

## Using Veris Energy Solutions to Improve Data Center Efficiency

### Introduction

In any data center, cooling requirements are a significant consideration. A combination of chillers, fans, and compressors are necessary to remove the tremendous quantities of heat generated by servers and other high-performance electronic equipment.

Up to 40% of energy consumed by a data center facility goes to cooling equipment. With this figure in mind, it is clear that optimizing the cooling system can have a substantial impact on the facility's monthly electric bill. The Green Grid, a consortium that promotes energy efficiency in the IT industry, has developed guidelines for measuring data center energy use, including two key evaluative terms: the Power Usage Effectiveness (PUE) and the Data Center Infrastructure Efficiency (DCiE).

### Calculating Energy Efficiency

The PUE is the ratio of the total facility power to the load associated with only the IT equipment. The total facility power includes all supporting equipment, including the cooling systems. For example, if a facility has a PUE of 3, then the facility uses 3 times more energy in total than is needed to power the IT equipment. This ratio is always greater than 1, and the higher the PUE value, the less efficient the facility.

The DCiE is the inverse of the PUE, expressed as a percent. The closer to 100%, the more efficient the facility. If the PUE is 3, then the DCiE is 33%, meaning that the IT equipment uses 33% of the facility's total power, and the remaining 67% is used by supporting equipment.

In a mixed-use facility, only the power consumed by the data center portion of the facility should be used to calculate the PUE and the DCiE. Where this information cannot be measured directly, the facility administrator must make estimates.

### Improving Efficiency

Increasing the efficiency of the data center facility involves reducing the amount of energy consumed by supporting equipment. This reduction will result in a lower PUE (closer to 1) and a higher DCiE percentage.

Maximizing energy efficiency requires accurate quantification of energy entering through the mains, as well as energy consumed by equipment. Metering devices can connect to main power conductors entering the facility, while branch current monitoring devices can measure energy consumption at the branch level, revealing how much energy is used by each type of equipment or in each section of the facility. As the administrator takes steps to increase energy efficiency, these meters can quantify that improvement. The diagram below shows the flow of energy through a data center facility.

Devices such as the Veris H8400, H81xx, and Enercept meters can quantify incoming power at the mains, as well as energy consumption by cooling equipment. The E30, E31, and H971 can quantify power distribution at the branch level. These devices can be networked to a control system to store consumption data over time, and this information can be used to track improvements in efficiency and look for locations where further improvements can be made.

As the study of datacenter efficiency continues, the Green Grid expects to establish more concrete guidelines for expected PUE values. At this time there is not sufficient statistical data to determine what is a "good" PUE number. But the Green Grid encourages facility administrators to begin measuring their PUE and DCiE values, even if some information must be estimated. In the short term, quantification allows cost-cutting and reduction of a facility's carbon footprint. In the long term, improved understanding of how to measure energy efficiency will have benefits industry-wide.

