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| PUC logo | COMMONWEALTH OF PENNSYLVANIA  PENNSYLVANIA PUBLIC UTILITY COMMISSION  P.O. BOX 3265, HARRISBURG, PA 17105-3265 | **IN REPLY PLEASE REFER TO OUR FILE**  M‑2012-2313373 |

**April 7, 2014**

TO ALL INTERESTED PARTIES:

Re: Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual 2013 Update

Docket Nos. M-2012-2313373; M-00051865

On December 20, 2012, the Pennsylvania Public Utility Commission (Commission) entered a TRM Annual Update Order adopting the 2013 Technical Reference Manual (TRM) update in the above-referenced matter. The TRM Annual Update Order and 2013 TRM update are posted on the Commission’s website at: <http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx>.

With this Secretarial Letter, the Commission releases an Errata to the 2013 TRM. The Errata corrects an error in the savings algorithm for variable frequency drives (VFD) in the 2013 TRM and the associated Appendix D – Motor and VFD Inventory Tool. Specifically, the savings algorithm included a factor to convert horsepower to kilowatts. This factor is redundant because the Energy Savings Factor and Demand Savings Factor used in the 2013 TRM already account for the conversion factor. As such, the algorithm effectively multiplies the factor twice, which miscalculates savings. The TRM Protocol affected is 3.4: Variable Frequency Drive (VFD) Improvements, page 202. Minor formatting changes were also made to page 202 when correcting the savings algorithm.

This Secretarial Letter, the corrected 2013 TRM update, including the amended Appendix D and a redlined version of page 202 are available on the Commission’s website at the aforementioned link.

The contact person for questions regarding this Errata is Megan Good at [megagood@pa.gov](mailto:megagood@pa.gov) or 717-425-7583.

 Sincerely,

Rosemary Chiavetta

Secretary

## 3.4 Variable Frequency Drive (VFD) Improvements

The following protocol for the measurement of energy and demand savings applies to the installation of Variable Frequency Drives (VFDs) in standard commercial building applications shown in Table 3-17. The baseline condition is a motor without a VFD control. The efficient condition is a motor with a VFD control.

### 3.4.1 Algorithms

ΔkWh = HP X LF / ηmotor X RHRSbase X ESF

ΔkWpeak = HP X LF / ηmotor X CF X DSF

### 3.4.2 Definitions of Terms

HP = Rated horsepower of the motor

LF = Load Factor. Ratio between the actual load and the rated load. Motor efficiency curves typically result in motors being most efficient at approximately 75% of the rated load. The default value is 0.75. [[1]](#footnote-1)215

ηmotor = Motor efficiency at the full-rated load. For VFD installations, this can be either an energy efficient motor or standard efficiency motor. Motor efficiency varies with load and decreases dramatically below 50% load; this is reflected in the ESF term of the algorithm.

RHRSbase = Annual run hours of the baseline motor

CF = Demand Coincidence Factor (See Section 1.4)

1. 215 In order to use Motor Master you would need to log. This can be done for custom measure but is not allowed for stipulated measures. A standard practice and/or load shape study would be required. [↑](#footnote-ref-1)