



# HP Data Center Smart Grid

Converting the data center into an intelligent, energy-effective asset for your business

An HP Converged Infrastructure innovation primer

## HP Data Center Smart Grid

The HP Data Center Smart Grid creates an intelligent, energy-aware environment across IT and facilities to optimize and adapt energy use, to reclaim facility capacity, and to reduce energy costs. It collects and communicates thousands of power and cooling measurements across IT systems and facilities in real time to give your organization greater insight and control over energy use. This lets you support business growth by deploying more IT within the same data center footprint, hosting more applications and making more effective use of your existing capacity and capital investments.

For the first time, your business can accurately visualize and control data center energy use and environmental impact in real time across the entire data center. This capability allows you to take action based on accurate data to increase power density, efficiency, and capacity utilization.

## A black box on a big grid

IT is the core of business operations, and delivers the driving force behind most business processes. Inability to grow your IT footprint can translate into business growth limitations—unpalatable for most businesses. A common

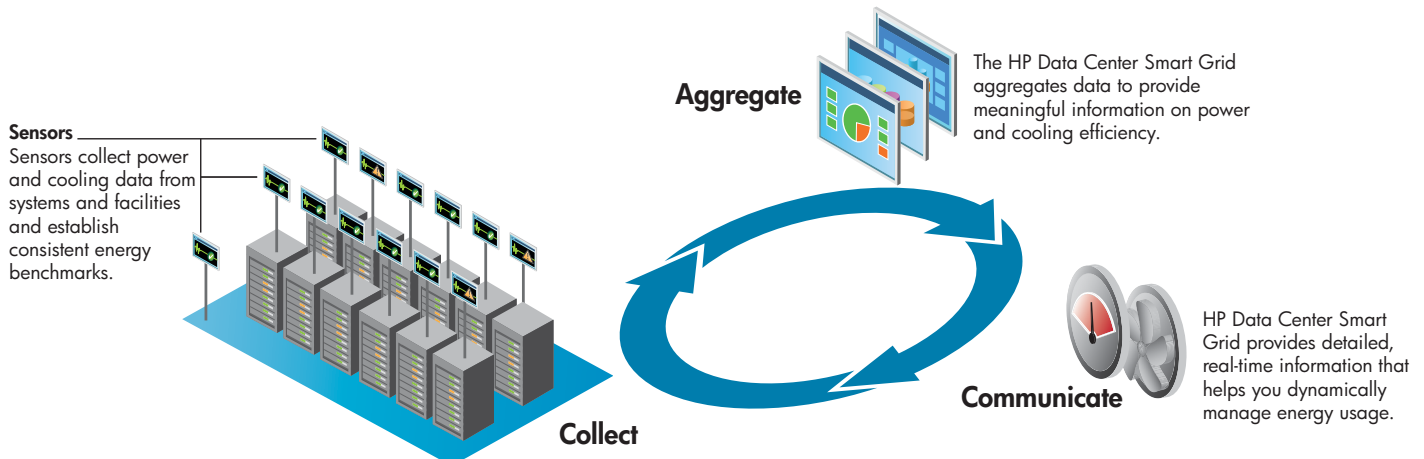
problem found in many data centers, exacerbated by design and operation, is the lack of power and cooling flexibility and the inability to effectively manage both your IT infrastructure and facility requirements. Data centers can often seem like rigid, unchangeable, and opaque black boxes.

A data center is by nature a highly complex system filled with IT hardware and racks, connected by miles of wires and cables, and complex relationships between hardware and software. IT intersects with another complex system, the data center facility itself, delivering power, cooling and space for IT. For reliability and availability, both IT and the facility are usually over-provisioned. An additional and fixed energy and cooling buffer is usually allotted to make sure that critical peaks of IT usage do not result in IT meltdowns. Plus, power and cooling is “fixed,” usually supplying a constant amount to IT—no matter the data center status or workload.

And in many data centers it is this rigidity that limits IT footprint growth. Data center capacity limitations can cause additional capital expense to create additional space, when in many cases the existing data center can be updated and the IT and facilities infrastructure integrated, to extend useful life and postpone reaching capacity limits.

**Figure 1. Data collection from across your environment**

The HP Data Center Smart Grid collects, aggregates, and communicates thousands of power and cooling measurements from your IT systems and facilities in real time. This capability gives your organization more efficient insight and control over energy use.



Plus, data center energy costs are climbing, and in many cases exceed the cost of IT hardware. Data center energy use can consume up to 40 percent of a business's entire energy use.<sup>1</sup> Fifty percent of the energy cost of a data center is the cooling and power transformation required for the facility—and in some data centers, it's even higher.<sup>2</sup>

Adding to the complexity is the fact that the data center organizations may not be set up to address these problems successfully. IT and facilities teams are focused on separate and sometimes conflicting goals and strategies. The IT team seeks to deliver additional IT performance, typically without emphasis on power savings; the facilities teams seek to minimize energy spend due to expense, and to meet the IT requirements.

Expanding a data center can cost up to \$25 million per redundant megawatt of added electrical capacity. And just operating your current environment can suck valuable funds, decreasing the funds available for your business innovation and growth. What's the solution? HP has the answer.

## How HP can help you use more IT footprint and less grid

Driving down operating expense is enabled with new-generation IT hardware and IT management, which deliver a flexible, energy-efficient resource pool. Viewing and integrating the data center as an organic whole allows you to address all aspects of the problem.

We're talking about dramatically reducing the energy consumption of your entire data center and adding IT capability within the existing environment to extend the data center life and reduce energy costs—sometimes all at once. A completely new level of integration can

get your data center IT and facilities to be holistically manageable as one unified and changeable entity.

HP has built a strong and solid foundation of technologies to reduce energy consumption in the data center. We've been providing solutions for years that are increasingly energy efficient and able to intercommunicate, react, and resolve. And we are about to take our solutions to another level, bringing you an unprecedented amount of quality control and efficiency. The extensive HP data center energy portfolio is driving towards this goal—a completely new level of integration across IT and facilities, to fundamentally reduce the proportion of budget allocated to maintenance and energy usage and release vast amounts of performance productivity from existing deployments.

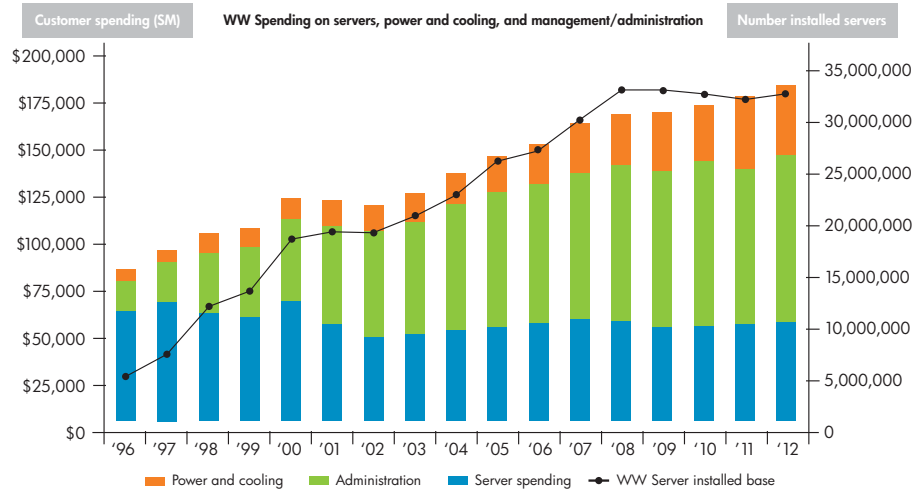
HP has the expertise, portfolio, and vision to make your data center and its grid become intelligent, alive, and unified, by enabling your data center to be transparent and interactive through expanded communication and intelligent capabilities. This organically whole data center plus grid can keep the core of your business operations not only up and running, but can identify and leverage unused capacity and reduce energy costs by automating adjustments to buffers and avoiding unnecessary over provisioning.

## Moving from the HP Data Center Energy Efficiency Portfolio to the HP Data Center Smart Grid

HP was the first data center solutions provider to enable customers to greatly reduce energy costs and environmental impact and enable higher application availability with control efficiency at the component, enclosure, and rack levels. HP has optimized products with smart technology innovations such as HP Data

**Figure 2. Sprawling infrastructure**

As infrastructure sprawls, operational costs rise dramatically, as shown in this view of data center costs from IDC.<sup>3</sup>



Center Environmental Edge and HP Thermal Logic.

HP Thermal Logic with Dynamic Power Capping can triple your data center capacity. Using wireless technology, HP Data Center Environmental Edge deploys a sea of sensors across your data center to establish consistent energy benchmarks. With instant, accurate measurements for every level of the data center, you have the hard data you need to optimize and control your power and cooling efficiency.

The extensive HP data center energy portfolio allows you to dynamically manage your energy usage and allocate your physical and virtual infrastructure. It includes powerful management tools, intelligent and comprehensive monitoring within the hardware, and tools that unite your entire IT infrastructure and automate tasks regardless of vendor platform or operating system. This portfolio has saved HP customers millions of dollars in energy and capital expense worldwide.

But we want to do even more. The HP vision is to integrate the entire IT and data center facility from a communication and energy information perspective, and actively manage both IT and facilities as a synchronized yin and yang, ensuring constant data center optimization. The HP Data Center Smart Grid vision extends HP Thermal Logic technology from IT systems to broader, environmental monitoring and control across the facility.

The HP Data Center Smart Grid philosophy supports our entire data center energy portfolio, and you'll see it in solutions ranging from HP Thermal Logic to HP Environmental Edge to the HP POD (Performance Optimized Datacenter), and more. We're adding even more smart technologies that communicate real-time status on power, cooling, utilization, available capacity, and more.

A typical data center runs air handlers at 100 percent to blanket their IT with cold air, making sure hot spots are covered. The HP Data Center Smart Grid matches IT cooling demands to cooling output, thereby saving energy and using capacity effectively. If the data center power is constrained, the HP Data Center Smart Grid will manage the power consumed by IT to increase the IT footprint capacity and reduce the need for data center expansion.

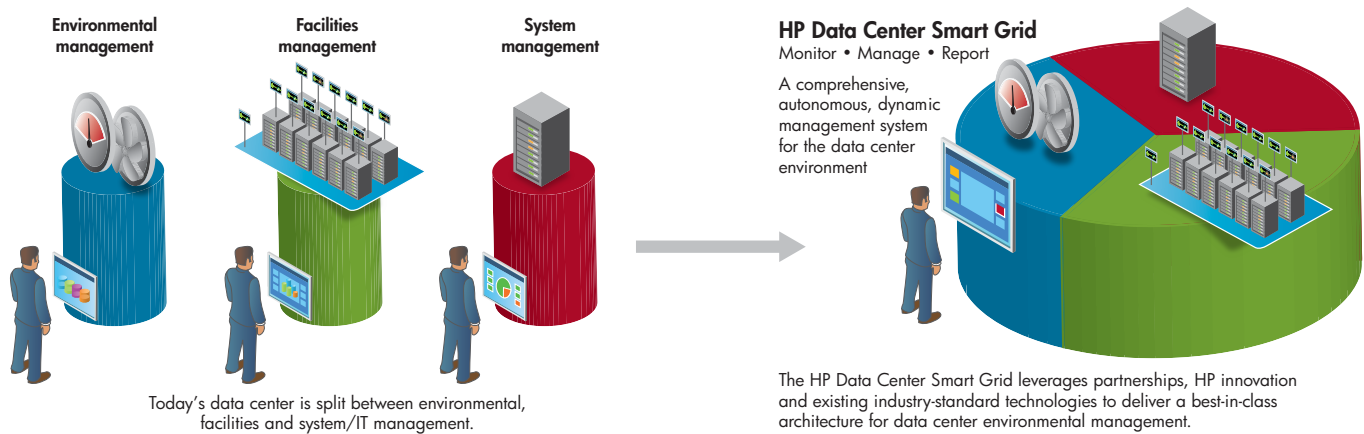
### The key elements: reduce, optimize, integrate

The HP energy philosophy, as it grows to the next level in the HP Data Center Smart Grid concept, centers around three key elements to unleash the potential savings and performance of the data center: Reduce, Optimize, and Integrate.

- **Reduce** energy consumption, energy costs, wasted capacity, and manual intervention in the data center for radical savings. HP Data Center Smart Grid reduces facility power and cooling costs by up to 30 percent.
- **Optimize** the capacity of the entire data center energy ecosystem. Move energy from power and cooling to IT, thereby doubling the capacity of your data center.
- **Integrate** all aspects of the data center to make it come to life with intelligent energy-aware common communication, dynamic responses to changes, and symbiosis between IT and the data center facility. Through live constant communication and integration, the data center and facility infrastructure move from disconnected elements to an orchestrated harmony that can monitor and adjust toward the goal of dramatic savings and performance.

### Figure 3. Creating a smart grid

The HP Data Center Smart Grid brings together environmental, facilities, and systems management to enable comprehensive management of the data center environment.



As we move towards this vision, you'll see us continue to drive integration through our product line. For example, bringing HP Thermal Logic across the entire ESS product line allows all hardware products to speak the same language and report the same way, integrating communication across the entire product line. Adding power monitoring capability to HP Data Center Environmental Edge delivers temperature, humidity, pressure, and power reporting of the facility environment.

### The HP difference

HP has the depth, breadth, and expertise to bring it all together. We know the IT footprint. We understand how to get the information and control for the IT part. We have the numbers on record for how much money the energy smart technologies can save. We understand, through the HP Labs Sustainable Datacenter Initiative, how to work with facilities and what information is required.

Only HP has the proven portfolio and IP across server, storage, networking, management, power and cooling to deliver a converged infrastructure. Only HP can bring it all together to deliver the next-generation data center. The HP reach extends from desktop to NonStop and from network edge to core. And it's all delivered the way you want, whether it be in-house or outsourced via the cloud, with deep partner integration that accelerates innovation and value.

Ultimately, HP is leading the way to a converged infrastructure.

### Your next step

Learn more about the HP vision of converged infrastructure and how the HP Data Center Smart Grid plays a key role at [www.hp.com/go/convergedinfrastructure](http://www.hp.com/go/convergedinfrastructure).

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1. U.S. Department of Energy, 2007, and U.S. EPA Report to Congress on Server and Data Center Efficiency, Aug. 2, 2007.
2. U.S. Department of Energy, DOE Data Center Energy Efficiency Program, April 2009
3. IDC, 2009



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