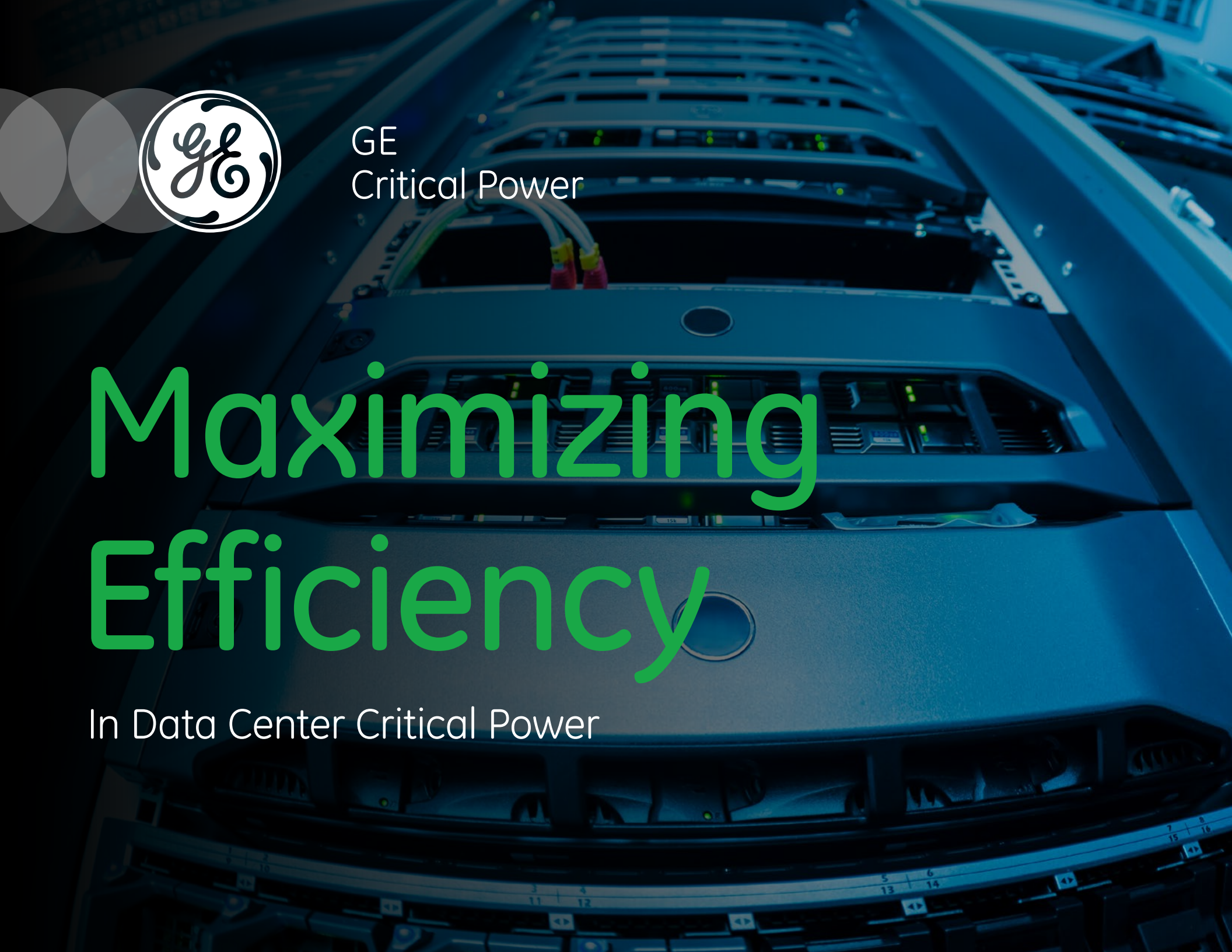

GE
Critical Power

Maximizing Efficiency

In Data Center Critical Power

Introduction:

Efficiency Matters

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Efficiency Matters

When it comes to data center critical power, less is the new more. How can we get more power in less space? How can we minimize energy loss and maximize power? How can we reduce expenses and increase revenue?

There's one compelling answer: **Improve efficiency.**

Here, we'll critically examine Data Center efficiency killers—everything from rack space limitations to how engineers spend their time. Then, we can begin to look into the groundbreaking technology that will resolve your most pressing efficiency-related problem: **Energy loss.**

Control Energy Loss

Chapter 1:

Powerful Demands

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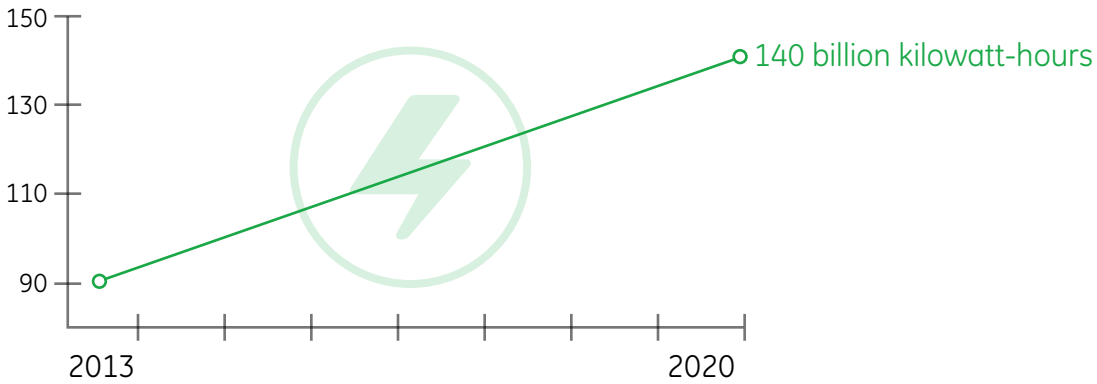
Powerful Demands

Your customers want two things from you: 100% uptime and maximum data transmission capacity. The only way to meet their expectations is to ensure your data center architecture is at peak condition at all times, particularly when it comes to energy use. That's no easy task.

According to the Natural Resource Defense Council (NRDC), data centers in the United States consumed an estimated 91 billion kilowatt-hours of electricity in 2013, and we're on target to reach 140 billion kilowatt-hours by 2020. At today's prices in the commercial sector, that's **$15 billion** allocated to electricity alone. Add to that data center infrastructure requirements, and we're looking at a staggering amount of financial resources flowing through the industry.



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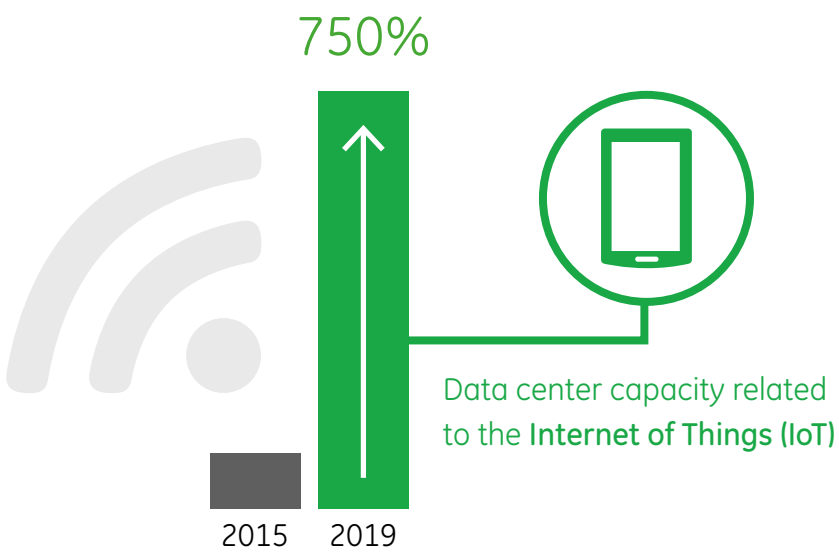
Chapter 1:

Powerful Demands

None of those numbers is likely to decrease in the coming years. In fact, the International Data Corporation estimates that data center capacity—just that related to the Internet of Things (network of Internet-connected physical devices, such as Wi-Fi appliances and tablet computers)—will increase **750%** by 2019. Supporting such rapid growth demands a significant investment.

To remain competitive in the marketplace, data centers must become shrewd energy consumers, discovering new solutions to ongoing efficiency challenges. If you're paying for all that power, you want to use as much of it as possible, right?



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Chapter 2:

Your Bottom Line. Transformed.

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Historically, data centers have been more concerned about the cost of physical assets and resources (CapEx) than operating expenses (OpEx). Given the statistics we just explored, it's critical that data centers look beyond the sticker price of a server to the true Total Cost of Ownership (TCO).

A primary factor in data center infrastructure TCO involves power supplies—more specifically, real estate in the racks. How many RUs are allocated to rectifiers rather than revenue-generating equipment? It's an important consideration, and one that drastically affects both CapEx and OpEx.

So, what if you could do something about it? If every RU could hold equipment that's actually working for you and your customers, instead of just powering that equipment, what would that do for your bottom line?

It's critical that data centers look beyond the sticker price of a server to the true Total Cost of Ownership (TCO).

Chapter 3:

Wired with Innovation

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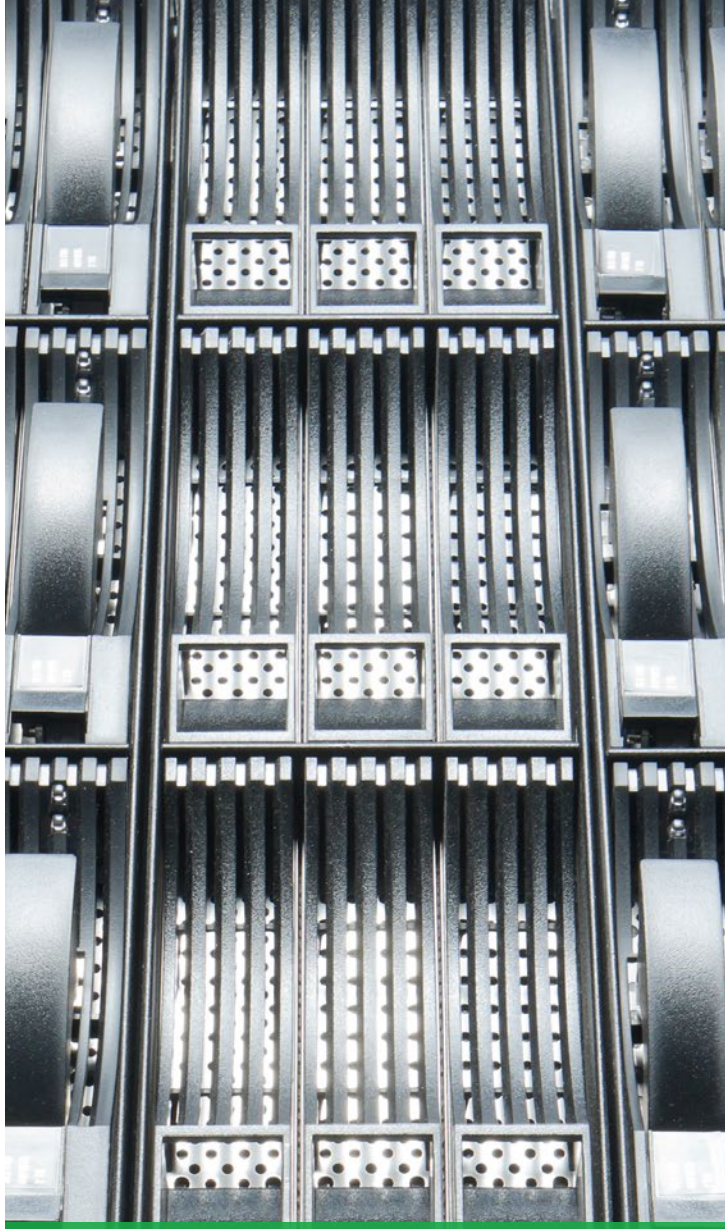
Wired with Innovation

At GE Critical Power, we're determined to develop products that help you solve critical problems—without sacrificing revenue. It's our job to find better ways for you to meet, and even surpass, data center demands.

With the recent release of our GP100 rectifier, we did exactly that. The 3-phase, 1RU GP100 significantly reduces the amount of rack space used by power supplies—and represents yet another breakthrough in efficiency.

But at GE, finding solutions this advanced requires the constant reinvention of technology. We continue to develop products that work towards increasing the availability of every rack unit possible in the data center.



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Chapter 4:

Wired for Balance

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Wired for Balance

We don't have to tell you that your data center engineers spend much of their time monitoring and balancing loads on the AC grid. This work is critical to your bottom line: phase balance protects equipment from over-use and minimizes penalties from the power company.

But is it the best use of your engineers' time and energy?

What if, rather than simply maintaining your current infrastructure, your engineers could do what they do best—develop and implement new technology? As a 3-phase rectifier, the GP100 provides a hands-off solution to phase balancing—releasing your engineers to do exactly that.

That's right: you'll never have to balance loads again.

So far, the GP100 has solved a significant inefficiency in manpower. But with current 3-phase, 480V to 48V rectifiers, one solution still leaves another unaddressed: How do we further maximize real estate in the rack?

We thought of that, too.

As a 3-phase rectifier, the GP100 provides a hands-off solution to phase balancing.

Chapter 5:

Wired for Density

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Wired for Density

The Uptime Institute reports average data center power density is 8.5kW per RU. As you're working to increase your server capacity without expanding your footprint, that's simply not dense enough.

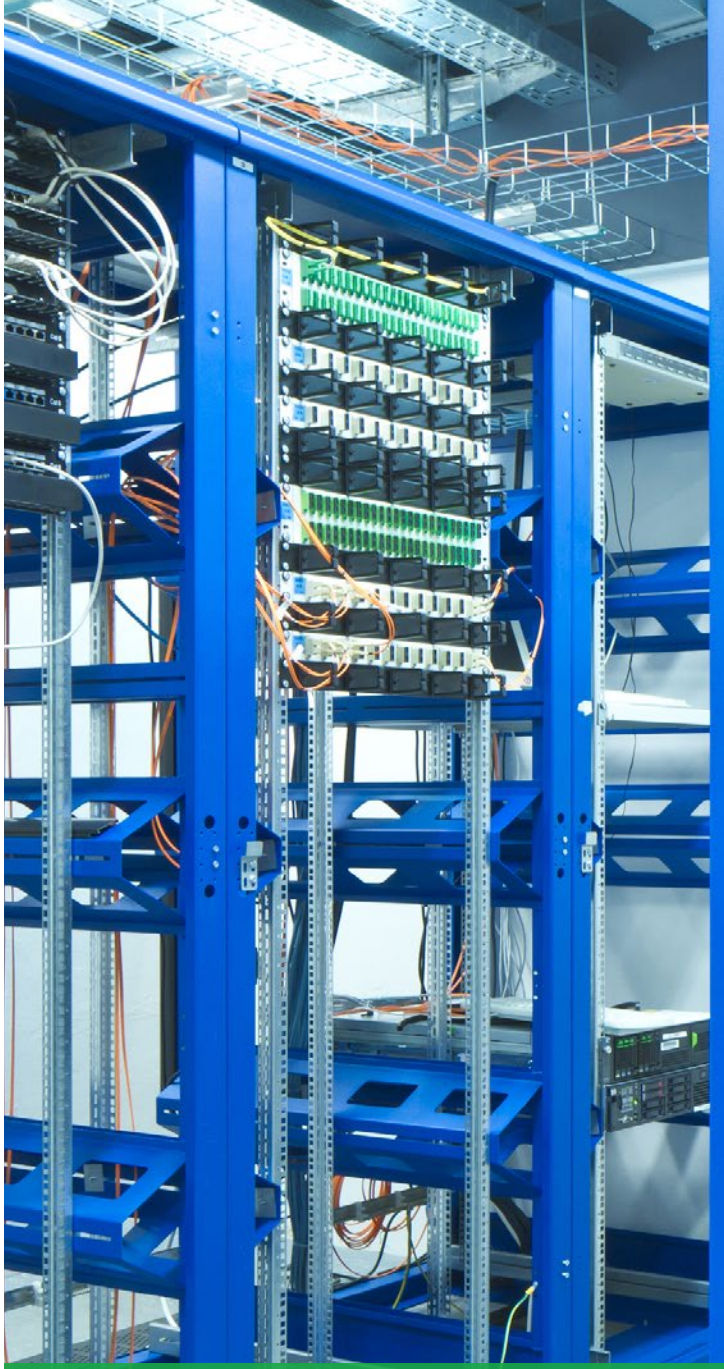
We worked on that problem by developing our GP100—the smallest 3-phase, 6kW rectifier available today. Installed side by side, the GP100 packs 12kW of power in 1RU—the highest power-to-size conversion technology ever developed for 19" rack mount applications. While a UPS that requires 75% less rack space is certainly an improvement, it's still true that every RU lost to power supplies translates into decreased revenue. We realized we could do even better than that.

OneStep Edge: The Entire Rack, Now Open for Business

The groundbreaking OneStep Edge solution removes power supplies from the rack entirely, leaving 42RU of usable space.

With efficient use of both rack space and floor space, your CapEx related to infrastructure just plummeted.

Now, let's get to work on your OpEx.



When was the last time you had 42RU of usable space?

Chapter 6:

Wired for Simplicity

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Wired for Simplicity

In the past, data centers have relied on highly skilled employees to install and swap out PDUs. This new technology radically simplifies that process.

With the OneStep Edge, the PDU is installed on the left side of the cabinet. Your electrician wires the 480V into the building and directly into the top of the rack. Then he goes home.

How?

The OneStep Edge accepts 480V AC 3-phase and distributes it down the rack to up to eight rectifiers, which are hot-swap pluggable directly into the PDU. UPS maintenance just got significantly less expensive and more efficient.

In addition, the OneStep Edge brings the user interface for power to the front of the cabinet, so rather than sending your valuable employees to the hot aisle, they'll be able to swap out power supplies—tool-free—from the cool aisle. By improving their comfort and safety, you're setting them up for success.

UPS maintenance just got significantly less expensive and more efficient.

Chapter 7:

Wired for Economy

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Wired for Economy

A significant percentage of TCO can be attributed not only to **power use**, but also to **power delivery.**

Getting power from the grid into the data center, carrying power to transformers, and sending power to the racks requires an incredible amount of cable. And, while it's on its journey through all that low-efficiency cable, the energy you're paying for is seeping out and being lost in conversion.

Not anymore.

With the GP100 and OneStep Edge solution, the amount of cable required to power your data center is drastically reduced. You'll no longer be running cables to and from the basement, and with your PDU located right next to your load-bearing equipment, we're now talking about inches of cable, rather than yards.

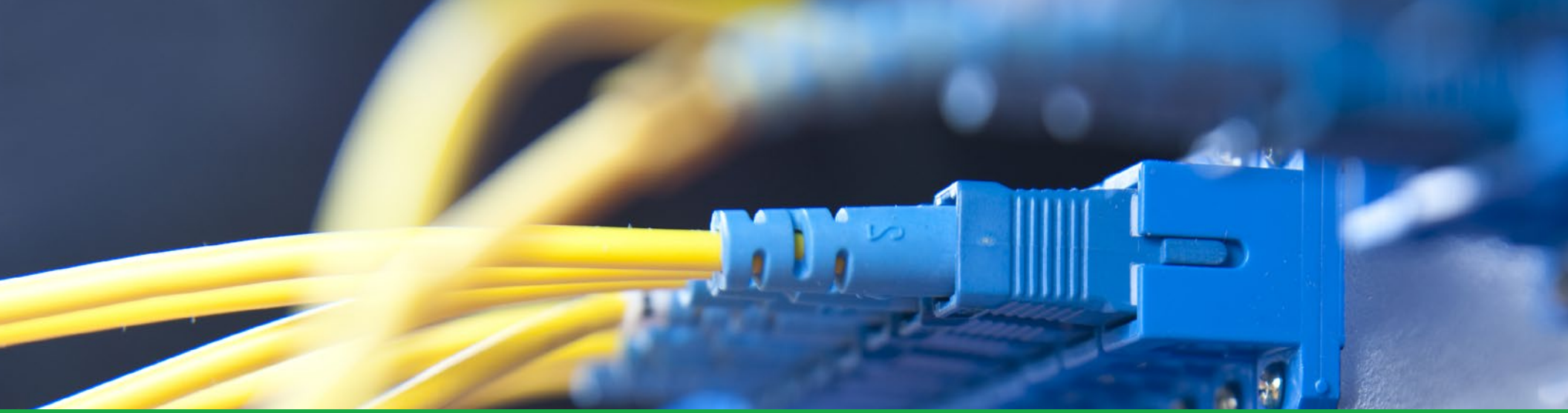
And since that energy's no longer leaking out as it makes its way to your servers, there's less heat generated, so there's less cooling required. 3-5% less.

Less cable. Reduced CapEx. Reduced OpEx.

It's efficiency in action.

Less cable.
Reduced CapEx.
Reduced OpEx.

It's efficiency in action.



Chapter 8:

Wired for Flexibility

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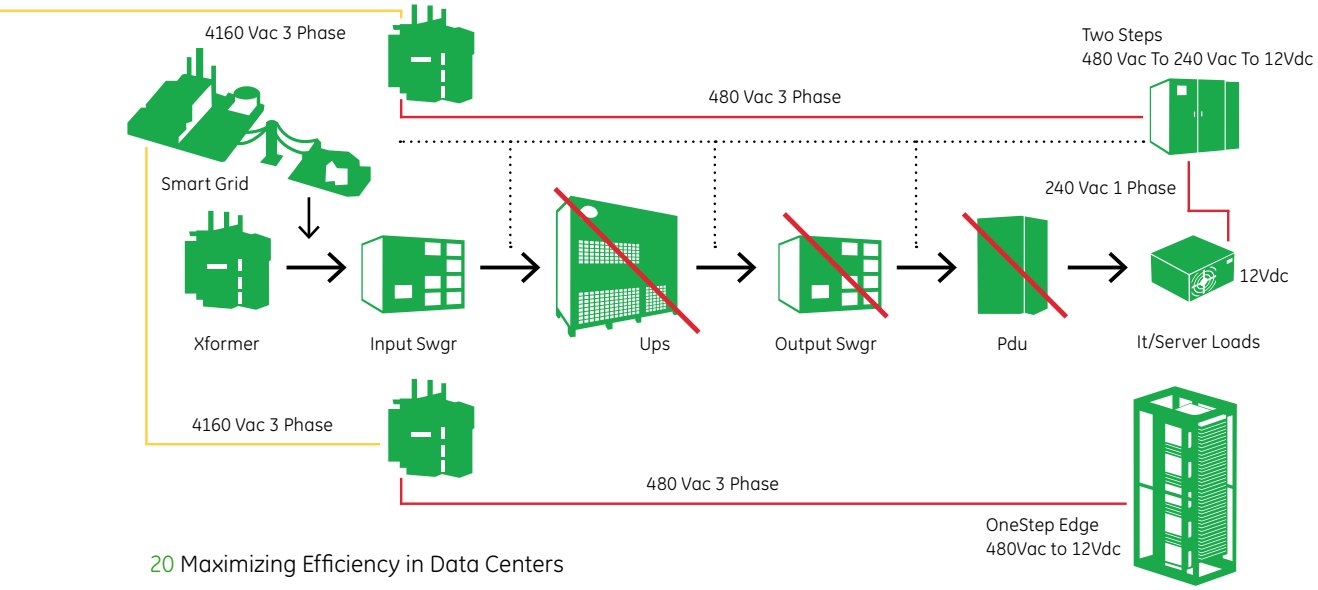
Wired for Flexibility

For data centers that have a preferred cabinet supplier, we have great news: OneStep Edge can be installed in other vendors' cabinets, adding just 5" to the cabinet width. It can also be installed horizontally , distributed through a 19" rack. Each GP100 still only uses 1RU, and they're still connected to one, 480V power source.

By filling OneStep Edge with up to eight of our 1 RU GP100 rectifiers, you'll still enjoy the most significant benefit of this revolutionary product—making efficient use of your space by releasing every RU to load equipment. Or, if you're partial to your current UPS, OneStep Edge will work with those, too—right where they sit today.



OneStep can be installed in other vendors' cabinets.

Chapter 9:

Wired for Sustainability

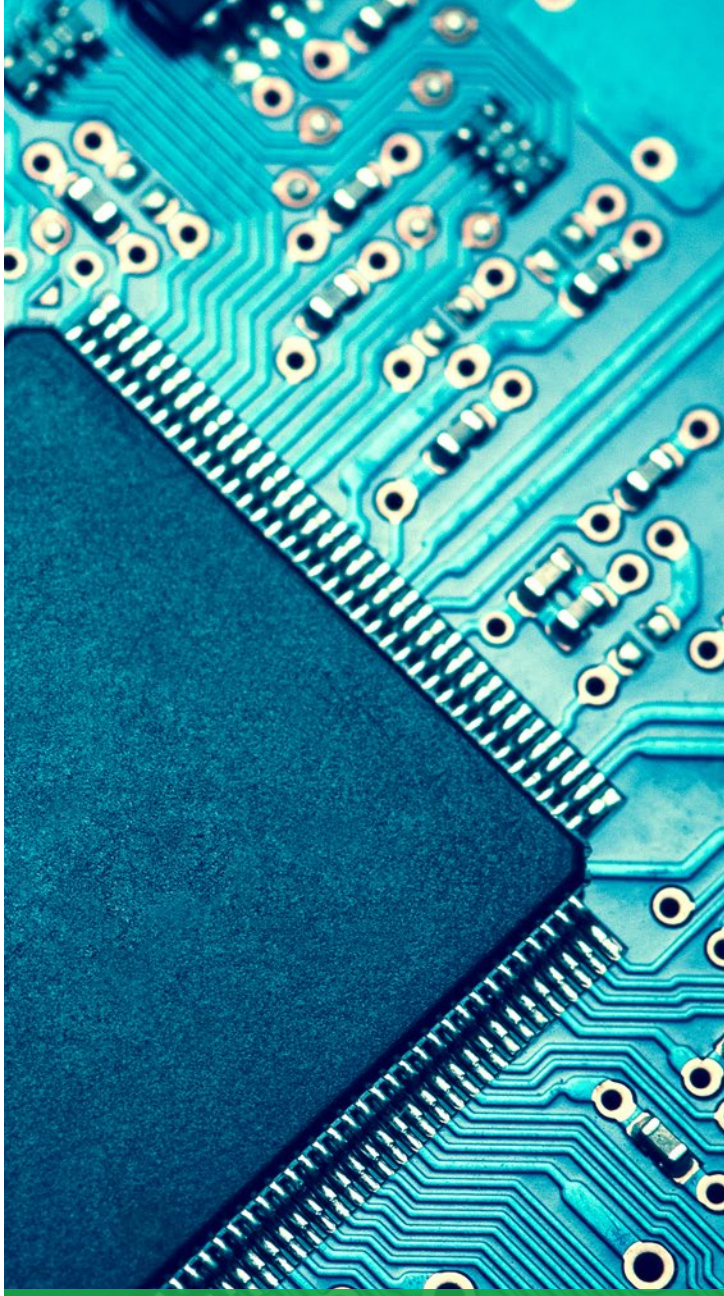
Chapter 9:

Wired for Sustainability

As technology advances at a startling rate, one principle has remained consistent for decades: Moore's Law: the idea that computing power approximately doubles every two years.

To remain competitive, data centers must replace obsolete systems. Across the industry, thousands of servers—along with their power supplies—must be removed, trashed, and replaced. Every two or three years. It's a bottom-line crusher.

Our OneStep Edge with GP100 is engineered to last 10 years, so although your servers will likely need to be replaced every two or three years, the power supplies won't. Plus, the OneStep Edge monitors its own health, storing the information where engineers can access it remotely or in person. That eliminates the guesswork when it comes to power supply life, ensuring that data centers don't waste capital by prematurely replacing equipment.



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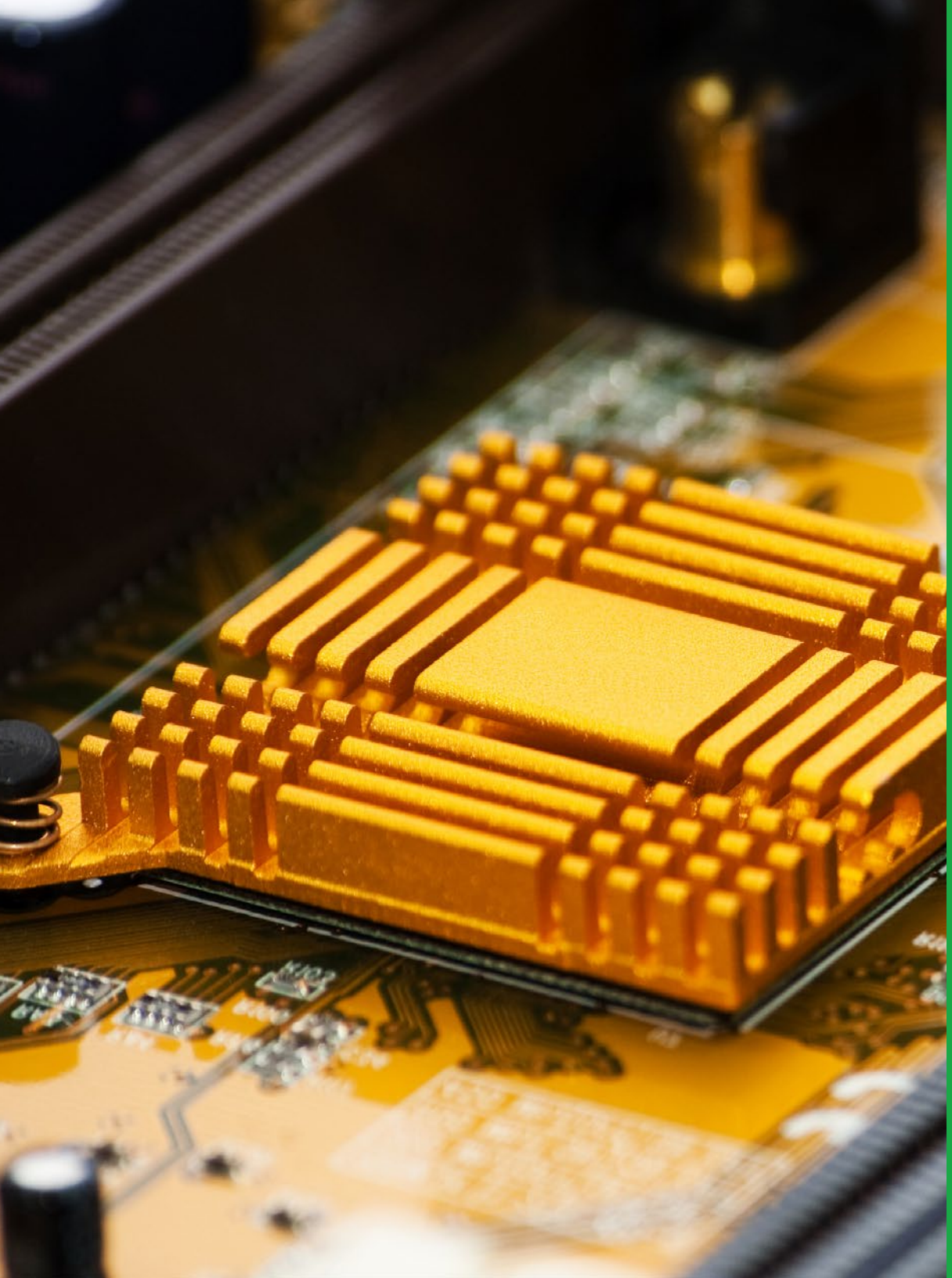


Chapter 10:

Wired for Efficiency

Chapter 10:

Wired for Efficiency

Having an efficient architecture that minimizes conversion steps and energy loss is critical to decreasing TCO.

With OneStep Edge, less truly is more. Less energy loss. Less cable. Less heat. Less environmental impact. Less manpower lost to maintenance.

Less space. More density. More power. More efficiency. More revenue.

It's your bottom line. Transformed

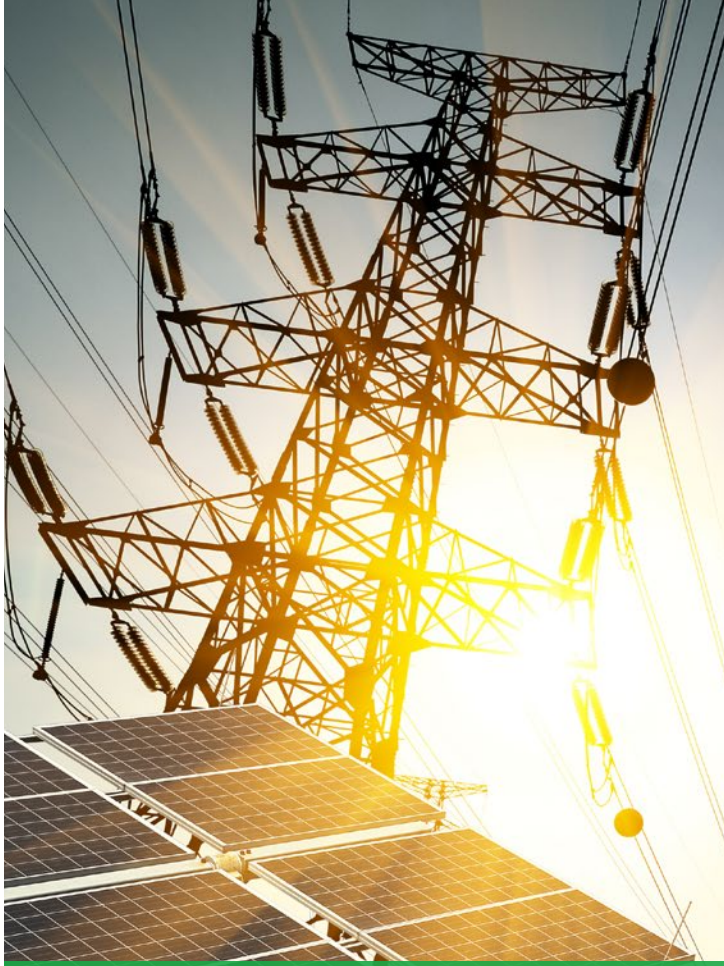
Less energy loss

Less cable

Less heat

Less waste

Less environmental impact



More density.

More power.

More efficiency.

More revenue.

It's your bottom line.
Transformed.

Coming soon:

OneStep Edge with GP400

The GP100 and OneStep Edge are revolutionary solutions for converting 480V to 48Vdc. But what about your equipment that requires 12Vdc? Today, you'd be adding an extra conversion step to take that 48Vdc down to 12Vdc.

We have a better solution in the works: The GP400—a powerful 3-phase 1RU rectifier that eliminates this last conversion step.

480VAC straight to 12VDC. Coming soon.

GE
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