

# Achieving Energy Efficiency Goals in Data Centers MARKET-LEADING POWER EFFICIENCIES FOR REDUCED POWER CONSUMPTION

### Introduction

With the demand for cloud computing skyrocketing, data centers play a critical role in supporting today's digital economy. Cloud services enable our day-to-day lives—every stream, click, and download fires up a server (or many) in data centers around the world. As data use climbs exponentially, data centers grow to keep up with the increasing storage and processing needs.

For data center operators, energy efficiency is a key priority when it comes to building, running, and maintaining their facilities. Electricity is often a large portion of operating expenses and while minimizing power consumption can reduce costs, it can also minimize the impact on the environment. Today's data center operators put sustainability at the forefront of their strategies as operations expand.

Our hyperscale and other data center customers rely on our power supply solutions to increase their power efficiency. At Advanced Energy, we are committed to reducing our impact on the environment by improving the energy efficiency of our products which in turn enables our customers to meet their power efficiency and sustainability goals. We focus relentlessly on optimizing efficiency and power density to reduce the total cost of ownership and environmental impact.

#### **Power's Role in Energy Efficiency**

Data centers, according to study by academic journal <u>Science</u>, account for ~1% of global electricity usage.

To keep energy consumption low, our customers aim to operate at peak capacity, minimize wasted "on" resources, and efficiently load server workload across their environment.

Advanced Energy power supplies play a critical role in overall data center efficiency. As the last stage in power conversion, low efficiency at the power supply can cascade back through the entire facility power distribution. Every 1% efficiency loss at the power supply unit will require more than 1% additional power to accomplish the same output. Efficient power supplies help data centers to achieve their sustainability goals.

#### Leading Power Supply Efficiencies and Densities

Our power supply solutions offer both market-leading power densities and efficiencies. We offer a best-inclass power density of 75 watts per cubic inch (W/in<sup>3</sup>) which enables high power, high efficiency designs in the smallest form factor. With this



Figure 1: AE's Market-leading Power Densities<sup>1</sup>

## ACHIEVING ENERGY EFFICIENCY GOALS IN DATA CENTERS

solution, our customers can maximize their cost-effectiveness, density, and system performance. A customer can deploy more computing power without adding to their facility footprint—pushing out or avoiding a buildout of another facility which can put an additional strain on capital and environmental resources.

Advanced Energy's market-leading power densities made significant leaps in efficiency innovation. We were among the first to demonstrate over 97.5% efficiencies. Every efficiency percentage point increase reduces



Figure 2: Hyperscale Peak Conversion Efficiency

our customers' needs for power which lessens the environmental impact and reduces carbon emissions, depending on the power source.

For example, consider a 10 MW facility with servers that consume 50% of the energy and a power usage effectiveness (PUE) of 1.6. A 2% increase in server PSU power efficiency increases the PUE and leads to a 1.6% decrease in electricity use—that's 1.4 million kWh saved per year. At \$0.07 per kWh, that's a savings of \$98K in power per year. This energy consumption can be the equivalent<sup>2</sup> to one of the following:



## Power Shelves—12 to 48 V Transition

For more than 20 years, AE has designed and built power shelves. Power shelves enable the consolidation of power within a rack to a single shelf of dedicated power conversion for a rack of servers without dedicated power supply units, freeing up space and consolidating available power.

Traditionally, data center racks have used 12 V power shelves but as higher performance compute and storage platforms demand more power, 48 V offers inherent efficiency gains, with 4x less current and 16x lower distribution losses than 12 V. This results in significantly better thermal performance, smaller busbars, and increased efficiency. As AE develops and drives market adoption of the next generation 48 V power architecture, our <u>Open Compute ORV3</u> platform is a key enabler in the growing adoption of 48 V rack power distribution in hyperscale data centers.





#### Figure 3: Advanced Energy's Data Center Solutions

#### **Building for Tomorrow**

As the industry aims to increase the efficiency of data centers while minimizing their environmental impact, AE is developing leading-edge technologies to serve the market. As data center buildouts continue to rise, we're developing innovative space-saving packaging techniques, miniaturization of assemblies, and more to create best-in-class devices that will minimize our customers' power consumption, save space, and help them achieve their sustainability goals. Our product roadmap aligns with industry demands and regulations—including the European initiative ErP Lot 9. This directive specifies distinct requirements for power efficiency and energy consumption in servers. We've worked closely with our customers and suppliers to ensure our power solutions can allow them to meet—and beat—regulatory requirements.

### Conclusion

Our constant power innovations drive the industry forward and our product efficiency success directly impacts power reduction. Sustainability is key to our strategy in the products we make and the way we operate. Our efforts extend beyond power efficiencies, and we incorporate environmental, social, and governance (ESG) responsibility across our business with the same focus and dedication we approach all our initiatives.

<sup>1</sup> Internal estimates

<sup>2</sup> https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

## **CONTACT US**

Contact us by phone, email, or visit our website to learn more about our ESG commitments

PHONE +1.970.221.0108

EMAIL sales.support@aei.com