

Seven Things Critical Facilities Managers Need to Know About Wirefree Monitoring

A white paper by



INTRODUCTION

Facilities owners and managers have many essential assets they need to protect from a host of environmental threats such as fluid leaks, temperature spikes, humidity, poor airflow and even air pressure issues. Many of these assets are housed in critical facilities such as data centers and include not only the sensitive physical equipment but also the information stored in that equipment. Other facilities such as museums, laboratories, libraries, healthcare facilities, and warehouses also house assets that are highly sensitive and simultaneously the lifeblood of the organization.

When owners and managers are able to create a secure and flexible network of sensors to monitor environmental conditions in these spaces, they are able to protect important assets, reduce power consumption and costs, get actionable insights into the operations of the space, and maintain business continuity. Existing sensors and systems may not provide the level of security, flexibility, and scalability necessary for implementation within a critical facility.

This white paper reviews the key challenges for owners and managers and explains how to identify the best wirefree system to work for your facilities.

Market drivers

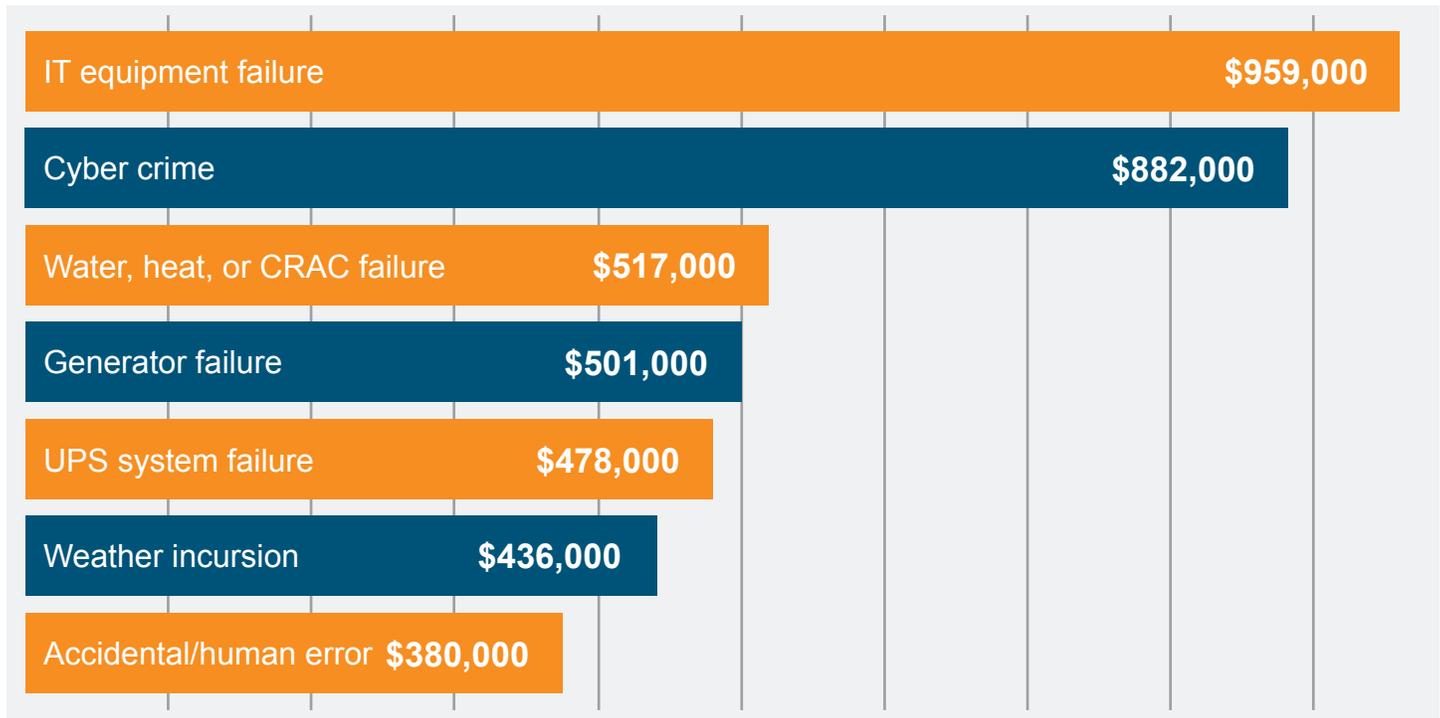
Business continuity issues, power consumption, and overcooling in data centers are a few of the market conditions encouraging smart building owners and managers to consider improving environmental monitoring for their critical facilities.

Business continuity

Even small issues that affect a critical facility can result in significant problems for businesses, including system downtime, inability to access vital records, damaged merchandise or equipment, or a full-scale shutdown of operations. Downtime in any type of critical facility typically results in loss of business and revenue and could impact the long term health of the organization due to customer defection and lost loyalty. However, nowhere is downtime felt more drastically than in data centers.

In 2013, the average cost of a data center outage was \$7,900 per minute, up 41% from 2010. The average incident lasted for 86 minutes and cost the company \$680,000.¹ These costs include detection, equipment repair and replacement, lost productivity, lost revenue, and costs to hire a third-party to help resolve the issue. This is bad enough for any business. But for data centers and co-location facilities that directly serve clients, downtime can also mean a damaged reputation and a loss of clients on top of lost revenue and all the other associated costs.

Costs* of Data Center Downtime²

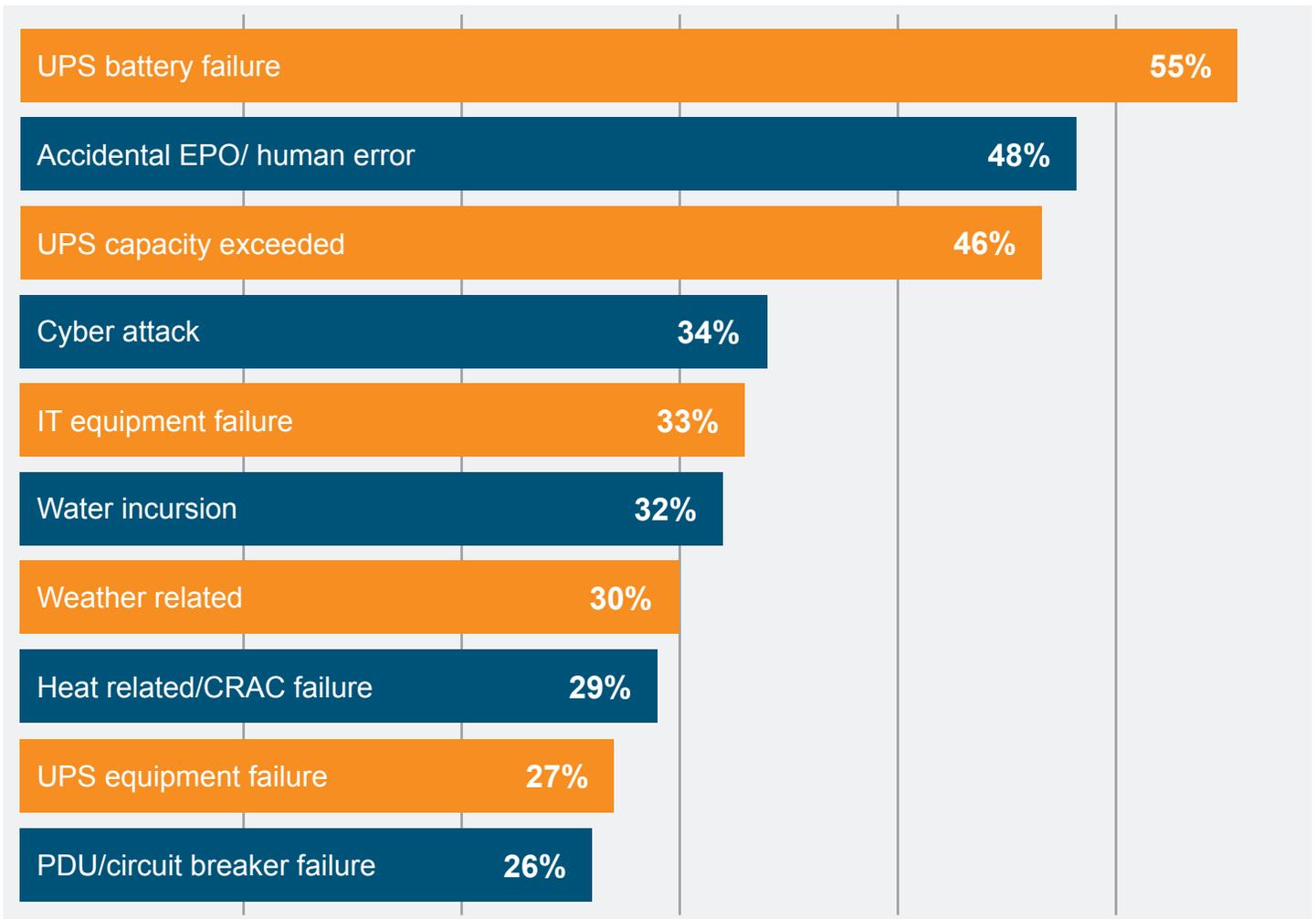


*Total expense of unplanned outages

¹2013 Cost of Data Center Outages, Ponemon Institute, December 2013

²The Lowdown on Data Center Downtime: Frequency, Root Causes and Costs, Emerson Network Power, http://www.emersonnetworkpower.com/en-US/Solutions/ByApplication/DataCenterNetworking/Data-Center-Insights/Pages/Causes_of_Downtime_Study.aspx

Common Causes of Data Center Downtime³



Power consumption

All critical facilities need electrical power to operate. Depending on the type of business and the type of facility, these requirements can be quite a significant part of the operating budget. So, effective use of environmental monitoring provides owners and managers with the opportunity to consume power in the most efficient manner by reducing power consumption, as well as to demonstrate environmental responsibility.

³ibid.

Data centers, in particular, account for significant power consumption. Information technology such as data centers, accounts for 10% of the total power consumption around the world⁴, and approximately 2% of power consumption in the United States.⁵

Research from the United States Department of Energy has found that if all data centers in the country operated at 20% higher efficiency levels, it would save more than 20 billion kilowatt hours of power by 2020 and save businesses roughly \$2 billion.⁶

Indeed, data center owners and managers understand the importance of reigning in costs. According the 2014 Data Center Industry Survey from the Uptime Institute, more than half the companies surveyed (54%) say that management sets specific targets for reducing data center energy costs.

Overcooling in data centers

Cooling is an issue that presents a particular problem for data centers. While it is critical to keep servers, routers, and other sensitive IT equipment cooled in order to operate correctly and efficiently, data centers are routinely overcooled, sometimes as much as twice the amount needed. This threatens the efficiency and functionality of this very sensitive equipment.

It also leads to increased power consumption. The Green Data Centers & Critical Facilities report from Agrion notes that businesses in the United States spend \$2.7 billion annually to cool their data centers.

The report also notes that "...cooling is the most significant single contributor to the cost of running a data center beside the actual IT load itself."

⁴"IT now 10 percent of world's electricity consumption," The Register, 16 August 2013, http://www.theregister.co.uk/2013/08/16/it_electricity_use_worse_than_you_thought/

⁵Green Data Centers & Critical Facilities: Aligning Costs, Performance, & Sustainability, Agrion, December 2013 <http://www.agrion.org/upload/fichier/Data%20Center%20Sustainability%202014--.pdf> and Data Center Accelerator Fact Sheet, U.S. Department of Energy Better Buildings Initiative, www.energy.gov/betterbuildings

⁶Data Center Accelerator Fact Sheet, U.S. Department of Energy Better Buildings Initiative, www.energy.gov/betterbuildings

WHAT HAPPENS WHEN YOU ARE NOT PROPERLY MONITORING YOUR CRITICAL FACILITY

There are three primary challenges for owners or managers within their critical facilities: the need to protect sensitive equipment and merchandise, lack of actionable data for facilities management systems, and dissatisfaction with existing monitoring systems.

Need to protect sensitive equipment and merchandise

No matter how well designed a critical facility is, there is a need for ongoing monitoring of the environment to protect the equipment or merchandise and ensure uninterrupted operations. Without sensors in the right places within a facility, problems may go unnoticed until it is too late—causing operational downtime, threatening safety and security, and causing losses of customers and revenue.

Lack of actionable sensor data for facilities management systems

Over the last 5 years, monitoring for critical facilities has grown from being something to just cover the bases to ensuring that owners and managers have good visibility into the safety and stability of these vital spaces. Along with that visibility, it is becoming increasingly more necessary to be able to extract actionable data to help make decisions—about infrastructure management, power consumption and efficiency, improvements, and maintenance.

Facilities owners and managers are using sophisticated tools to operate and manage their facilities, such as datacenter infrastructure management (DCIM) software, building management systems (BMS) software, building information modeling (BIM), facility management systems (FMS), and integrated workplace management systems (IWMS).

Each of these systems requires relevant data to monitor and support continuing operations. Without sensors to provide proper environmental monitoring data to integrate into these systems, facilities managers cannot properly monitor resource usage, keep track of environmental conditions, maintain equipment,

or identify issues before they become a problem.

Disadvantages with existing monitoring systems

Monitoring a critical facility is a complex process. There are many elements that must work together efficiently and effectively in order to truly protect a critical facility from environmental threats. Facilities managers can choose to work with either wired or wireless systems, depending on their needs.

However, there are disadvantages with both existing technologies. Wired sensors and monitoring systems require invasive wires and cables, which make these sensors harder to place. In addition, cables and wires are themselves physical assets to monitor, maintain, and protect.

Because they are hard wired, these systems have solid security and reliability. But the very characteristics that make them so also make them harder to deploy or move around. And they are more expensive to install and maintain. The U.S. General Services Administration notes that wired systems cost \$1,000-1,500 per sensor node, while wireless systems cost \$100-150 per sensor node to install.⁷

Wireless sensors and monitoring systems are much more flexible and scalable, but many of the systems have major disadvantages that mean facilities owners and managers are not keen to use them. Two of the biggest disadvantages with current systems: signal conflict and battery life.

In current wireless systems, when two sensors try to communicate at the same time using the same signal, it can cause the entire network to fail. In a critical facility, if this happens during off hours, or notification is not immediately sent, this can be a catastrophic failure.

Battery life has also been a problem with existing wireless sensor networks. Typically, batteries in the sensors are good for 2-3 years and because they are not synchronized nor do they use power evenly, they fail at different times.

⁷Wireless Sensor Network for Improving the Energy Efficiency of Data Centers, Lawrence Berkeley National Laboratory, March 2012, <http://www.gsa.gov/graphics/pbs/wireless-sensor-network-final-full-report.pdf>

This means that each time a battery dies, it is necessary to find it and replace just that sensor, taking time and costing money each instance. In addition, if the battery dies during off hours and there is an environmental threat that is not captured because of it, this can also be catastrophic for the business.

Also, current wireless sensor solutions have significant limits on the number of sensors that can connect to a gateway, making them difficult to scale for larger facilities. They also can be challenging to configure and do not have a single interface through which customers can see the entire system.

Security is also a concern with current wireless sensors. If sensors are not properly encrypted, others could possibly intercept the data or send malicious information to the sensors to affect their accuracy or performance. It is even possible that an outside party could spoof the data and send false alarms or notifications.

THE SOLUTION: LATTICE WIREFREE MONITORING

When a wired solution is not viable, smart facilities owners and managers are choosing Lattice wirefree monitoring systems for their critical facilities. Lattice wirefree is the next generation in wireless technology, designed to address the drawbacks of current high frequency radio wave transmission technology. This new approach ensures the most secure and flexible system to protect sensitive equipment and merchandise, to deliver relevant and actionable data about the facility's environment, and to address inefficiencies and failures with current monitoring systems.

The benefits of Lattice wirefree monitoring

There are significant benefits when building owners and managers choose to monitor their critical facilities with a Lattice wirefree system including improved monitoring, increased protection and security, and actionable data.

Improved monitoring

Critical facilities, especially data centers, are increasingly complex to build and operate, and are becoming ever more critical to a business's bottom line. Therefore, proper monitoring of environmental conditions such as temperature, humidity, and airflow, is even more urgent to ensure successful operations and performance and to minimize downtime.

A secure, robust, and flexible Lattice wirefree system provides owners and managers with improved monitoring capabilities and improved visibility into the environment of their critical facilities.

Increased protection and security

Lattice wirefree monitoring helps owners and managers protect more of their critical facilities by being less expensive to implement and easier to install and maintain. This ensures that the critical facility is able to operate at the highest level without concerns about unplanned downtime.

Actionable data

Facilities owners and managers need data to understand and optimize operations for their facilities. Lattice wirefree monitoring, with its user-friendly interface and the ability to integrate with existing facilities management software provides a big picture view. Baseline and real-time data about operational areas enables easier management, operations, and optimization of functions like energy use, air management, heating and cooling, and humidity control.

THE IDEAL WIREFREE MONITORING SYSTEM: SEVEN THINGS TO LOOK FOR

When looking for a wirefree sensor system to monitor your critical facilities, be sure to consider the following seven factors.

1. Technology

Look for a monitoring system designed with rigorous technology, including:

- Long battery life, to reduce equipment and labor replacement costs.
- Battery balancing feature, to cause equal battery use among sensors, so they all fail together and can be replaced at the same time.
- Signal scheduling capability that prevents signal conflict.
- Support of multiple protocols to assure flexibility, scalability, and the ability to integrate with BMS, DCIM, FMS, and IWMS systems.

2. Security

Look for encrypted environmental wirefree sensors that protect your data and systems from eavesdropping, spoofing, and denial of service attacks.

3. Configuration

The best wirefree monitoring solutions are easy to configure and maintain. Look for a system that is self-discoverable and self-configuring to save time and resources during installation, and one that is self-healing, to assure continuity of protection even if one or more sensors drop off.

4. Scale

Look for a wirefree monitoring system that works with hundreds of nestable sensors and multiple gateways to be flexible and address your requirements as your facility grows and as your monitoring needs evolve.

5. Interface

Best-in-class wirefree systems offer a customizable and easy to interpret user interface. Having access to the data you need about facility performance is

critical, but it is useless if you cannot easily and quickly view, interpret, and act on the information provided.

6. Global

Look for a manufacturer that provides a wirefree monitoring system designed with transmitting frequencies that work in countries where you currently have facilities or might in the future.

7. Cost effective

Look for a wirefree monitoring system with no annual licensing fees. Purchasing the sensors and gateway up front and having full access to your own interface and automated firmware updates without recurring fees saves you a great deal of money over time and dramatically reduces your total cost of ownership.

THE RLE LATTICE WIREFREE SENSOR NETWORK ADVANTAGE

RLE Technologies developed patent-pending technology that addresses the current drawbacks in wireless solutions, by allowing wirefree environmental sensors to securely communicate with the gateway without any signal conflict and with substantially extended battery life. This technology forms the backbone of the RLE Lattice Wirefree Sensor Network.

The system was designed to meet the needs of highly sensitive critical facilities and to provide best-in-class environmental monitoring for owners and managers of these facilities.

1. Technology

- Multiple power options
 - 3.6v lithium AA batteries, with life of more than 10 years
 - Network battery energy balancing
- Statistically routed to ensure no signal conflict
 - Scheduled transmit and receive times

- Flexible communication protocols include
 - TCP/IP, HTML, TFTP, SNMP v1: V2C MIB-2 compliant; NMS Manageable with Get; IPv4; IPv6
 - Modbus (EIA-485)—Modbus Slave; RTU mode; Supports function codes 03
 - Modbus TCP/IP UDP/IP—Modbus Slave; TCP/IP transmission protocol
 - BACnet/IP—ASHRAE STD 135-2004 Annex J
 - BACnet/MSTP—EIA-485
- Unique, patent pending secure wirefree network, not P2P, Zigbee, or Mesh
- Certifications:
 - CE – European Union
 - CSA – Canada
 - ETL – North and South America
 - FCC – United States
 - IC – Canada

2. Security

- Fully encrypted sensors protect from eavesdropping, spoofing, and denial of service attacks.

3. Configuration

- Self-discovering
 - Built-in sensor locator barcodes
- Self-healing network
 - Greater stability with more sensors in the system
 - System reroutes communication path if sensor drops off
- Easy, user controllable firmware updates

4. Scalable

- Up to 400 sensors per gateway
- Nestable sensors

5. Interface

- Monitor all sensor points in a single, web friendly interface
- Multiple alarm options: Visual, email, text

6. Global

Transmits and receives at three frequencies:

- 868 MHz
- 900 MHz
- 2.4 GHz

7. Cost effective

- You store and retain full control of the data
- No licensing fees required

Current system

- Lattice WireFree Network Manager
- Lattice WireFree Temperature Sensor
- Lattice WireFree Temperature and Humidity Sensor
- Lattice WireFree Temperature Sensor plus Digital Input

Available soon

Phase 2

- WireFree air flow, pressure, leak detection sensors
- WireFree point repeater
- Extended battery pack

Phase 3

- Energy harvesting capabilities
- Additional wirefree sensors

Sophisticated owners and managers of critical facilities understand the importance of secure, reliable, and scalable environmental monitoring. To take the first steps towards ensuring the best protection for your critical facilities, get in touch with RLE Technologies today. Call 800.518.1519, email sales@RLETech.com, or visit www.RLETech.com.