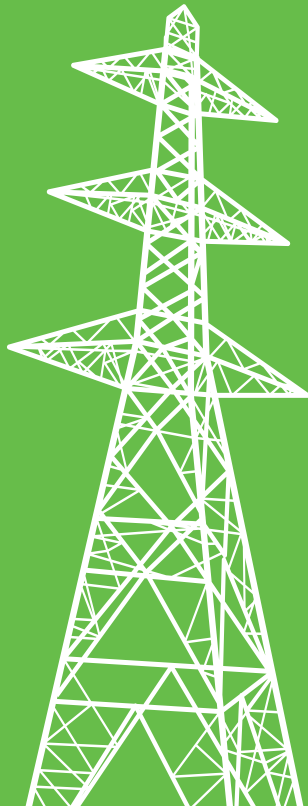


Unreliable Energy,

Sensitive Electronics
and the

Rising Costs of Field Service



THE SILENT STALKER

The power grid that every business relies upon to connect, inform, and fuel their operations consists of an aging collection of power generation, transmission facilities, and distribution facilities, some of which date as far back as the 1880's. We rely upon over 6,000 power generating units and 3,200 electric distribution utilities to bring power to our economy via 360,000 miles of transmission lines¹. Not only is this power network vast, far-flung and complex, but the majority of the grid has been in place for decades²:

When one combines this aging infrastructure with our relentless thirst for more power, as more people add more devices to their lives and careers, the margin for error within our power ecosystem has become extremely thin.

51%

of the generating capacity of the U.S. is in plants that were at least 30 years old at the end of 2010

70%

of transmission lines and power transformers are 25 years or older

60%

of circuit breakers are more than 30 years old



It comes as no surprise, then, that power outages have become commonplace. In the last two decades, power outages in the US have increased by 124%, leaving over 500,000 people affected by power outages every day³. And when it comes to power, time is money. The average cost of a one-second outage among industrial and digital-economy firms is \$1,477. In total, the US economy loses between \$104 billion and \$164 billion a year to power outages⁴.

Clearly, power outages are significant – and costly – problems. When outages hit – particularly when they hit large urban areas like the Northeast blackout of 2003 that took power from 55 million people – they are highly publicized and relentlessly analyzed. But there is another power issue lurking, quietly, without much fanfare or analysis, behind every faceplate covering every outlet in every business in

America. This “silent stalker” of equipment lifespan, employee productivity, and corporate profits is not always visible, but equipment and operations managers everywhere looking to improve productivity and profitability should get to know this silent stalker by one name: power quality.



Fluctuations in power quality are far more common than power outages, often happening multiple times a day, frequently simultaneously, and typically without attracting attention. The causes of these costly fluctuations are both numerous and commonplace in most businesses:

Simply turning on a large piece of equipment

Turning off a large piece of equipment

Rebooting a machine after a Blackout occurs

A generator or UPS can cause power disturbances at switch over

Improper wiring, either the wrong size wire for the load or excessively long runs

Faulty or corroded connections somewhere in the network

Most of the time, these power fluctuations are relatively minor, and as such they inflict correspondingly minor damage to equipment. Because these fluctuations do not cause an immediate failure, they often go unnoticed, making it very difficult to estimate the cumulative long-term costs of power quality fluctuations. However, over time, small disturbances take their toll on sensitive equipment, and analysts agree that any estimates of the cumulative costs, if ever successfully evaluated, would likely reveal staggering numbers.

*One study of only the industrial and digital segments of the US economy (approximately **17%** of all US businesses) attributes approximately **\$6.7 billion** a year in losses to power quality issues for just these two segments.⁵*

THE HIGH COSTS OF EQUIPMENT FAILURES

Every time a power issue occurs, the performance and lifespan of the equipment that connects us to the internet and powers our economy is compromised. Over time, as power fluctuations mount, so do failures. When electronic equipment does fail, the costs add up quickly as productivity declines, output is reduced, and the customer experience invariably suffers. Additionally, equipment failures that require field service calls also incur time, administrative and financial costs in order to restore the machines to optimal performance.



Field service calls, while certainly a lifeline to restored productivity, are typically no panacea. Long wait times for appointments, late technicians, and unresolved issues are the top three complaints registered by customers when placing requests for field service, as reported by the Aberdeen Group in their Field Service 2013 report⁶:

57%

COMPLAINED THAT THE TECHNICIAN DID NOT RESOLVE THE REPORTED ISSUE ON THE FIRST CALL

37%

COMPLAINED ABOUT THE LENGTH OF TIME THEY HAD TO WAIT FOR AN APPOINTMENT TIME

25%

COMPLAINED THAT THE TECHNICIAN DID NOT ARRIVE ON TIME

The depth and breadth of customer service challenges are further reflected in the alarming fact that only a paltry 58% of field service organizations surveyed by Aberdeen met their Customer Satisfaction goals for 2012⁷.

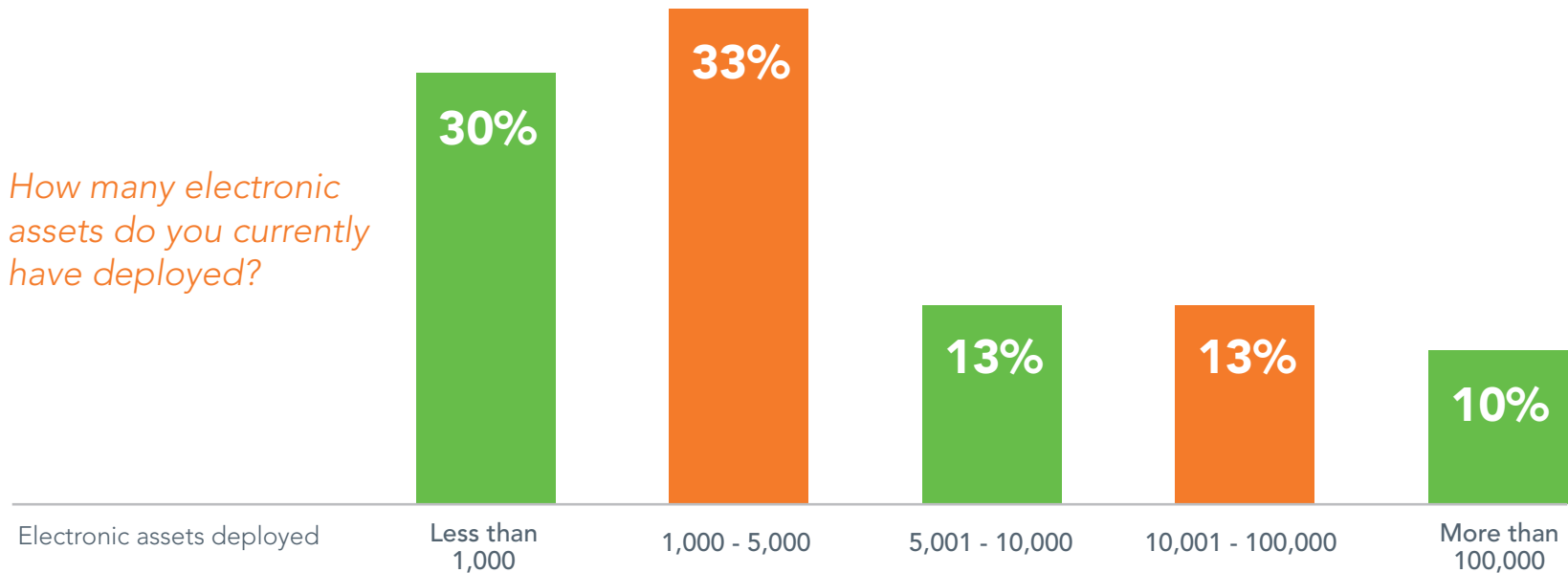
Clearly, the costs and challenges associated with equipment failures caused by power quality issues are significant. To better understand these costs and how businesses intend to control these costs going forward, Innovolt sponsored a survey of almost 100 executives from several industries that are particularly dependent upon the reliability, performance, and lifespan of sensitive electronic equipment: gaming, office equipment, medical, ATMs, fuel, vending, retail, and parking.

The study, conducted by Gatepoint Research in the fall of 2013, sheds new light on the myriad challenges that businesses face in today's highly competitive marketplace, with an emphasis on the problems caused by power quality fluctuations and the true costs related to equipment issues requiring service calls. The sometimes surprising results also reveal important insights into long-term mitigation strategies as companies evaluate their plans to manage the downtime and failures caused by power quality fluctuations.

HIGH VOLUMES OF HIGH VOLTAGE HEADACHES

In today's digital economy, every business in every industry depends upon a variety of electronic assets (desktop computers, mobile devices, slot machines, ATM, POS, fuel dispensers, medical equipment, office equipment, vending machines, kiosks, parking gates, ticketing machines, etc.) to power their performance,

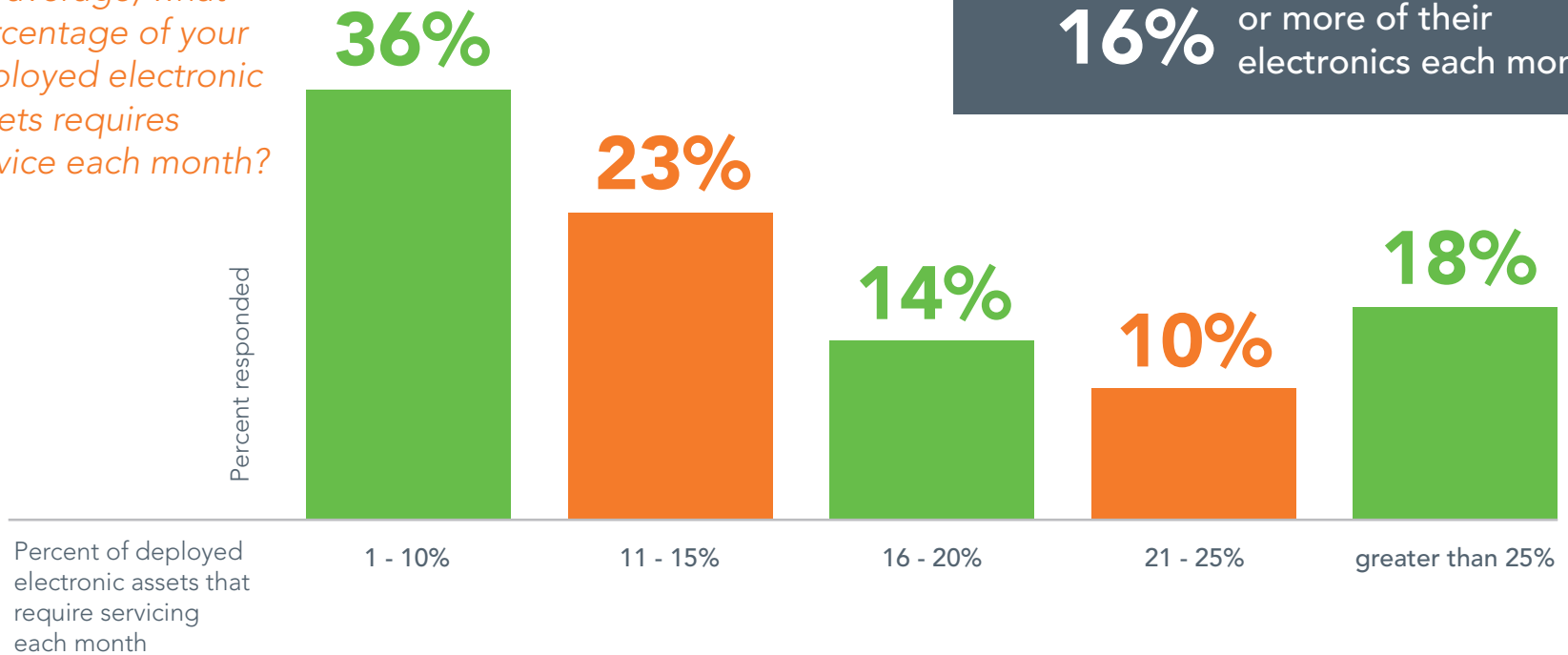
and the companies represented in our survey are no exception. The vast majority of respondents (70%) have deployed over 1,000 electronic assets, while more than one third (36%) have deployed over 5,000 electronic assets.



Unfortunately, many of these machines have a history of being high-maintenance assets, as a significant percentage of the assets require service at least once a month. **Almost a fifth of companies surveyed (18%)**

indicate that greater than 25% of their assets require service every month, and another 10% of respondents indicate that 21% - 25% of their deployed assets require service each month.

On average, what percentage of your deployed electronic assets requires service each month?



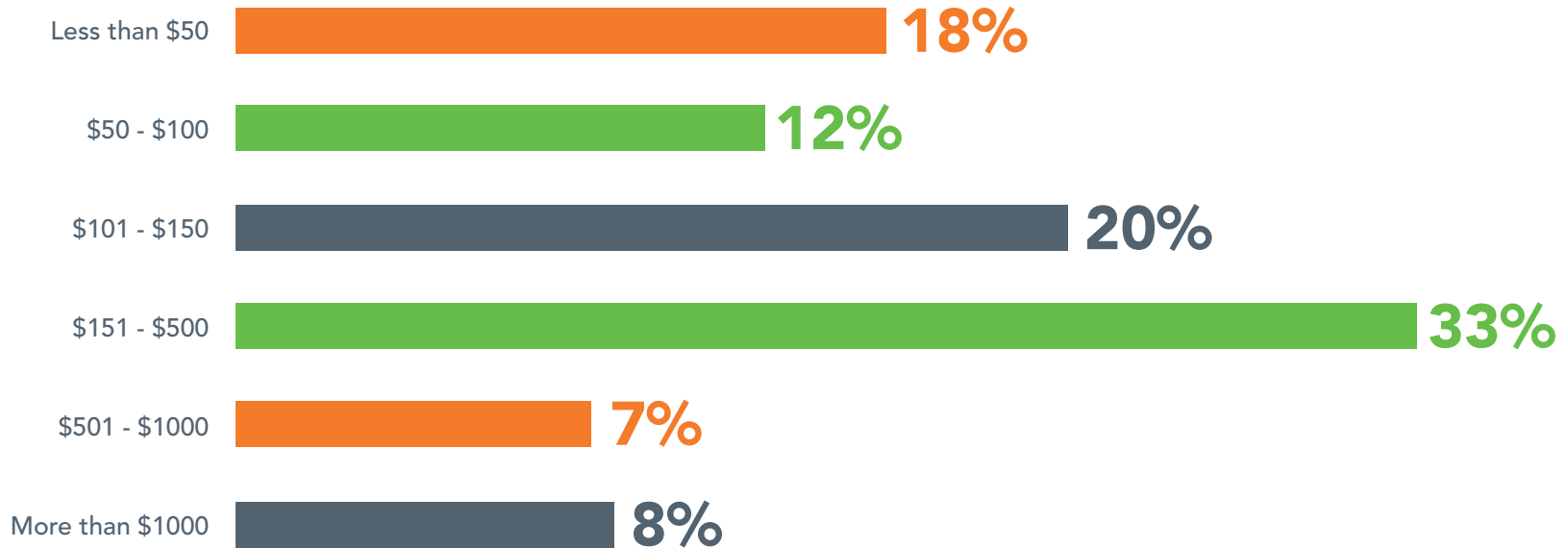
42% of companies service **16%** or more of their electronics each month

HIGH MAINTENANCE EQUALS HIGH COSTS

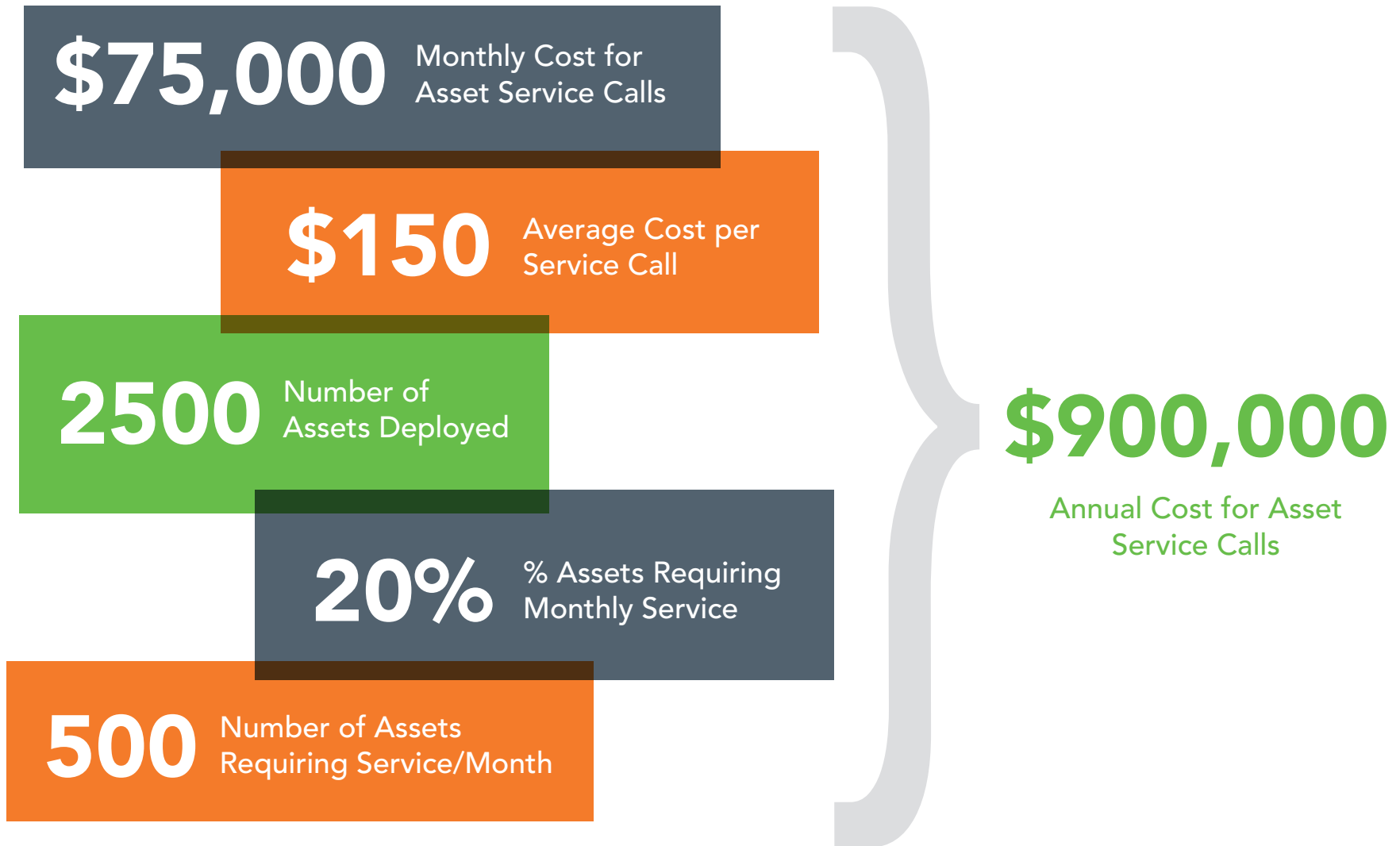
In addition to requiring constant attention, servicing these assets is an expensive proposition. And there seems to be a correlation between the number of machines deployed and the cost of service calls.

Nearly 70% of respondents indicate that every service call costs over \$100, including travel, parts, labor, and call center expenses.

When an electronic asset requires service, what is the average total cost to repair? (travel, parts, labor, call center)



A simplified example culled directly from the survey can help demonstrate the hard costs typically incurred by organizations with high numbers of deployed assets requiring frequent service:

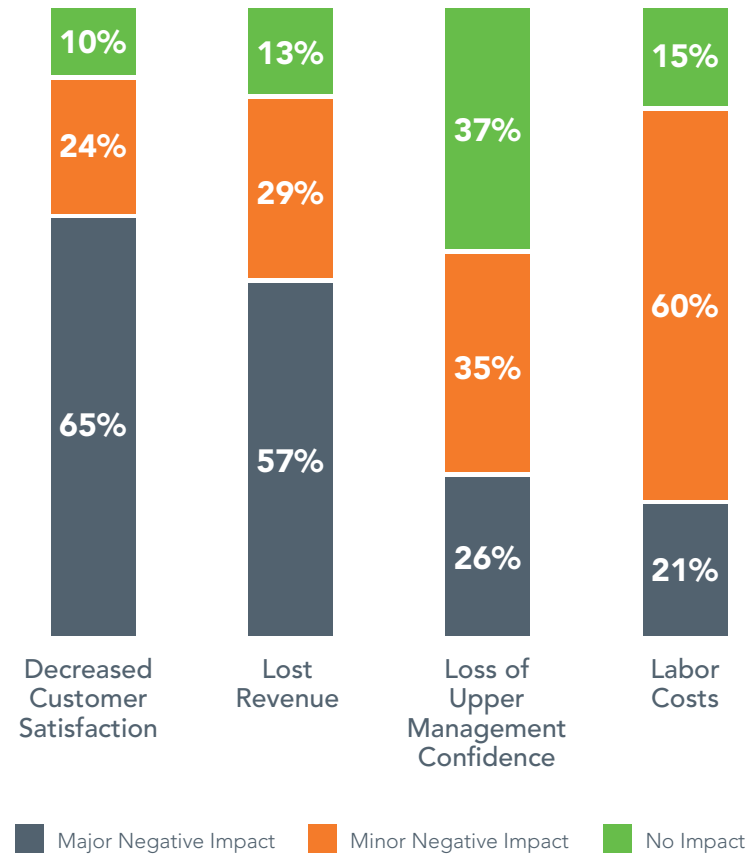


DOWNTIME IS A REAL DOWNER FOR THE BOTTOM LINE

In an attempt to ascertain the full costs associated with electronic asset downtime, the survey asked respondents to quantify the ramifications to the business when electronic assets are not operating. In what some may deem as a surprise, lost revenue was not the top answer. Instead, decreased customer satisfaction topped the list, identified by almost 9 out of 10 respondents as a critical ramification of electronic asset downtime. Loss of upper management confidence was also cited by a majority of respondents (61%).

When these “soft” costs (not to mention other soft costs like lost productivity, missed shipments, administrative effort, etc.) are added to the aforementioned hard costs associated with service calls, it is easy to see the important link between asset maintenance (and power quality management) and financial performance.

When electronic assets are not operating, what are the ramifications?



NO QUICK FIX

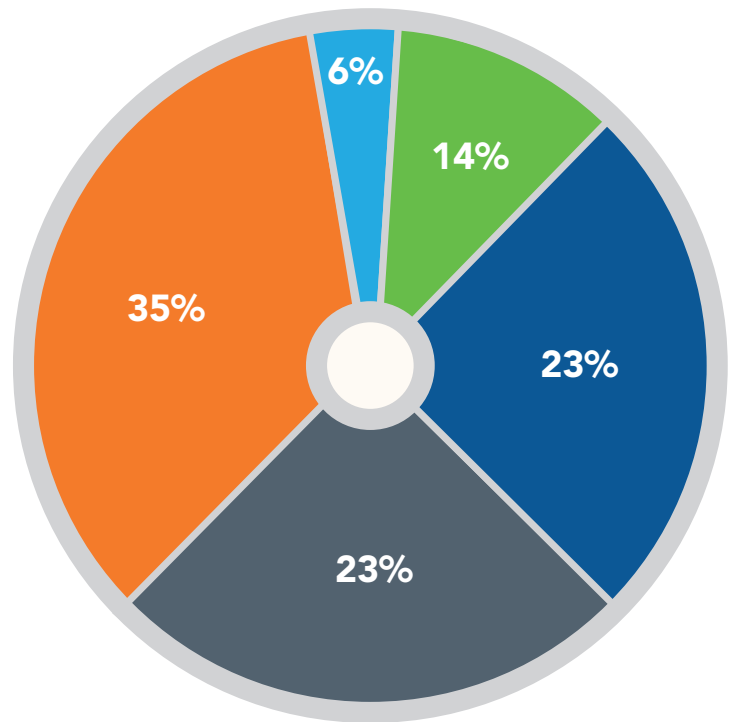
Obviously, the longer machines are down, the greater the impact to productivity, revenue, and customer satisfaction. Unfortunately, the executives surveyed report a poor track record when it comes to getting down equipment back online. While 23% of respondents indicated that it typically takes less than

an hour to bring down electronics back online (admittedly a very high bar for most operations), unfortunately almost as many respondents – fully 20% – indicated that it typically takes longer than 24 hours to bring failed equipment back online.

When an electronic asset is not operating, typically how long does it take before it is operational again?

More than 3/4 of responders take longer than 1 hour to get back online

- Less than 1 hour
- 1 - 12 Hours
- 13 - 24 hours
- 25 - 36 hours
- More than 36 hours



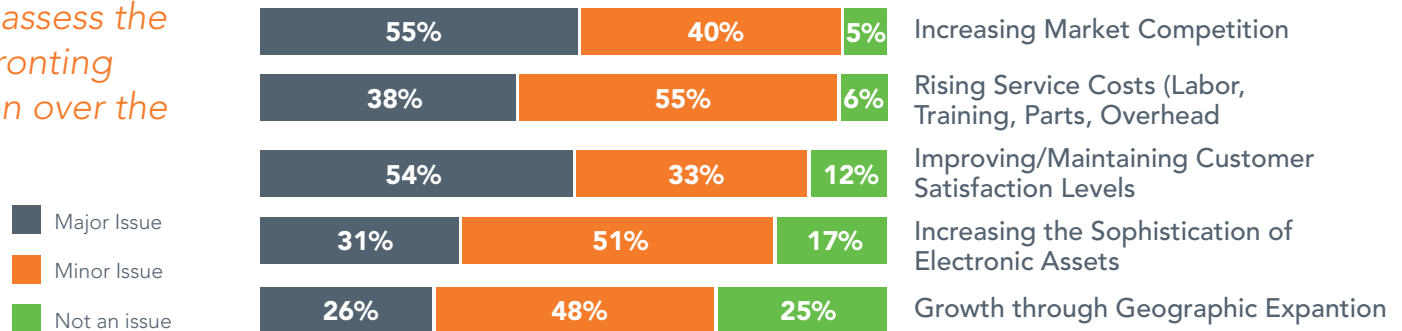
SUSTAINED COMPETITIVE ADVANTAGE POWERED BY ASSET PERFORMANCE

When executives look forward over the next three years, they see a wide variety of challenges facing their organizations as they attempt to leverage electronic assets to maximize revenue and valuation in an era of almost constant economic uncertainty and relentless competitive pressure.

It likely comes as no surprise that competition tops the list of their concerns, with 95% of respondents identifying increasing market competition as an issue their business will be forced to confront during the

next 3 years. Lining up closely behind competitive pressures, however, are the **rising costs of servicing electronic equipment (93%)**. When these concerns are combined with the high number of assets deployed, their concerns about their ability to improve customer service levels (87%) and the elevating sophistication of electronic assets (82%), it becomes clear that these executives believe their future success will largely be dependent upon their ability to manage the performance, maintenance, and service of the electronic assets they deploy.

How would you assess the challenges confronting your organization over the next 3 years?



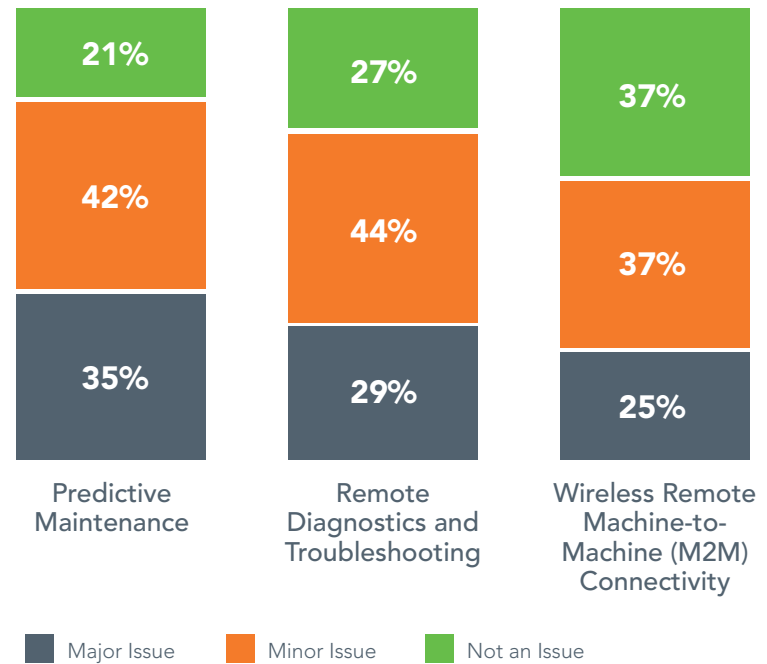
LOOKING AHEAD: PREDICTIVE MAINTENANCE LOOMS LARGE

When it comes to evaluating technology trends in any industry, it can be extremely difficult to discern hype from hyperbole, and electronic asset management technology is no exception. From virtualization to 3D printing to wireless connectivity, the list of trends that executives must evaluate in an attempt to identify technology that could actually have a positive impact on the future of electronic asset management is indeed long. However, when asked to identify the trends that they believe will impact their ability to grow their businesses in the next three years, the executives in our survey were very definitive: predictive maintenance (77%) and remote diagnostics (73%) have garnered their full attention.

When viewed in light of executives concerns over the rising costs associated with the increasing sophistication of electronic assets, it becomes clear why the ability to anticipate maintenance issues before they occur and to

remotely diagnose problems when they do occur are very attractive to executives attempting to improve customer satisfaction and fend off competitive pressures.

How would you assess the following trends' impact on your business over the next 3 years?

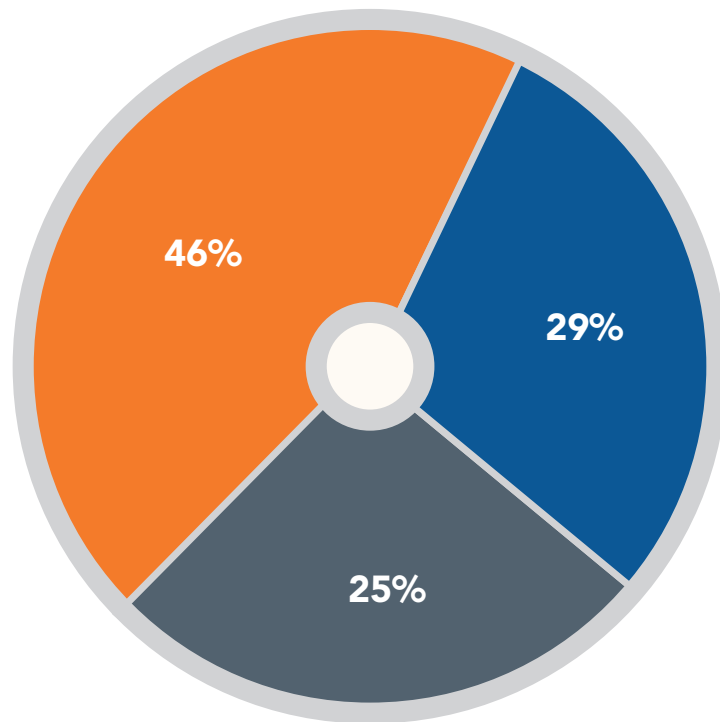


A SHOCKING LACK OF VISIBILITY, PROTECTION

Given the well-documented relationship between power quality fluctuations and electronic asset performance, the high number of electronic assets deployed by survey respondents, the high number of extended downtime, and the high costs associated with failures, it was shocking to learn that only 21% of the executives surveyed reported high levels of visibility into power disturbances that impact those electronic assets. Perhaps more shocking is the fact that more executives (29%) reported having no

visibility into power disturbance issues than those reporting high levels of visibility, and a combined 78% of executives surveyed reported having either limited visibility to no visibility whatsoever.

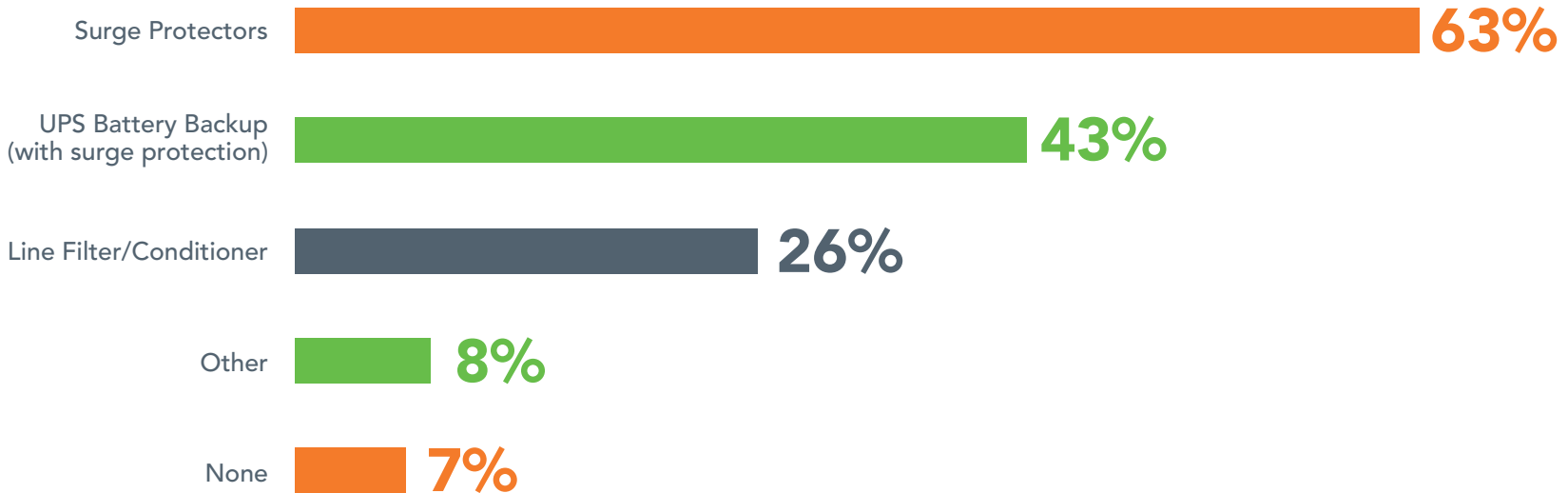
What is your level of visibility into power disturbances that are impacting your electronic assets?



Given the overall lack of visibility into power disturbances, it comes as no surprise, then, that very few respondents have taken significant steps to protect their electronic assets from the very problems

causing so much downtime. Most rely heavily on surge protectors and UPS systems, but relatively few (only 26%) use line filters and conditioners to protect their electronic assets.

What power protection solution(s) do you deploy with electronic assets?

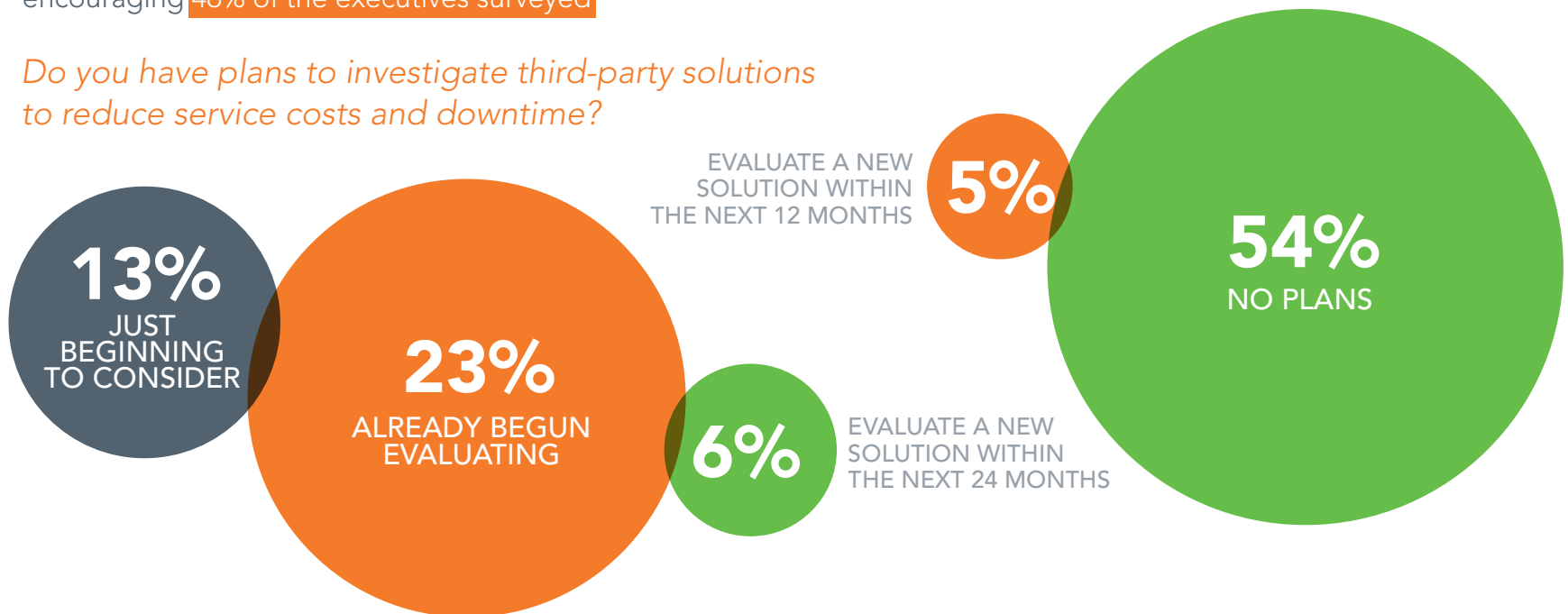


THE GOOD NEWS? HELP IS ON THE WAY

Fortunately, most respondents recognize (at least) that the status quo is not good enough to tackle either the challenges they face today or those they expect to face in the coming years. Modern electronics management solutions are specifically designed to virtually eliminate power fluctuations and to protect assets when power outages occur, and an encouraging **46% of the executives surveyed**

indicated that they have imminent plans to begin evaluating these solutions to help reduce downtime and service costs. However, the results also shed light on the high number of businesses that are most likely unaware of the problems caused by power quality fluctuations, as fully 54% have no plans in place to investigate power quality solutions.

Do you have plans to investigate third-party solutions to reduce service costs and downtime?



SUMMARY AND CONCLUSIONS

Power fluctuations cost a fortune. Every overage, every brownout, every sag and every surge silently shorten the lifespan of the electronic equipment that serves as the lifeblood of business. Productivity is compromised, output is diminished, and customer service levels fluctuate in lock step with power quality.

The cumulative effect of power fluctuations leads to frequent and extended equipment downtime that can only be remedied by costly and inconsistent service calls. It is clear that while most businesses are keenly aware of the frequency, duration, and costs associated

with equipment failures, the vast majority of respondents are practically *blind to the root cause of the problems*.

The time has come for business to pay more attention to the silent stalker lurking inside the walls of their business and invest in intelligent electronics management solutions that can minimize the damage caused by power fluctuations and proactively mitigate maintenance issues in order to ensure maximum asset lifespan, optimal productivity, consistent customer service, and higher margins.



RESEARCH APPROACH

In August 2013, Innovolt, in conjunction with Gatepoint Research invited selected executives to participate in a survey themed, "Controlling Service Costs." Candidates were invited via e-mail, and 92 executives representing various industries participated.

The companies represented by survey participants come from the following industries:

- Gaming (49%)
- Medical (14%)
- Office Equipment (12%)
- POS/ATM (15%)
- Fuel/Gas (5%)
- Vending/Retail/Parking (5%)

Survey participants were senior operations, field services, and technical decision makers:

- 19% CxO or VP
- 29% Directors
- 52% Technical Managers

- 1 – U.S. Department of Energy, Large Power Transformers and the U.S. Electric Grid, June 2012, p. 5
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- 2 – The Lexington Institute, "Ensuring the Resilience of the US Electrical Grid," January 2013
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<http://www.mphonline.org/public-health-nightmares/>
- 4 – The Data Center Journal, "A Word to the Wise: Know Your power," May, 2012
<http://www.datacenterjournal.com/it/a-word-to-the-wise-know-your-power/>
- 5 – Galvin Electricity Initiative, "Calculate Your Costs," 2012
<http://galvinpower.org/your-business/calculate-your-costs>
- 6 – Aberdeen Group, "Field Service 2013," February 2013
<http://v1.aberdeen.com/launch/report/benchmark/8325-RA-field-service-workforce.asp?lan=US>
- 7 – Ibid.

ABOUT INNOVOLT: THE NATION'S LEADER IN ELECTRONIC ASSET PROTECTION FOR BUSINESS

Innovolt's Intelligent Asset Management (IAM) platform combines patented protection technology with comprehensive monitoring and analytics software to help companies safeguard and optimize the performance, productivity, and usable life of the electronics that power today's digital world. As the first company to provide complete power protection and asset management software, we solve a host of unique problems that most businesses and consumers are not aware of but are paying for through shortened electronics lifespan and decreased product reliability.

Our proven solutions help customers of every size guard expensive and sensitive technology, while giving businesses the tools they need to predict, measure, and maximize the performance of assets across the distributed enterprise. From our microprocessor technology to our cloud-based management software, we offer the complete solution for sophisticated electronics management. Innovolt's IAM solution ensures the performance of electronics through the combination of a cloud-based management platform with our Remote Optimization & Control technology (ROC™).



