrofitted
 - Can be installed 'hot' with flexible or split core transducers
 - No need to buy and install a new UPS to comply with ENERGY STAR for Data Centers
- Fewer meters needed
 - $\geq 6x$ reduction possible with optimal placement
 - Saves money
 - Simplifies data collection
 - Inherently more accurate (fewer sources of error)
- Typically provide revenue grade accuracy
- Independent of UPS
 - No security concerns
- Additional functionality available
 - Power quality measurement (harmonics, swells, sags, flicker, etc.)
 - Forensics/fault propagation
 - Waveform capture

Conclusion

- Output energy metering should not be required by ENERGY STAR for UPSs Version 1
- Requiring it would exclude the vast majority of products
- Metering capabilities could be declared on PPDS

Thanks for the opportunity to comment!