



The Power Usage Effectiveness

In an effort to become more environmentally friendly, IT companies around the world are working to create the most power efficient data centres possible.

The Power Usage Effectiveness (PUE) metric is a simple way of measuring the efficiency of data centre power usage, to allow for better understanding of energy consumption.

Many organisations use the PUE to make decisions on their infrastructure that relate to power and cooling, how it manages with increased demand as well as reduce the impact of their data centre on the environment.

The PUE metric was created by the [Green Grid organisation](#) a not for profit association of professionals aimed at increasing data centre efficiency. This organisation includes such companies as CISCO, Dell, Intel, HP, IBM and Sun. The formula is simple, take the total facility power and divide it by the power used for the IT equipment.

$$PUE = \text{Total Facility Power} / \text{IT Equipment Power}$$

The Total Facility Power can be measured at the utility meter, however it is important that this figure relates only to the energy used within the data centre. If the data centre is located within an office building it is important to measure the power used in the data centre separately from the offices.

The IT Equipment Power measurement should be the total power distributed to the computing equipment.

This formula ($PUE = \text{Total Facility Power} / \text{IT Equipment Power}$) will then give a PUE number. The ideal is to get as close as possible to 1.0 which means 100% of your facility power is being used for computing. In reality your lighting/cooling etc will always consume some power which will increase the PUE. If your calculated PUE is 2.0 that means that your datacentre is using twice the power necessary to run the IT equipment. This is certainly not an uncommon PUE figure.

Having a low PUE has become a key factor in having a competitive data centre with many large organisations focusing on getting lowest PUE possible. Google have achieved an exceptional PUE of 1.19 (measured over a twelve month period) after analysing and adjusting power usage using the PUE metric.

To improve a PUE organisations may look at modifications to cooling systems, as this can be one of the main influences on energy consumption. Hot/cold aisle arrangements can certainly help, as can an analysis of localised hot spots in the datacentre.

The Green Grid website now provides a reporting and certification feature which allows for all information relating to the conditions of PUE testing to be published and/or verified depending on level chosen.

For more information on PUE and other efficiency measurement tools visit the green grid website www.thegreengrid.org.