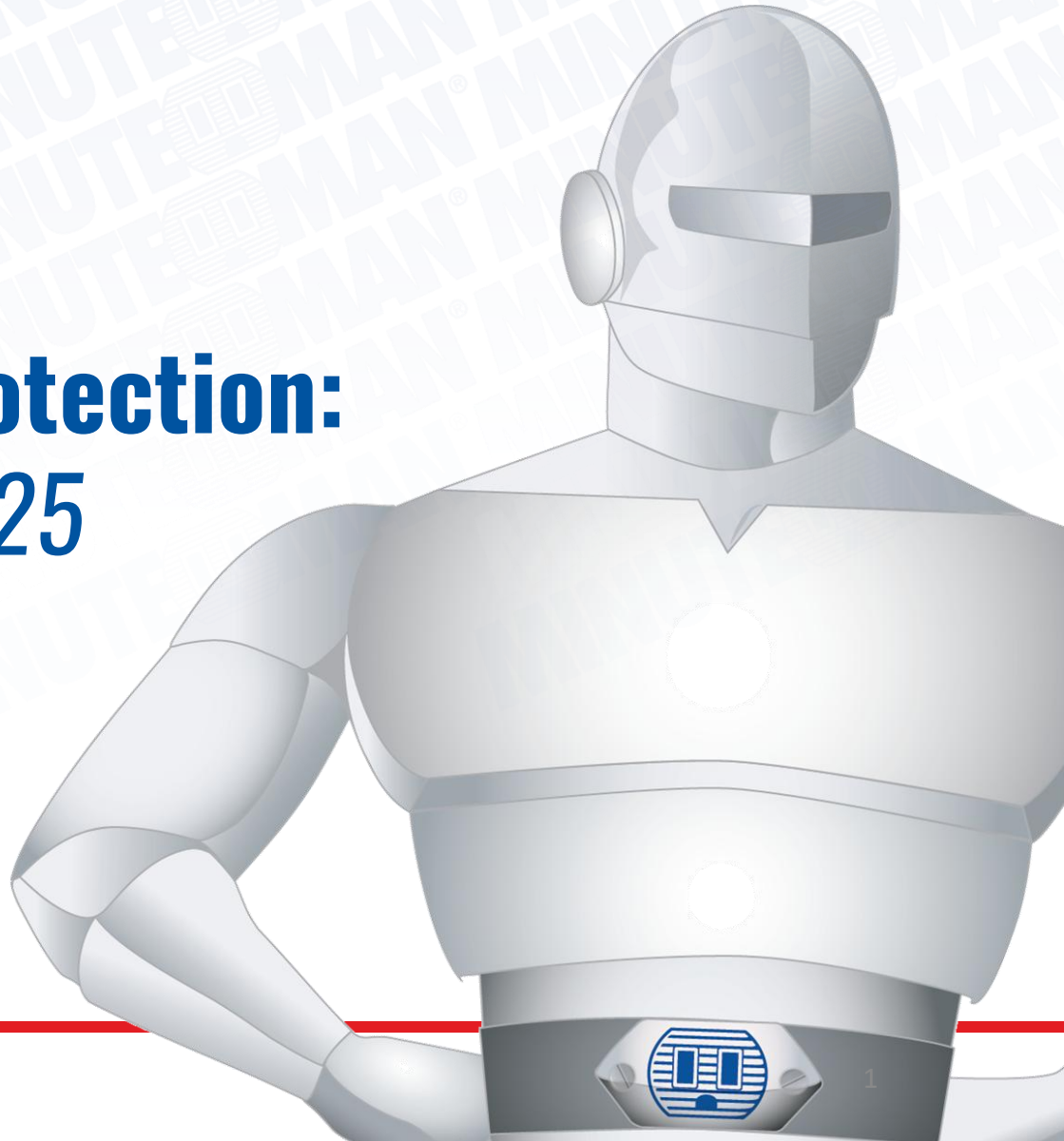
MINUTEMAN®
POWER TECHNOLOGIES

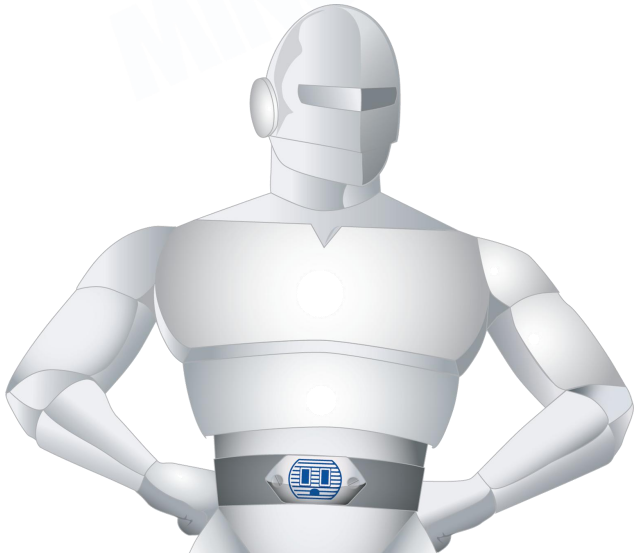
Single Phase Power Grid Protection:
Security & Surveillance Design 2025

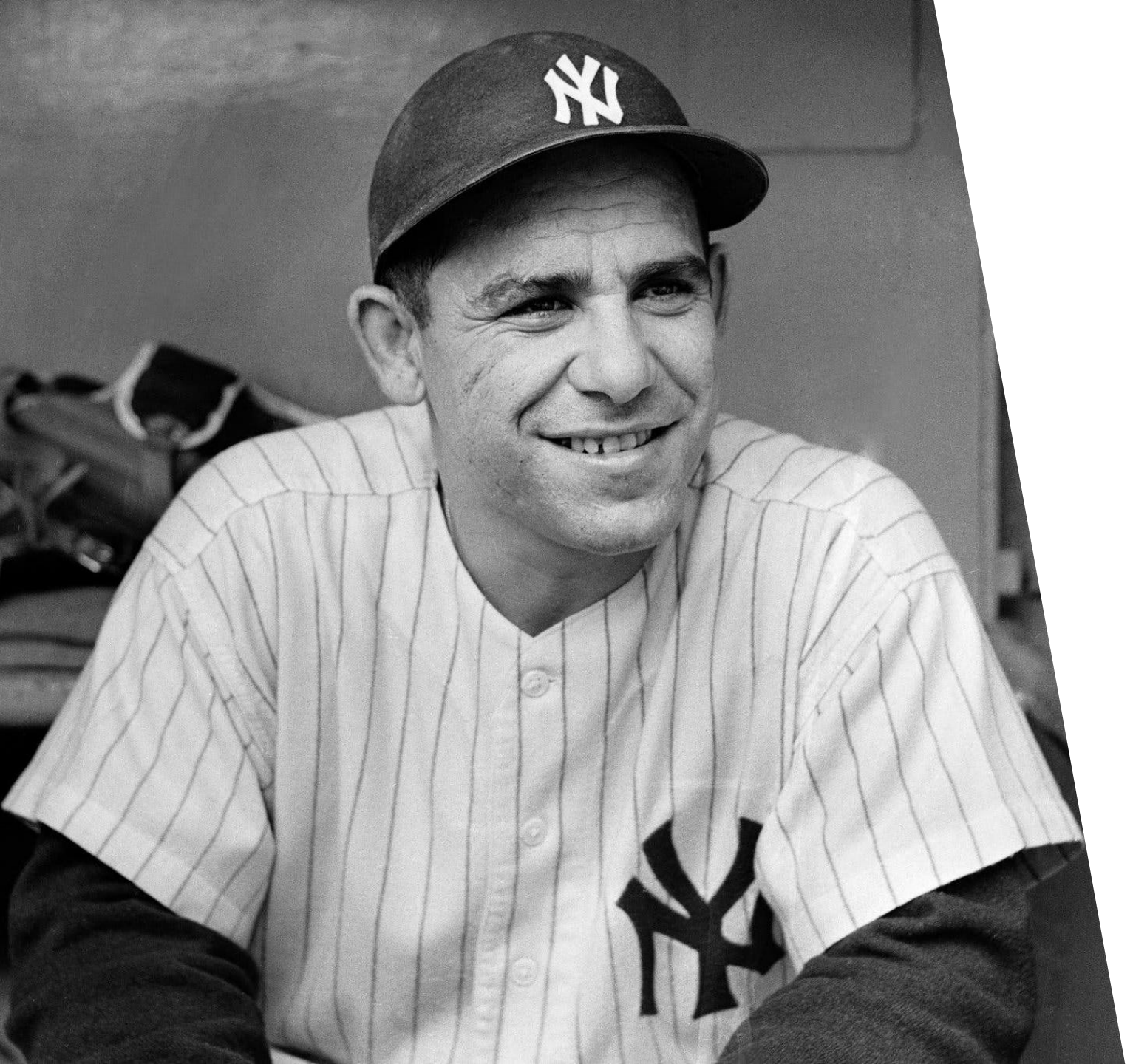


TN Approved #2502.01 & MS Approved CEU
2 Credit Hours

TOPICS

1. What causes power problems?
2. Why Your Security & Surveillance Customers Need Power Protection
3. Where to sell power protection
4. Integrator Benefits of Selling Power Protection
5. What is the right Power Protection Solution topology?
6. Design Considerations + Expanding the Sale
7. Selling Solutions & Overcoming Objections
8. Partnering with Minuteman Power Tech!





“The Future ain’t what it used to be!”

“In Theory, there is no difference between Theory and Practice. In Practice there is.”

Yogi Berra

WHAT CAUSES POWER PROBLEMS?

Power Problem Causes

1. Weather Events
2. Natural Elements
3. Human Interference

LIGHTNING & FLOODING

SOLAR FLARES & EMPs

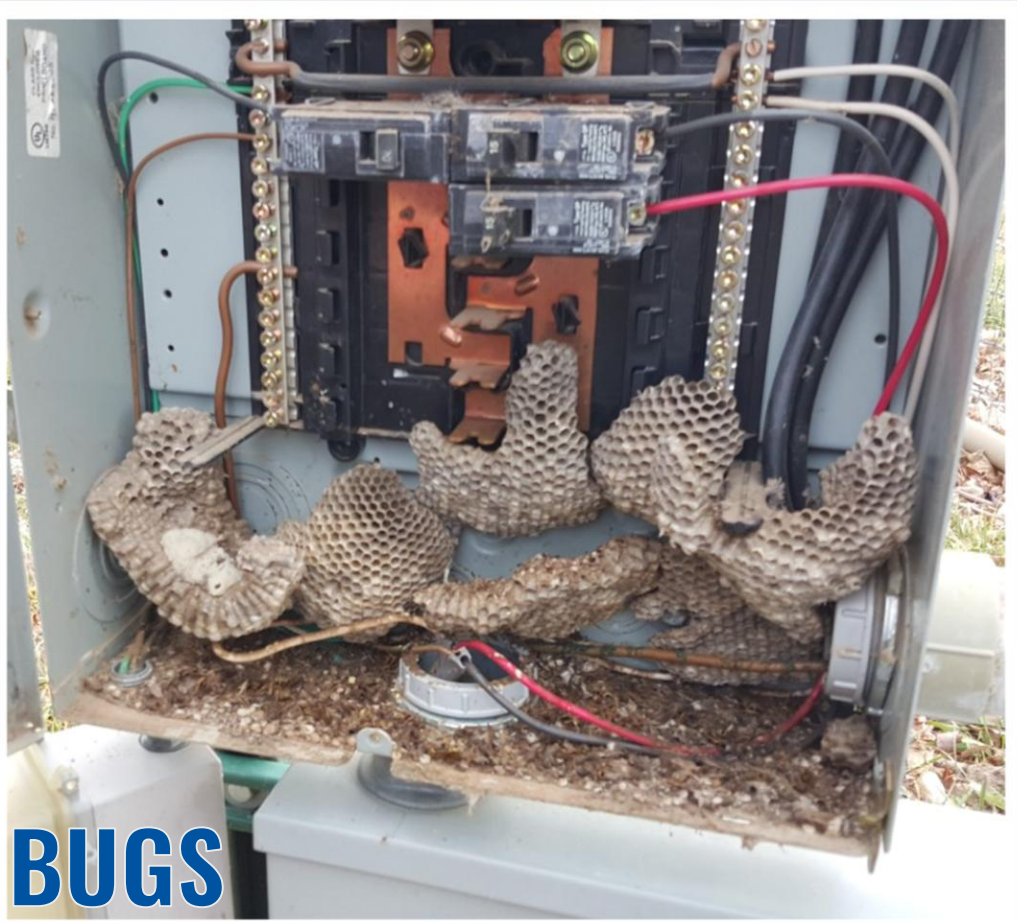
ICE / HAIL & TORNADOS

HURRICANES & EARTHQUAKES

Power Problem Causes

1. Weather Events
2. Natural Elements
3. Human Interference


ANIMALS


BUGS


GREEN
ENERGY


FIRE

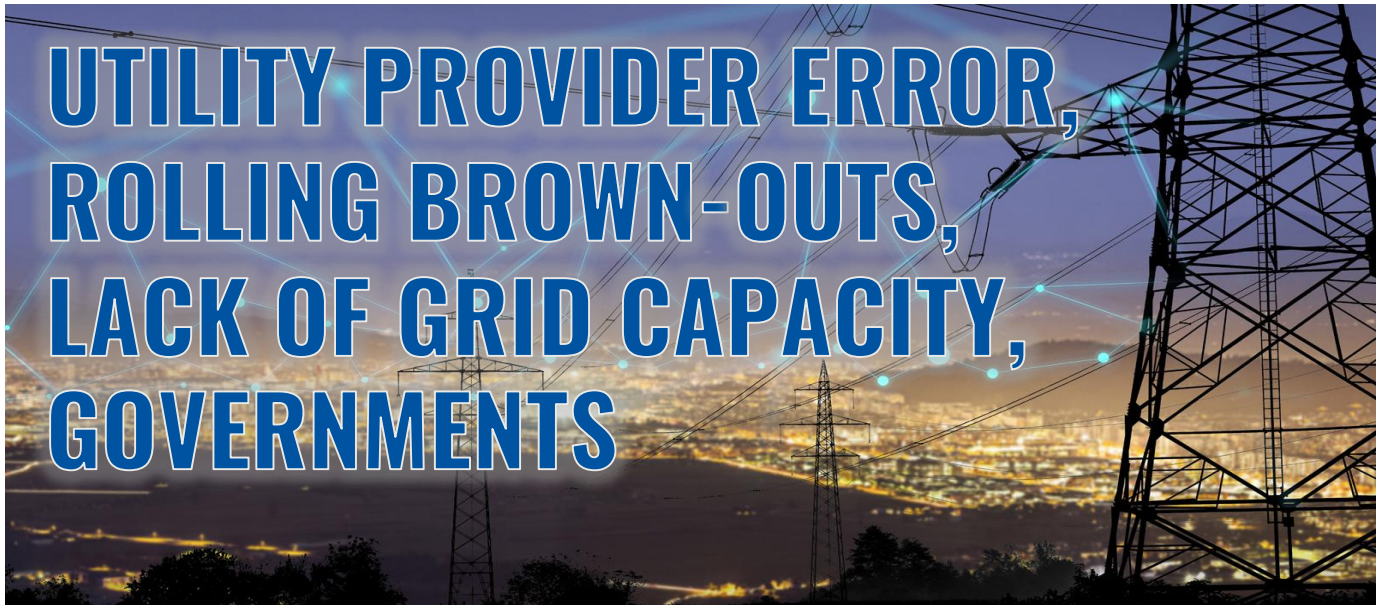
Power Problem Causes

1. Weather Events
2. Natural Elements
3. Human Interference


CAR ACCIDENTS


CONSTRUCTION
ACCIDENTS


WATER MAIN
BREAK


UTILITY PROVIDER ERROR,
ROLLING BROWN-OUTS,
LACK OF GRID CAPACITY,
GOVERNMENTS

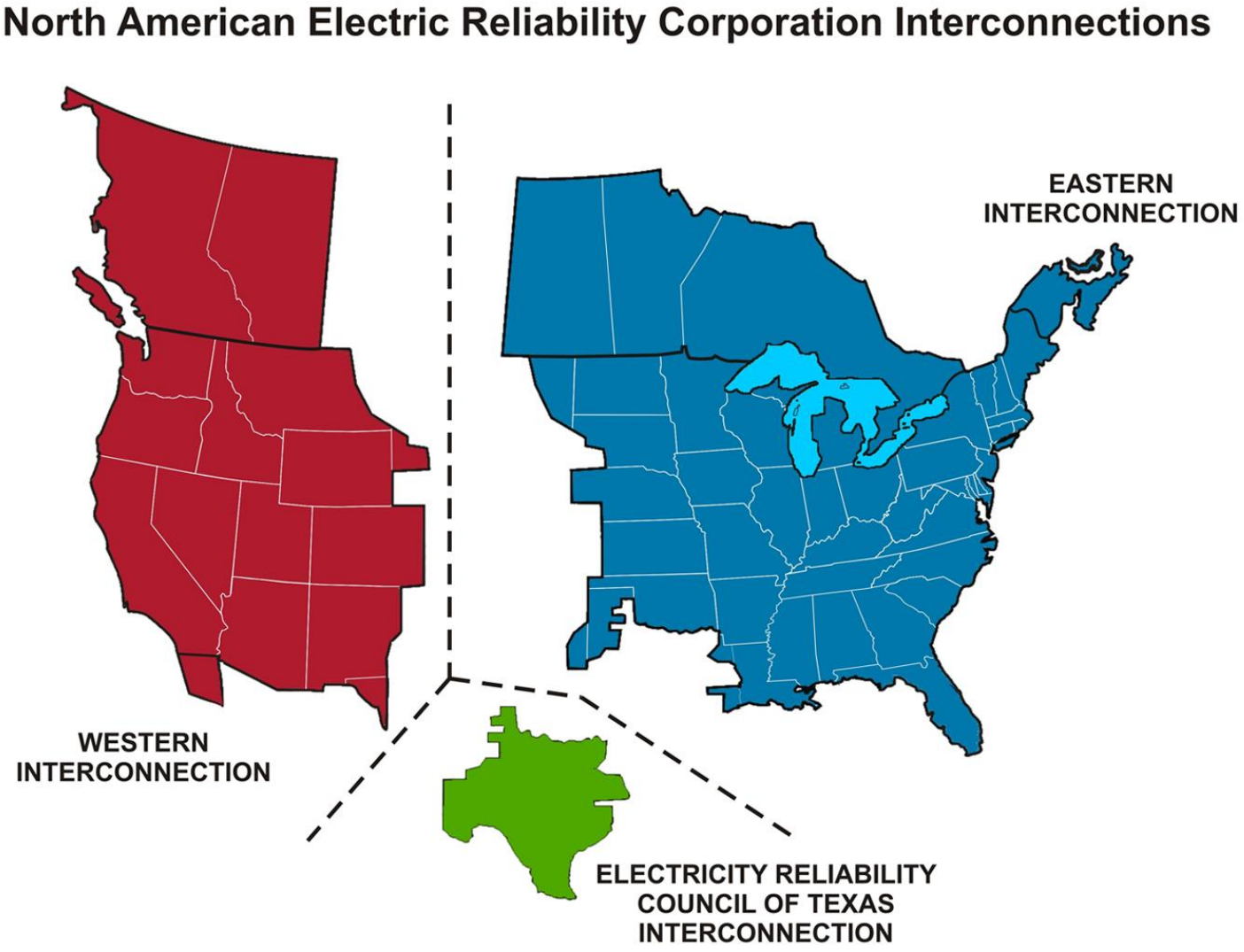
Math & History in One Question:

How many Power Grids exist in North America?

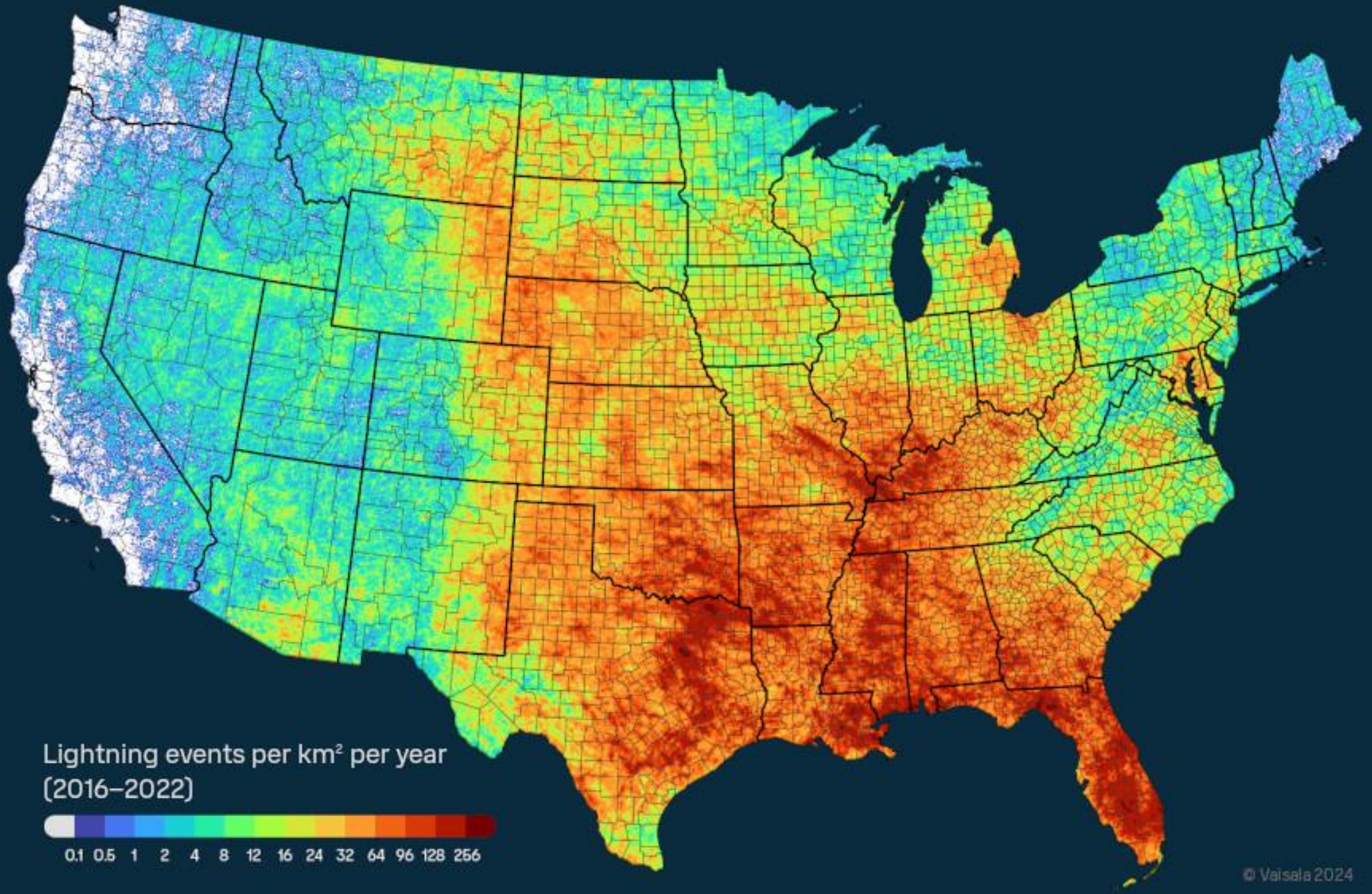
The Grid

MINUTEMAN POWER TECHNOLOGIES

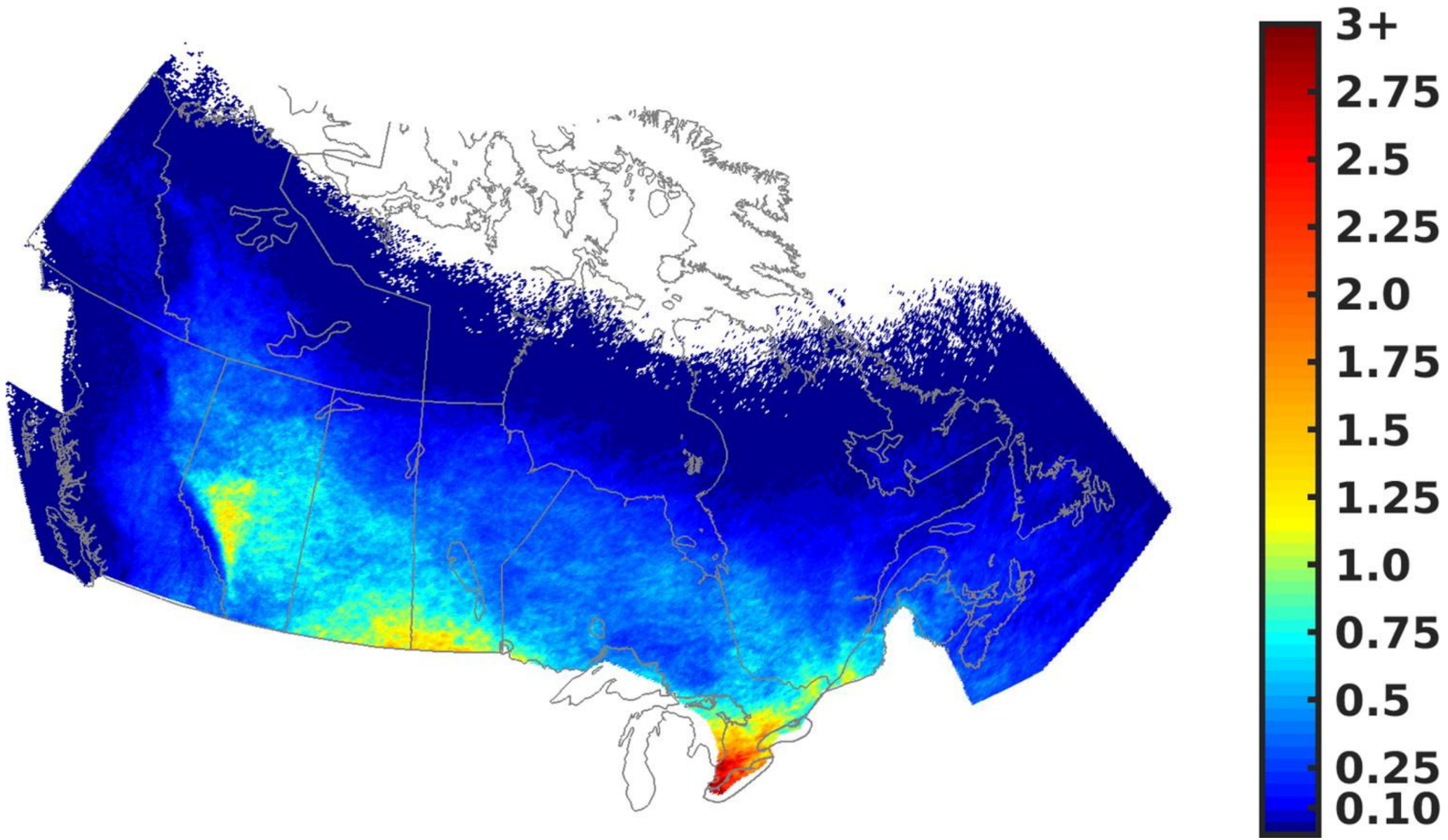
3



Where does lightning exist in the United States?

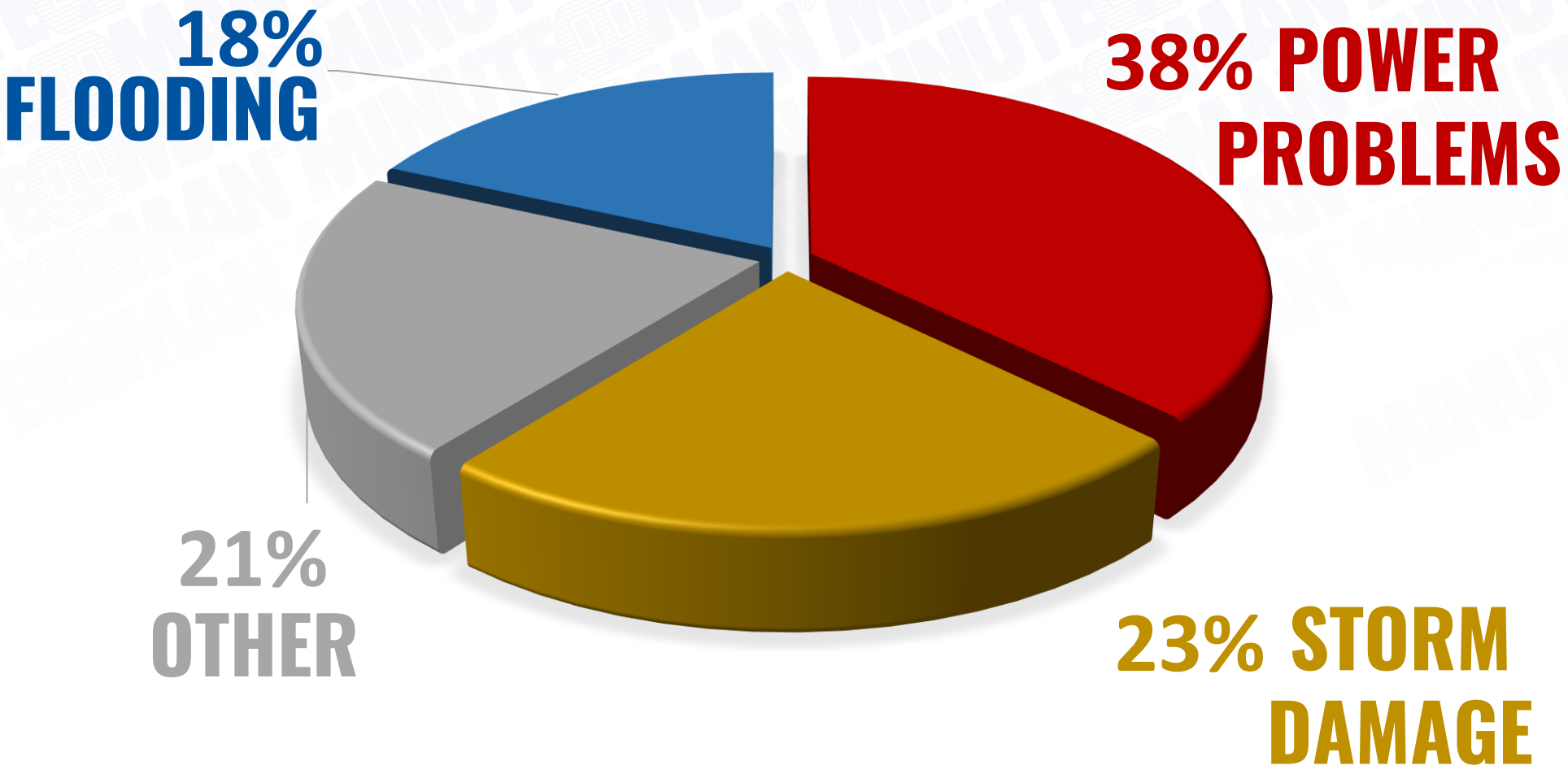


Where does lightning exist in Canada?


3+
2.75
2.5
2.25
2.0
1.75
1.5
1.25
1.0
0.75
0.5
0.25
0.10

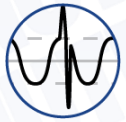
What are the primary causes of business interruptions?

Business Interruptions



Power Problems

5 Everyday Power Problems



1. Spike: sharp voltage increase or sustained overvoltage

2. Brownout: momentary or sustained reduction in voltage

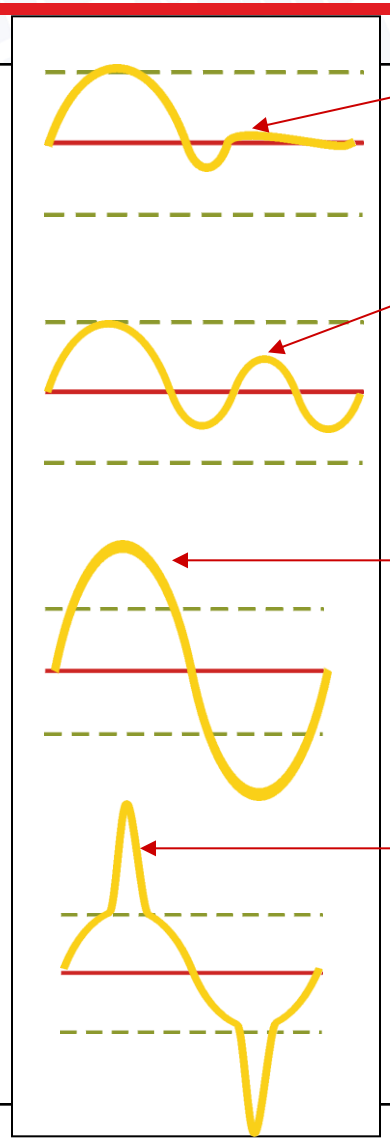
3. Noise: defined as a high frequency transient or oscillation, usually injected into the line by nearby equipment

4. Frequency Variation: instability of the line frequency

5. Harmonic Distortion: a departure from the ideal sinusoidal waveform expected on the line

Power Problems

- Blackout – Total loss of utility power
- Brownout (sag) – Short-term voltage decrease
- Surge – Over-voltage
- Spike – short-term, severe over-voltage



Equipment fails

- Equipment becomes inoperable

Equipment fails

- Equipment shuts down due to not enough voltage

Equipment damage occurs

- Power supply and internal components can burn out

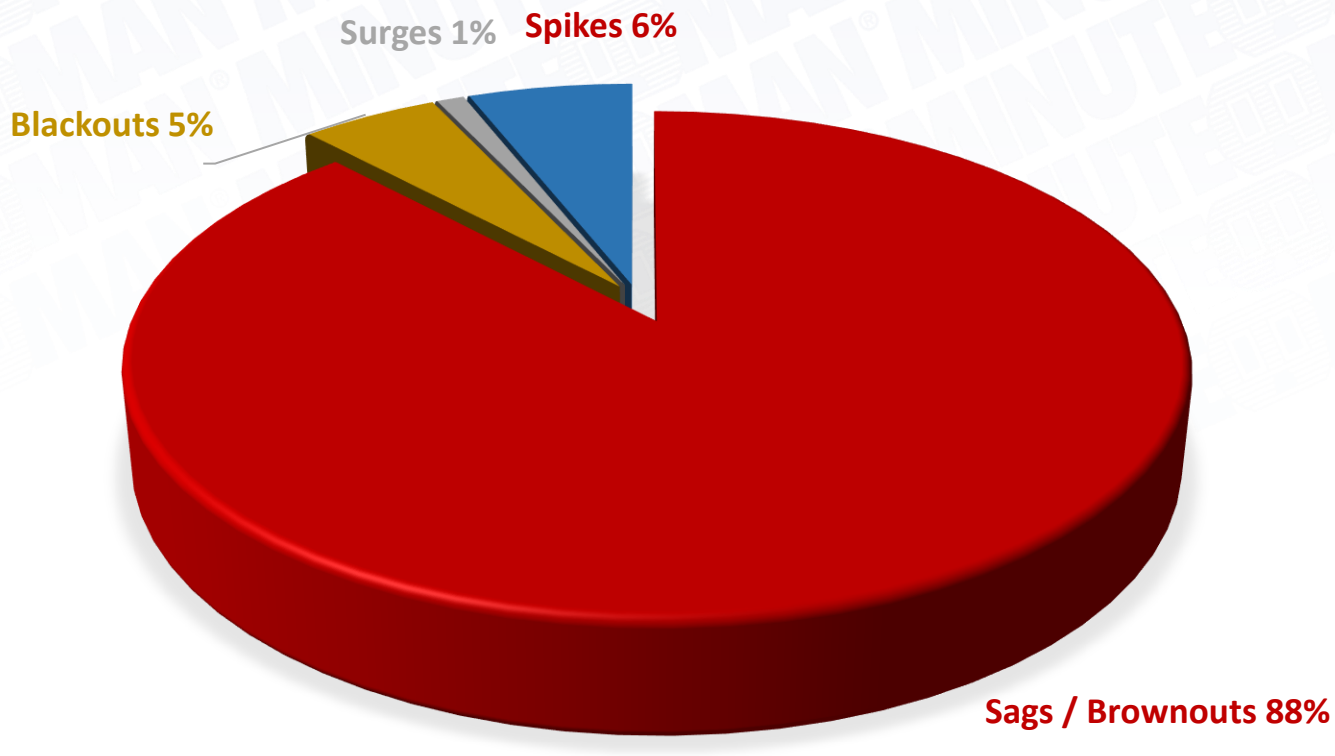
Equipment damage occurs

- Severe damage to power supply and internal components

Power Problems

Surge suppressors provide protection for only 7% of power problems.

(Surges & Spikes)



A UPS protects against 100% of all power problems!

WHY POWER PROTECTION?

Why Power Protection?

Every year 72%* of businesses in the US are affected by power quality that causes interruption to critical operations

- **The cost of downtime – it's real, and can be painful**
  - *J.D. Power says the average business experiences 5.2 power outages per year*
  - *Average is less than 10 minutes*
  - *Extended outage average = 7.9 hours*
- **From Electric Power Research Institute:**
  - *The annual cost to the U.S. economy due to power disruptions: $150 (low) to $300 billion (high)*
  - *One second outage average cost is $2500; One hour is $7,795*
- **$billions are lost due to poor power quality phenomena**

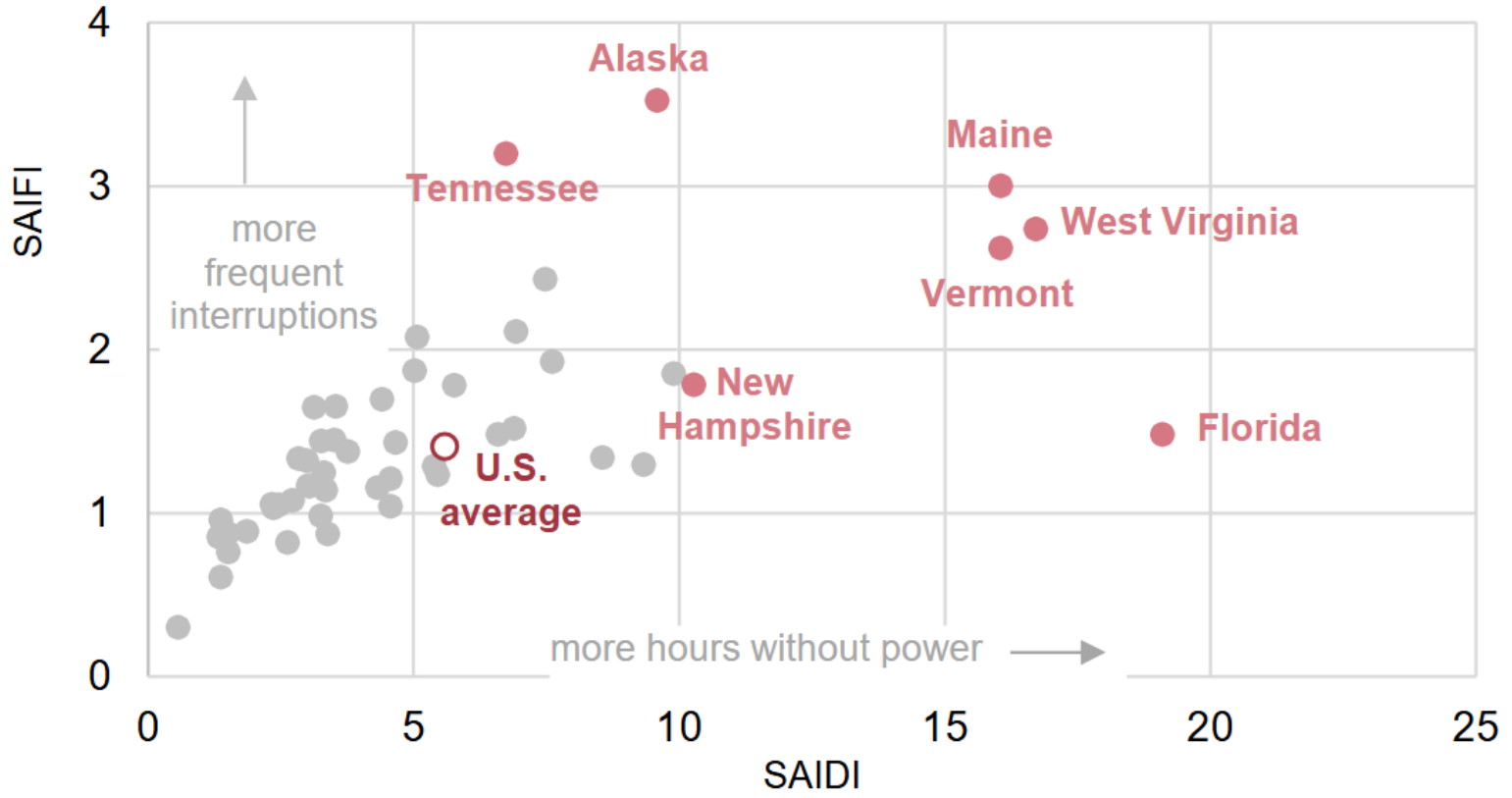
*According to Frost and Sullivan

Why Power Protection?

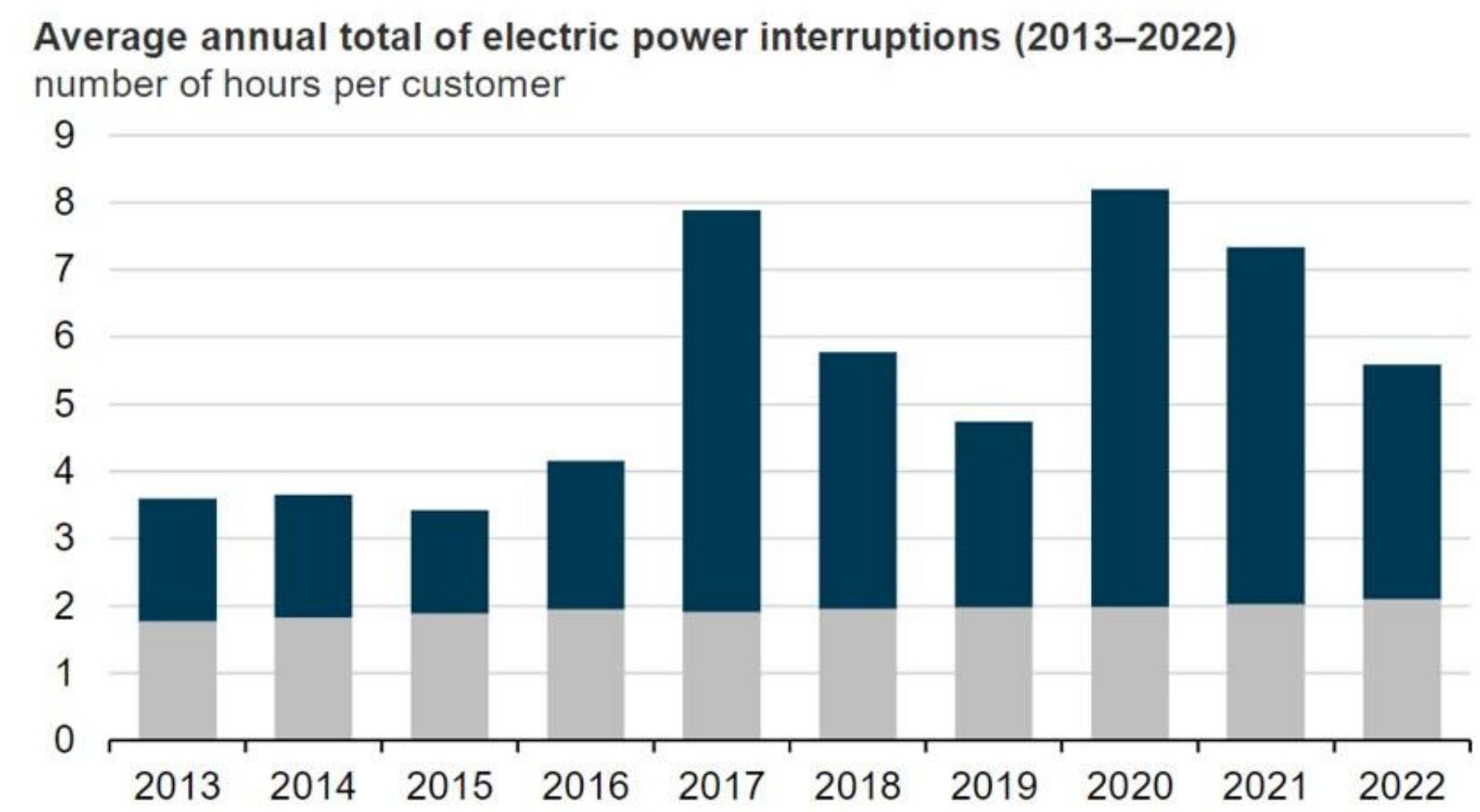
The **System Average Interruption Duration Index (SAIDI)** *measures the total duration (in hours) an average customer experiences non-momentary power interruptions in a one-year period.*

The **System Average Interruption Frequency Index (SAIFI)** *measures the frequency of interruptions in number of occurrences.*

Average annual total electric power interruptions by U.S. state (2022)
number of interruptions and duration (hours) per customer



Why Power Protection?

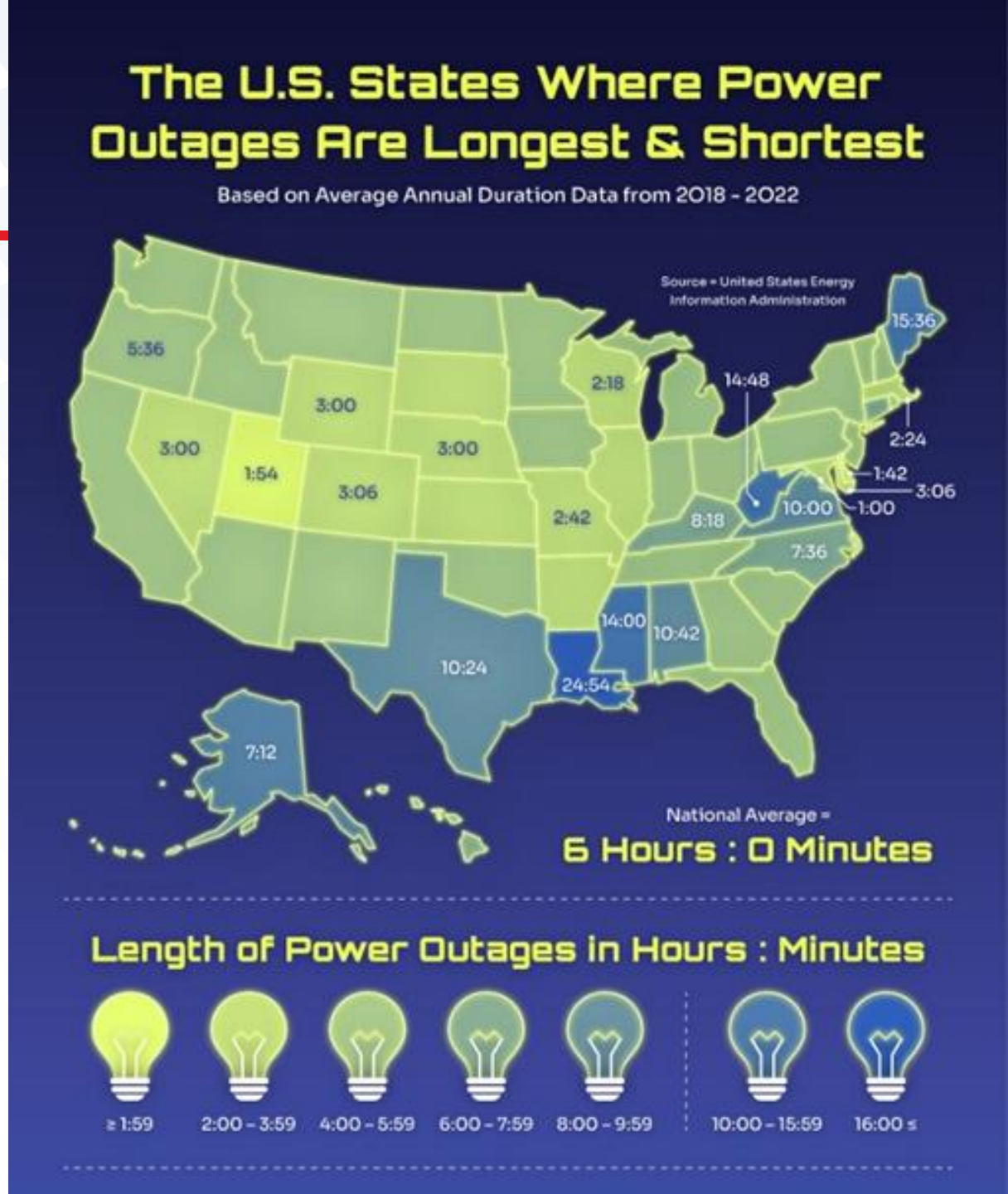


Data source: U.S. Energy Information Administration, *Annual Electric Power Industry Report*

10 Year System Average

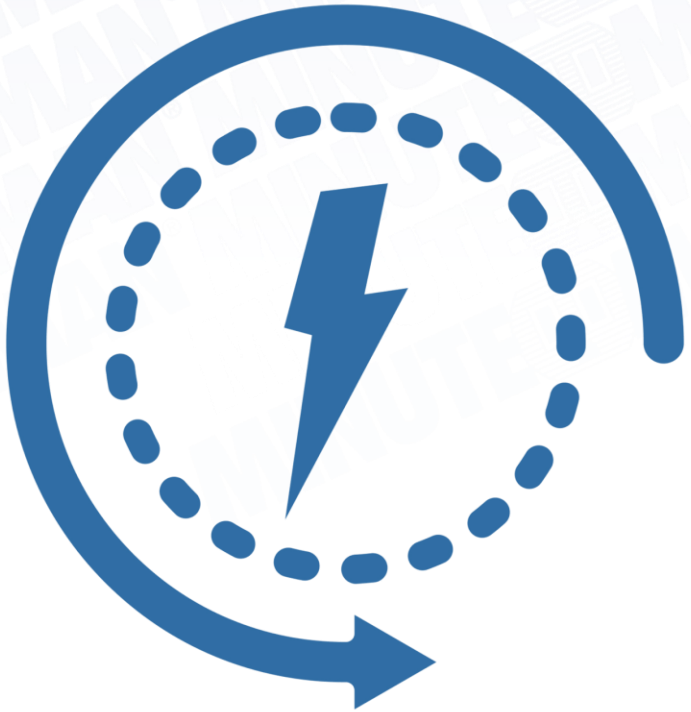
Why Power Protection?

- Map of States and respective Outages
- Duration of Disruption
- Not all States are created equal



Why Power Protection?

- Power is never available 100% of the time - Things do happen unexpectedly
- Business continuity is critical
- Reaction time can be necessary to relocate applications or shut down gracefully
- Increasing dependence on the network means businesses demand 24/7 uptime
- True cost of a power problem vs. protection
- Cost of recovery vs. cost of protection
- Power protection should be a no-brainer



Why Power Protection?

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A great UPS will never be seen nor heard! It will be the unsung hero!

Where to Sell Power Protection:

What are the opportunities?

Power Protection Opportunities

24-7, “always on” demand for power - some equipment and applications cannot go down for various reasons

- *Networking systems*
- *Security Systems*
- *OEM applications*
- *Industrial installations*
- *Kiosks*
- *POS terminals / Hospitality*
- *Home management and entertainment*
- *Banking*
- *Medical*
- *Telecom*
- *Law enforcement communications (DAS)*

Be On *the* Look Out (B.O.L.O.)

Sales opportunities are abundant!

Surveillance Power Protection

What is the real cost of lost recordings?

Does it matter if they are on a $200 DVR or a $20,000 server?

How much downtime is lost to rebooting system if power is out for 10 seconds?

Surveillance Power Protection

- Backup UPS for Surveillance Equipment is generally accepted as a best practice among integrators.
- Power loss is unexpected and may result in lost recordings and/or create issues when Servers or DVRs are shut down unexpectedly.

Surveillance Power Protection

- UPSs add cost to any system and are usually not in the budget; especially small systems as a percentage of cost.
- Education of customers is important.
- What's the best Camera System on the market today?

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EVERY camera has the SAME resolution when *the power fails*

Surveillance Power Protection

Prudent integrators should insist that large systems containing high camera count, multiple servers, PoE switches, and power supplies have adequate UPS backup designed into the deployed solution

Video Entry Power Protection

- Mission Critical Building Management Interface Device
- Networkable, World-wide connectivity via Session Initiation Protocol (SIP) and VOIP
- Computer based units - preeminent assets
- Used with Access Control Systems
- Door Dash – Uber – Amazon management
- 1 – 5000 users per system

Audio / PA Power Protection

- True-sinewave Line Interactive or On-Line UPS for AMP protection?
- Provides line conditioning and battery backup simultaneously
- Audio Line conditioners are expensive by themselves.
  Add a little extra solution UPS!

INTEGRATOR BENEFITS

Top 10 Reseller Benefits

1. Shows you are a total solution provider
2. Increased revenue
3. Happier clientele
4. Shows your commitment to customer
5. Potential recurring revenue (service, battery replacement, etc.)
6. Potential for resellers to provide power monitoring services
7. Potential for resellers to provide services during a disaster
8. Potential to provide disaster recovery services after an event
9. Fewer non-revenue warranty service calls
10. Lower liability on system sales

Top 10 End-User Benefits

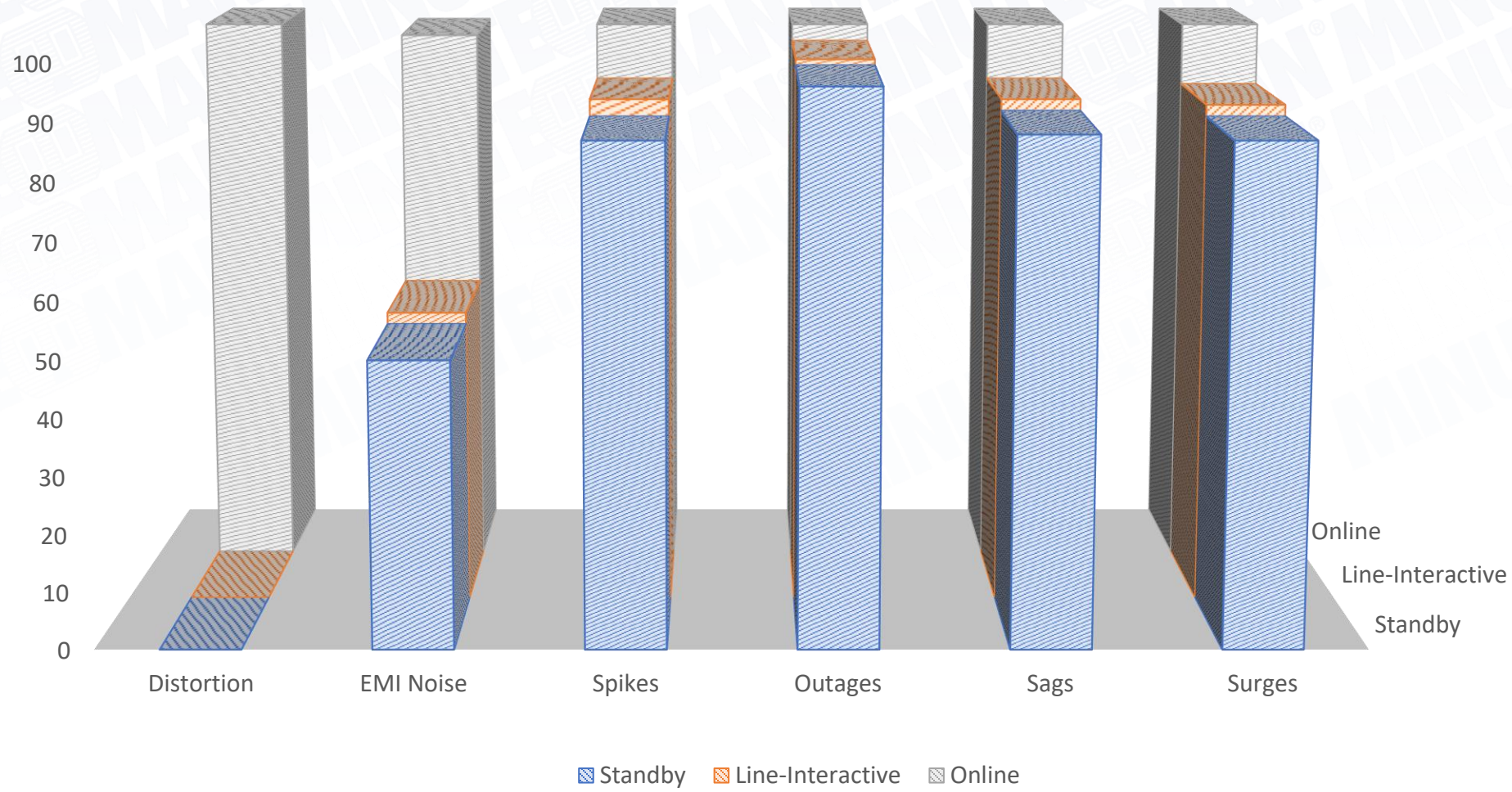
1. Equipment stays safe from all power anomalies
2. Warranties don't cover damage power problems
3. Equipment lasts longer, undergoes less stress
4. Prevents disaster from downtime and system crashes
5. Limited liability (security applications)
6. Increased efficiency + Lower system maintenance
7. Increased productivity: no down time
8. Power monitoring and management benefits
9. Potential lower cost vs. alternative sources of power protection (generators, fuel cells, etc.)
10. Peace of mind

UPS Topology Choices

UPS Topology

Standby	Line-Interactive	Online
• Basic Protection • Includes Surge Suppression • Line Noise Filtering • Battery Backup	• Medium Protection • Includes Surge Suppression • Line Noise Filtering • Battery Backup • Automatic Voltage Regulation • Potential Pure Sine Wave Output	• Best Protection • Includes Surge Suppression • Line Noise Filtering • Battery Backup • Double-Conversion Online operation • Pure sine-wave output

How effective are Standby, Line-Interactive, & Online?



How effective are Standby, Line-Interactive, & Online?

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Standby Covers

Power Problem	
1	Power failure
2	Power sag
3	Power surge (spike)

Line-Interactive Covers

Power Problem	
1	Power failure
2	Power sag
3	Power surge (spike)
4	Under-voltage (brownout)
5	Over-voltage

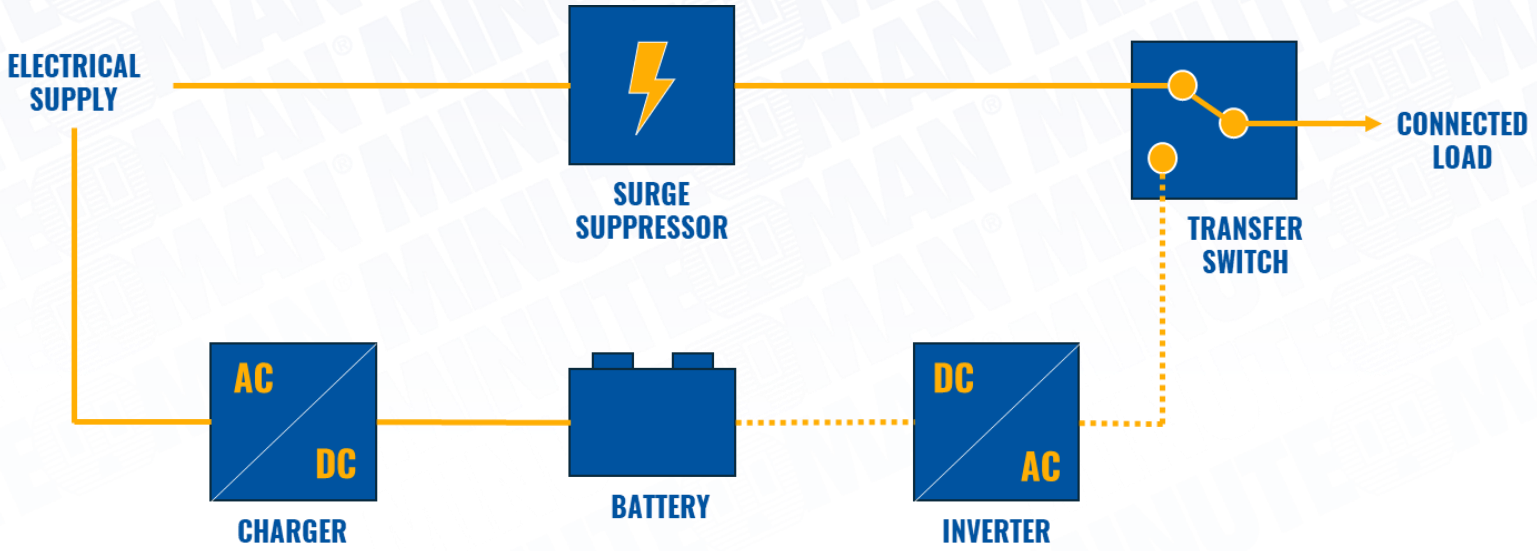
Online Covers

Power Problem	
1	Power failure
2	Power sag
3	Power surge (spike)
4	Under-voltage (brownout)
5	Over-voltage
6	Electrical line noise
7	Frequency variation
8	Switching transient
9	Harmonic distortion

UPS Topology - Standby

Advantages

- *Compact footprint*
- *Less expensive*
- *Easy install and operation*



Limitations

- *May not handle all power disturbances as well as other types*
- *Provides a minimum backup time to allow for proper shutdown*
- *May have a ms switching delay to battery, which is fast enough to protect most equipment*

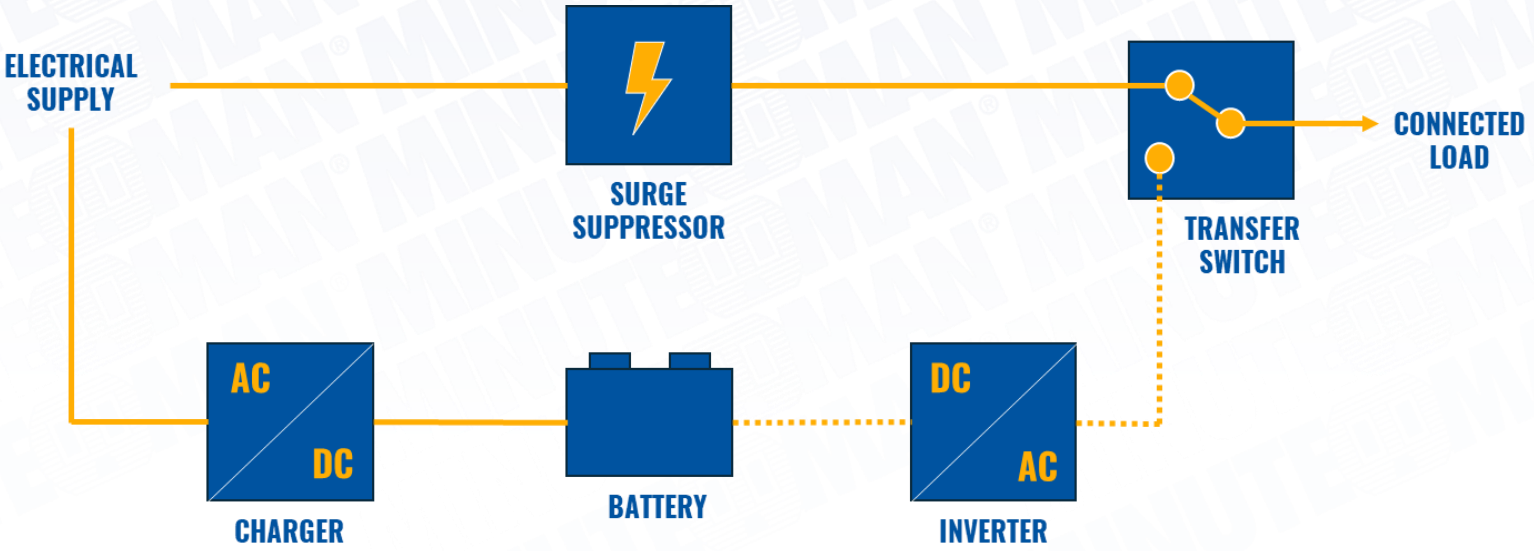
Typical Applications

- *Homes or small offices*
- *Most standby UPS are rated for 1,000VA or lower*
- *80%plus of total market in units sold*

UPS Topology - Standby

Enspire-G Series

EN450G



EN600GU

EN750G

EN900LGU

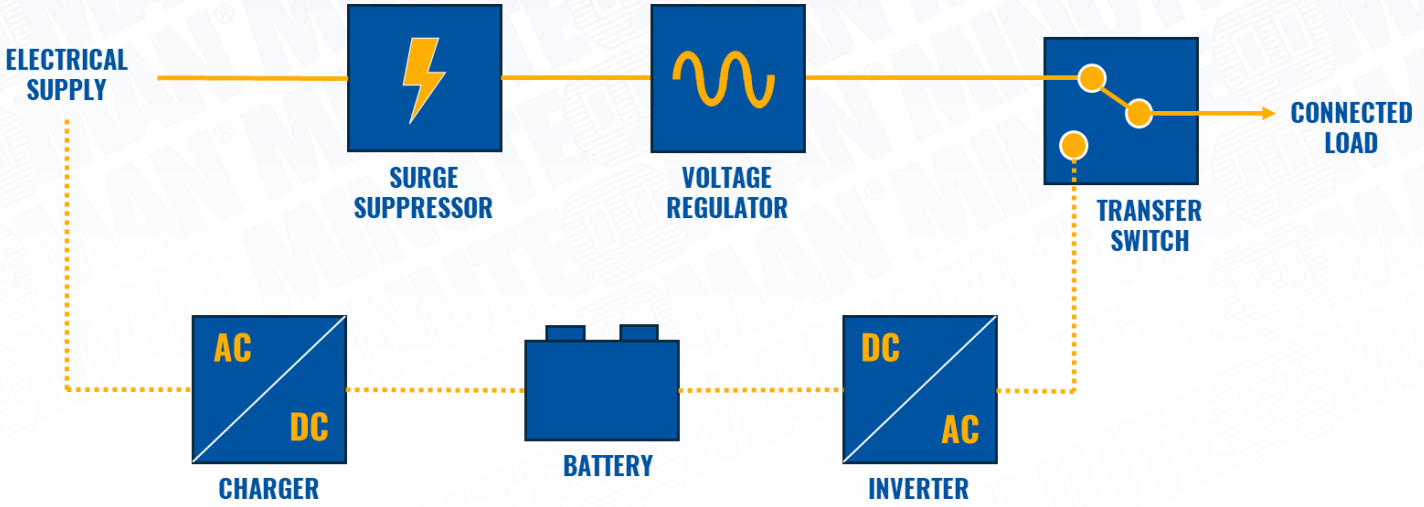
UPS Topology – Line-Interactive

Advantages

- *Enhanced power protection*
- *Better reaction time*
- *Easy install and operation*
- *Voltage regulation & consistent output*
- *Handles wider range of power disturbances*
- *Elegant balance between cost and performance*

Limitations

- *Limited amount of backup time without battery pack connectivity*



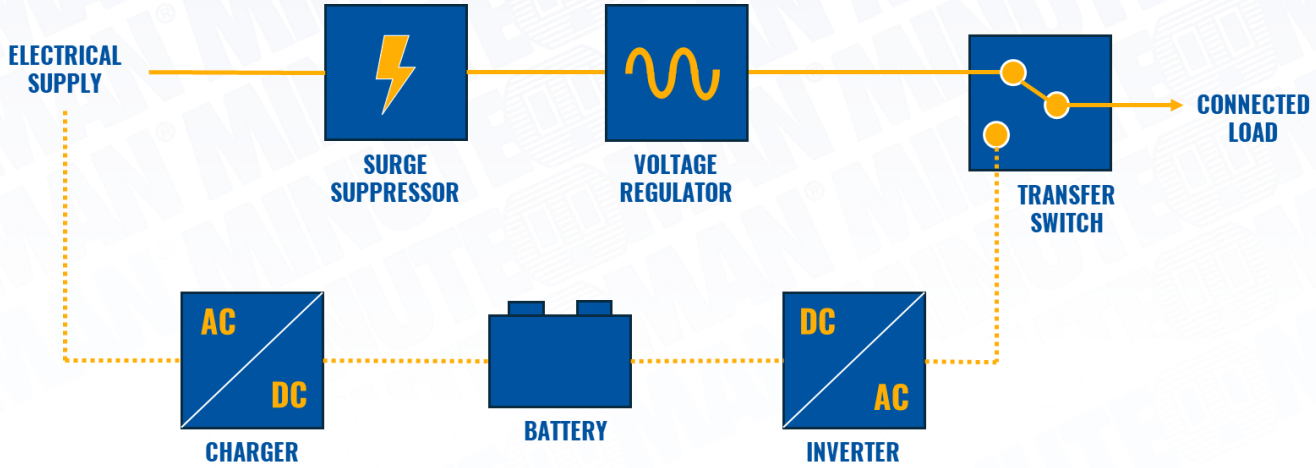
Typical Applications

- *Larger offices, Businesses with on-site servers, computers, NVRs, Video Entry, Networking equipment, and POS (Point-of-Sale) Systems*

UPS Topology – Line-Interactive

EXR *True Sine Wave*

EXR750RT2U (NC)
EXR1000RT2U (NC)
EXR1500RT2U (NC)
EXR2000RT2U (NC)
EXR3000RT2U (NC)
EXR1000RTHV



Entrust-LG (ETR)

ETR550LG
ETR850LG
ETR1000LGU
ETR1350LGU
ETR1500LGU
ETR2000LGU

Simulated Square Sine Wave

PRO-RT2U (PRO)

PRO750RT2U (NC)
PRO1000RT2U (NC)
PRO1500RT2U (NC)
PRO2000RT2U (NC)

UPS Sine-Wave Topologies

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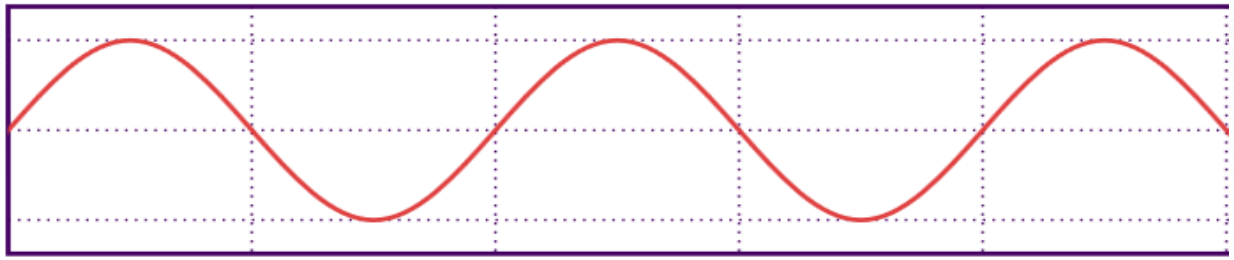
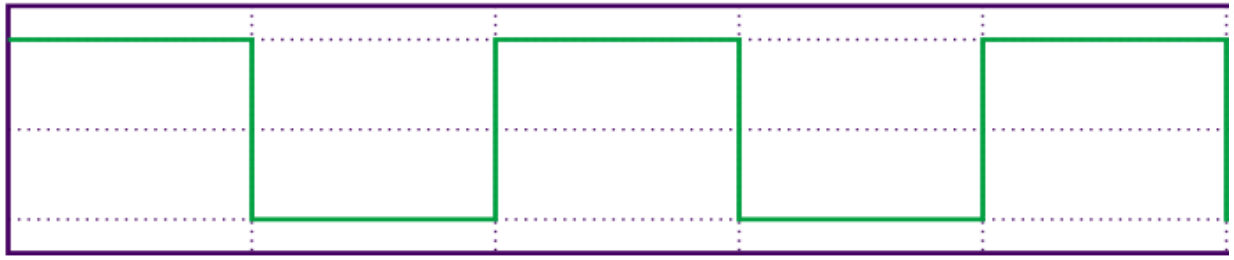
True Sine Wave (EXR)



Simulated Square Sine Wave (ETR & PRO)



Sensitive equipment may require a ‘True Sine Wave’ line interactive unit

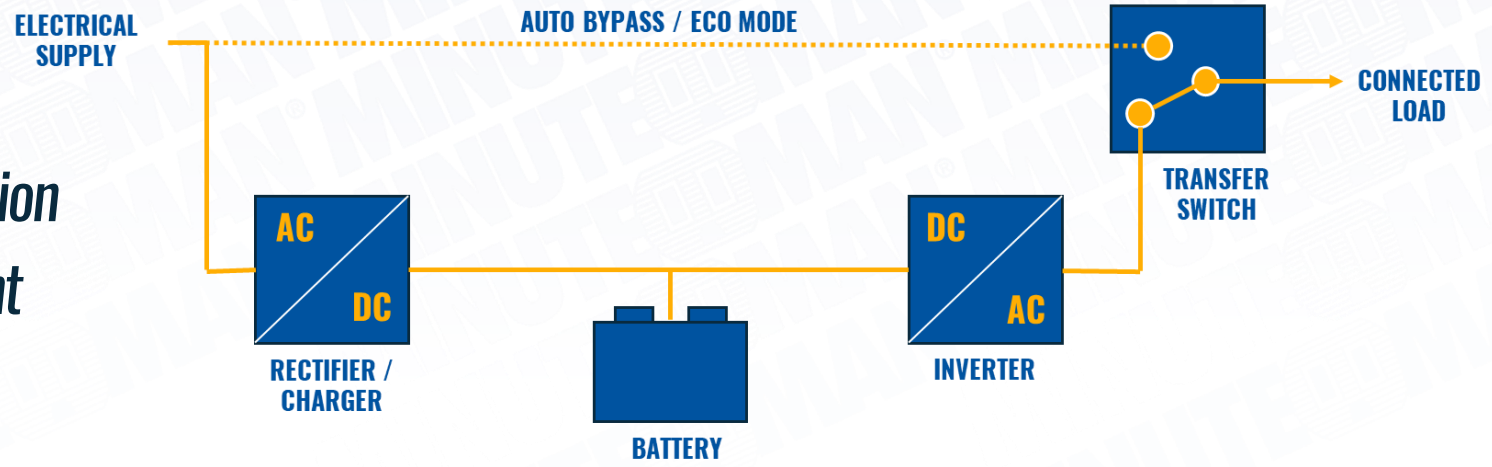
UPS Topology – Online

Advantages

- *Highest level protection*
- *Double conversion without interruption*
- *Zero transfer time & most consistent*
- *Cleanest power output*
- *Ideal power quality & reliability*
- *Longest backup time*
- *Handles widest range of power disturbances*

Limitations

- *Advanced features increase price and footprint*



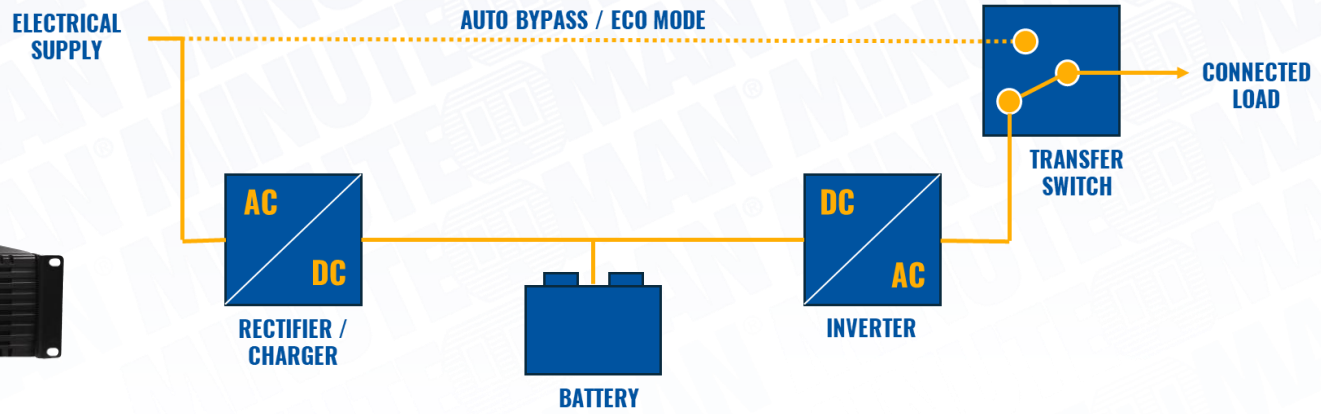
Typical Applications

- *Mission-Critical Systems, Data Centers, Telecom, Medical Equipment, Industrial Operations*

UPS Topology – Online 1-3kVA

Encompass RTXL (EC)

- *EC1000RTXL2U (NC)*
- *EC1500RTXL2U (NC)*
- *EC2000RTXL2U (NC)*
- *EC3000RTXL2U (NC)*



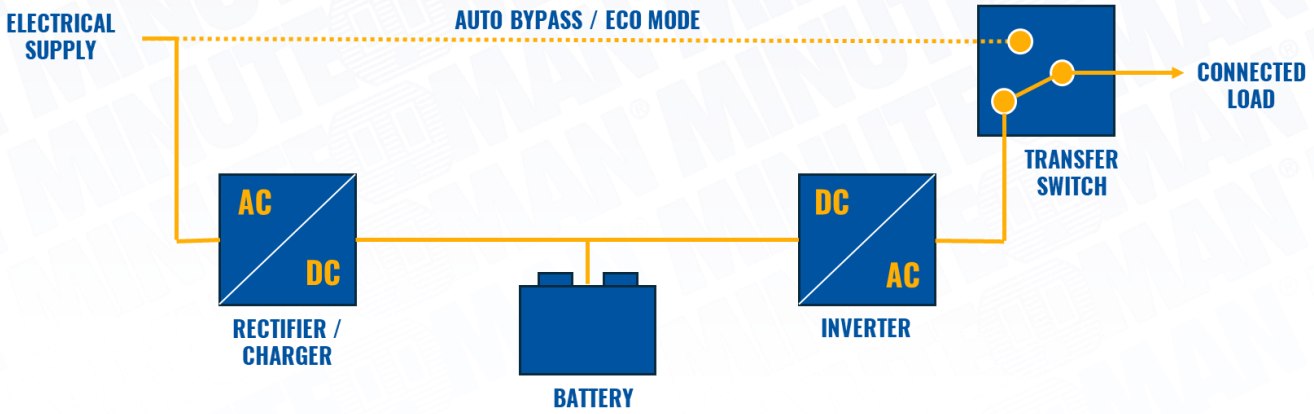
Encompass LCD

- *EC1000LCD (NC)*
- *EC1500LCD (NC)*
- *EC2000LCD (NC)*
- *EC3000LCD (NC)*

Endurance (END) *NEW!! LITHIUM ION*

- *END1000RT2U-L*
- *END1500RT2U-L*
- *END2000RT2U-L*
- *END3000RT2U-L*

UPS Topology – Online 5-10kVA



Endeavor 5-10kVA (ED)

- *ED5KRT*
- *ED6KRT*
- *ED8KRT*
- *ED1-KRT*

Endeavor 6 & 10kVA (ED)

- *ED6KTF*
- *ED10KTF*

UPS Choices

Prioritizing the features you need most:

- *Standby, Line Interactive, or Online*
- *True-Sine Wave*
- *Cost-Effective*
- *Rack-mount / Wall-mount / Tower*
- *Time factor*
- *Power factor*
- *Generator interaction*

Design Considerations

Design Considerations

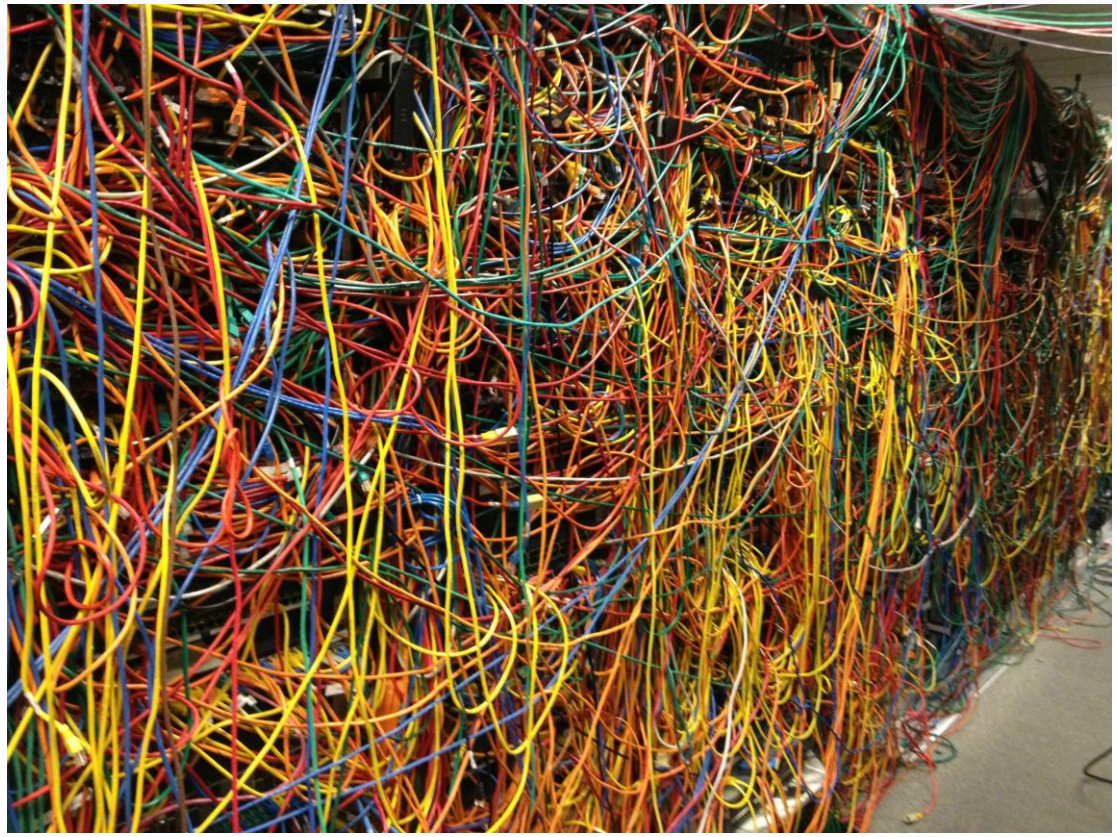
- Installation Environment
- Power Load & Form Factor
- Availability & Battery Runtime
- Manageability & Distribution
- Operation & Maintenance
- Budget Economics
- Rules & Regulations
- Electrical Outlets and Breakers

Installation Environment

- Evaluating the site environment is necessary and prudent for any deployment of UPS systems.
- Sites may support several sizes and types of UPS products.
- Environmental factors must be considered including Temperature, Humidity, Smoke may influence decisions.

Installation Environment

- Heat generated?
- Keeping it cool? *but not too cool*
- System noise?
- Operational efficiency?
- Reduce energy usage and generate positive environmental impact?
- Adequate available space?

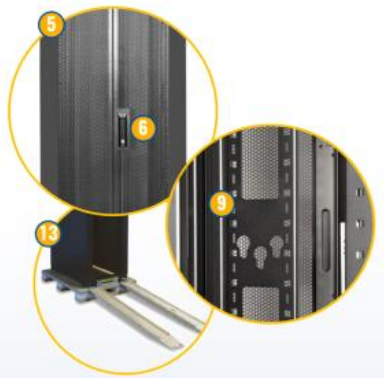


When in doubt, bring in the experts!

Power Load & Form Factor

- Calculate total *potential* load
- Use sizemyups.com!
- Best topologies
- Give yourself room to grow!
- Form Factors

1. **Roof Panel** Removeable & Vented with Tabbed Cable Management Ports
2. **Convenient Grounding System**
3. **Steel Mesh Front Door** Reversible & Removable with 180° Swing
4. **Modular Side Panels** Key-Locking & Removable
5. **Split Rear Doors** Key-Locking & Removable
6. **Secure Key-Lock Entry**
7. **Pre-Populated with UPS** (5/6/8/10kVA) for Plug & Play Deployment
8. **Adjustable Mounting Rails** (4) with Easy-View Numbered Depth Index
9. **Toolless Vertical Quick Mounting** for PDUs/Cable Managers
10. **Baying Tabs** Front & Back
11. **Heavy-Duty Casters** (4) & Levelers (4)
12. **Open Bottom** for Cable Routing
13. **Swift Deployment Pallet-Ramp** for Stress-Free Unpacking



Availability & Battery Runtime

- "Safe" Run-time = Capacity of the Box
- The amount of runtime required can greatly affect TCO

TCO = Total Cost of Ownership

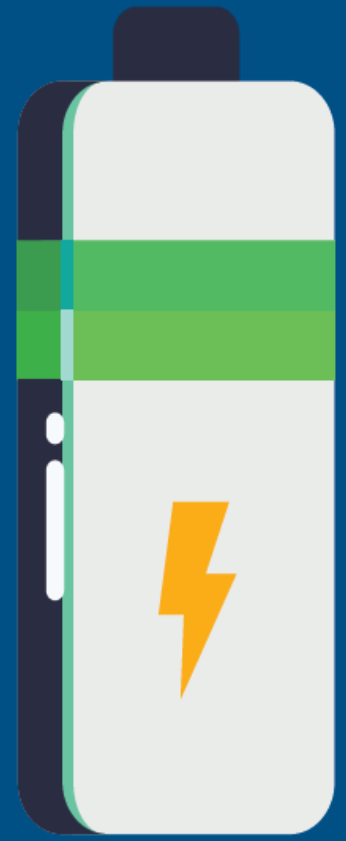
Availability & Battery Runtime

4 Basic Battery Power Configurations:

1. *5–20-minute runtime standalone unit*
2. *5-20-minute runtime combined with a generator*
3. *Redundant UPS units along with redundant generators*
4. *UPS system designed to work for two or more hours*

Battery Basics

1. **LIFE EXPECTANCY = 3-5 YEARS**
   - Average VRLA (Valve-regulated, lead-acid) batteries will last 3-5 years
2. **TEMPERATURE & HUMIDITY = 77°F**
   - Optimal temperature for maximum life is 77°F (25°C), with an operating temperature range between 32°F – 104°F (0°C – 40°C). Operating outside this range will adversely affect the performance and longevity of the batteries.
3. **USE & STORAGE = 8 HOURS EVERY 90 DAYS + DEEP-CYCLE**
   - If stored, batteries should be charged 8 hours minimum every 90 days. Repeated, short-cycle use of VRLA batteries reduces overall performance. If operated in an environment experiencing recurring, short-term utility outages, run a deep-cycle battery test on an annual basis to help maintain maximum runtime performance.



Manageability & Distribution

- Power intelligence is more than a UPS
- Envision SNMP Management capability is essential for enhanced command and control of your infrastructure
- **#1 IT solution is "Power Recycling"**

Manageability & Distribution

Power Distribution Units (PDU)

- *More standard outlets (2-24)*
- *Multi-form factor (1U and 0U, horizontal or vertical)*
- *Locking input plugs*
- *Surge protection*
- *Load-metering (Amps)*
- *High standards*
- *Cost-effective*

Manageability & Distribution

Remote Power Management "RPM" Solutions

Control & Configure:

- *LAN Connection: IP-based PDU*
- *Control Individual Outlets: Programmable/ Cascadable power on/off, reboot, and monitor up to 2-24 individual devices from a single IP address*
- *Scheduled Management Actions: automatic shutdown and startup of devices over weekends or holidays*
- *Notifications via SNMP, SMS Text, or Email.*

Benefits:

- *Time Saver*
- *Increased Productivity*
- *Notifications & Auto Reboot*
- *Cost Savings*

Manageability & Distribution

Simple Network Management Protocol "SNMP" Solutions

Control & Configure:

- *Internet-standard protocol for managing devices on IP networks*
- *Switches, Routers, Servers, Workstations, UPS*
- *Available for Line Interactive and Online units*
- *World-wide control of your power protection network*
- *Reporting for unit performance*
- *Extra sales opportunities for Integrators*

Envision Capable UPS Options

- Endeavor 5-10kVA Rack/Tower
- Endeavor LCD 1-3kVA
- PRO-RT2U
- EXR
- Encompass LCD
- Encompass Rack/Tower
- Encompass RTXL

Applications:

- *Networking*
- *Edge Computing*
- *Remote Installations*
- *Server Rooms*
- *Small Data Centers*
- *CoLo Facilities*

Manageability & Distribution

Simple Network Management Protocol “SNMP” Solutions

Optional Environmental Sensors

MINUTEMAN ENVISION SNMP TEMPERATURE & HUMIDITY SENSOR
EV-PROBE-TH

MINUTEMAN ENVISION SNMP SMOKE SENSOR & ALARM
EV-PROBE-SM

MINUTEMAN ENVISION SNMP CONTACT SENSOR
EV-PROBE-CO

Operation & Maintenance

- **Service and maintenance programs** *offer great ways to stay connected with customers and provides growth opportunities for the future*

- **Rule of Thumb:** *maintenance of higher-level UPS products should be left to experts!!*

Maintenance Best Practices

1. **CONTROL ENVIRONMENT**
   a. Keep the UPS in an environmentally controlled, clean and well ventilated area
   b. Prevent overheating and ensure optimally efficient operation of the UPS by removing any dust accumulation from the UPS on a regular basis, especially from fan openings
2. **PERIODICALLY SELF-TEST**
   a. Schedule periodic self-tests of the UPS, to include both electronics and a 10-second battery testing *(check the user manual for available options specific to your unit)*
3. **MAINTAIN A CHARGE**
   a. The UPS automatically charges internal batteries when connected to utility power, however, if in storage, the UPS batteries should be charged every 90 days for 8 hours minimum
4. **DEEP-CYCLE ANNUALLY**
   a. Schedule a deep-cycle battery test annually where they are depleted to low-battery cut-off, (LBCO). *Ensure there are no critical applications running prior to testing to prevent data loss.*
   b. Immediately order replacement batteries anytime a UPS self-test identifies weak or dead internal batteries.
5. **KEEP CURRENT**
   a. Visit the Minuteman Resource Library for any firmware or software updates:
      - *UPS firmware updates are listed under the UPS model*
      - *SentryHD software and SNMP card firmware updates are listed under Network Accessories*

Budget Economics

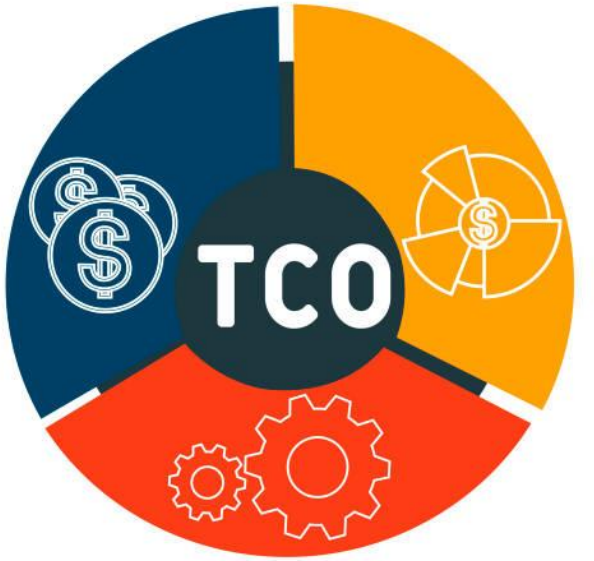
Needs and wants are different, *especially when company, departmental or home budgets are concerned. Compromises might be necessary, so make sure the client understands features and functions in advance of the sale.*

Budget Economics

The **total cost of ownership (TCO)** *for a UPS system will always exceed the dollar amount you spend purchasing the equipment. Estimates suggest potential increases of 25%to 40%for TCO.*

Other cost considerations include:

- *Installation, start-up and commissioning services*
- *Energy efficiency (more efficient systems usually have lower long-term costs)*
- *Battery replacement cycle*
- *Project management*
- *Integrating with existing systems*
- *Performance monitoring (onsite or remote)*
- *Uninterruptible power supply maintenance and repairs*
- *Local, State, and Federal Rules and Regulations (TAA Compliance, et.al)*



Rules & Regulations

- Electrical Codes
- TAA Compliance
- LEED Certification
- UL Listed
- Rohs

Electrical Outlets & Breakers

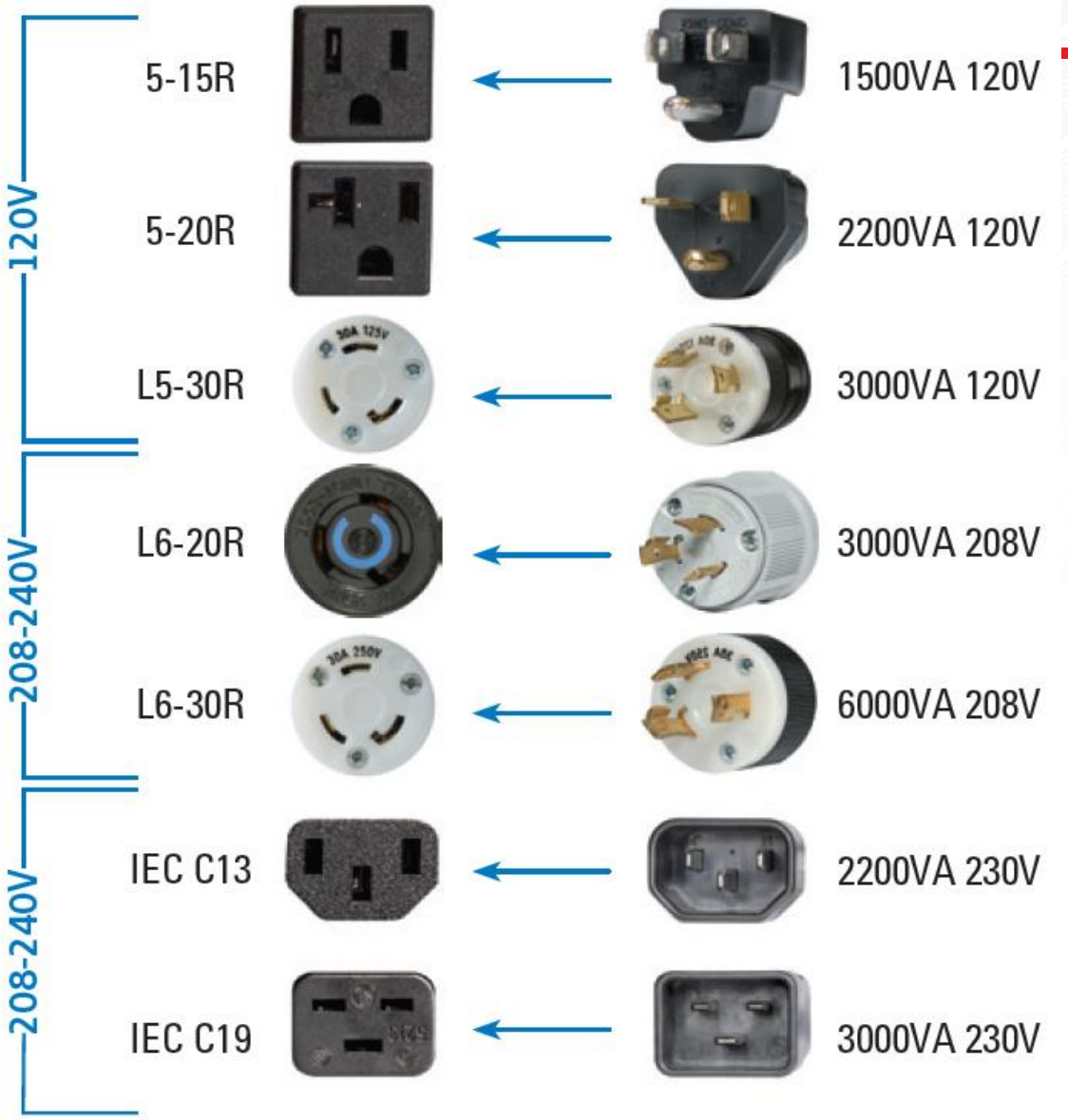
Typical largest UPS rating per outlet

1500VA and below = 15-amp circuit

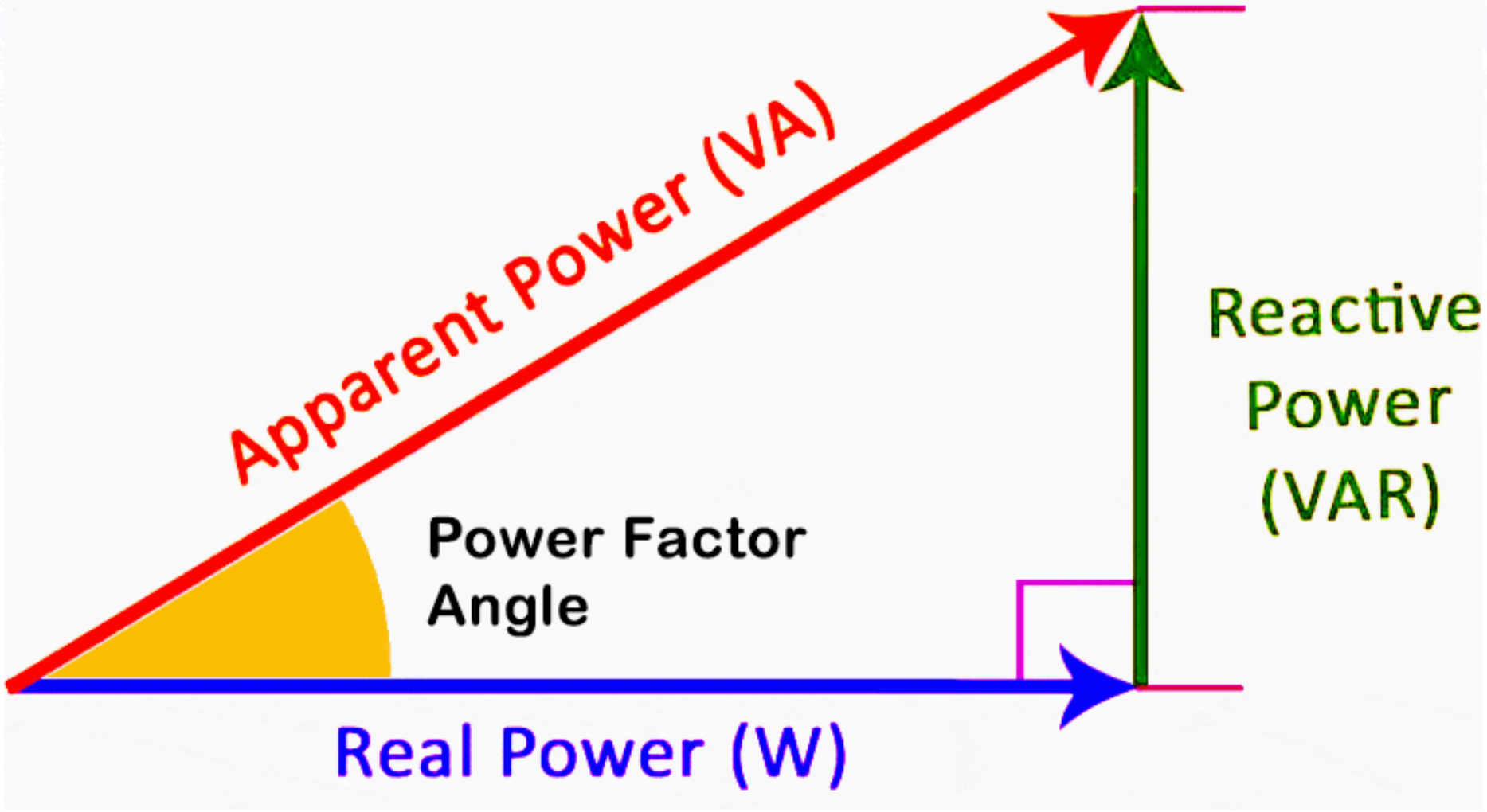
2000VA = 20-amp circuit

3000VA = 30-amp circuit.

Electricians may be required to install upgraded units. Costs for an electrician may be prohibitive to overall budget.



Theory


Apparent Power (VA)
Power Factor
Angle
Reactive
Power
(VAR)
Real Power (W)

Reality

Apparent power (VA); Full capacity

Real power (watts); Actual usable power

Selling Solutions & Overcoming Objections

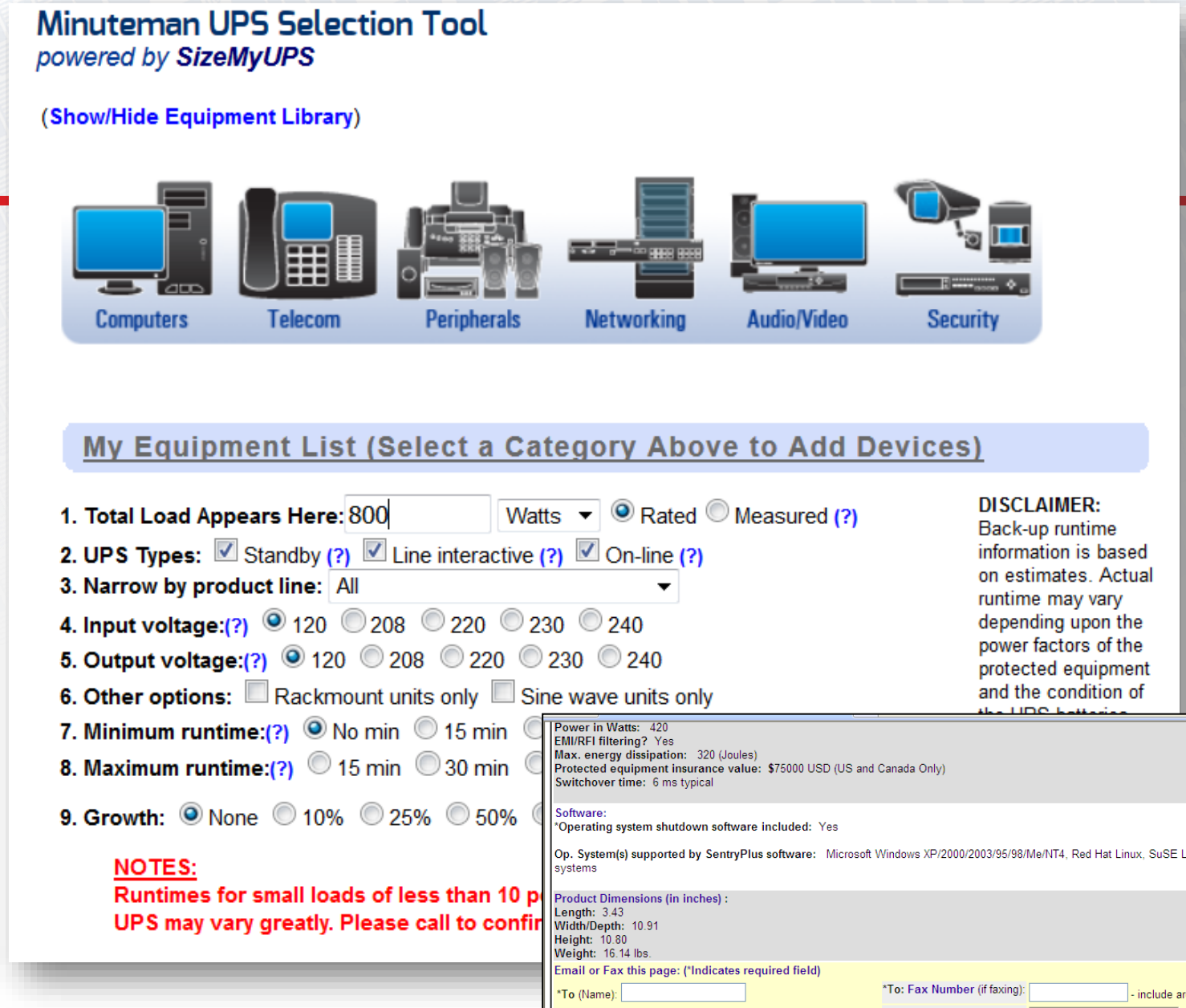
Selling Solutions

Sizing Tool:

- *Easy interface*
- *Concise options*
- *Database of devices*
  - *Covers all equipment categories*
- *Export Options*
  - *Print, email or fax a data sheet*

Bookmark the address:

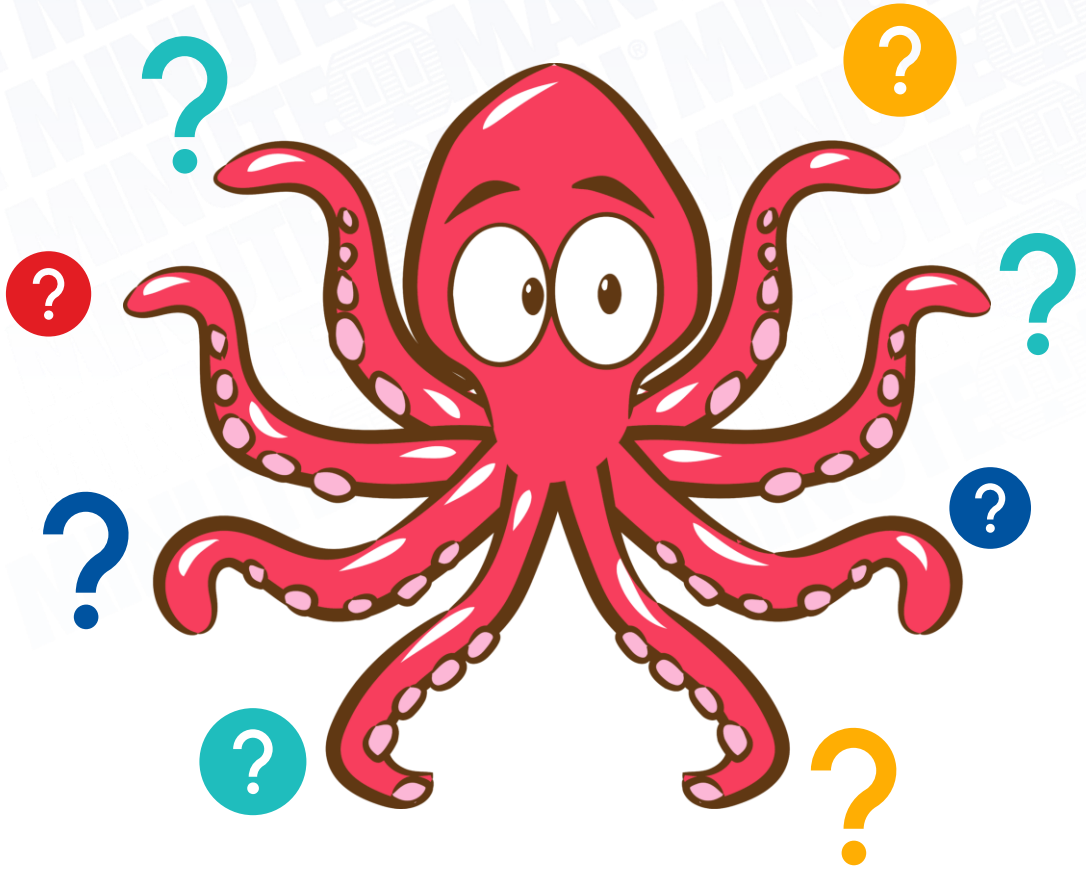
https://sizemyups.com/



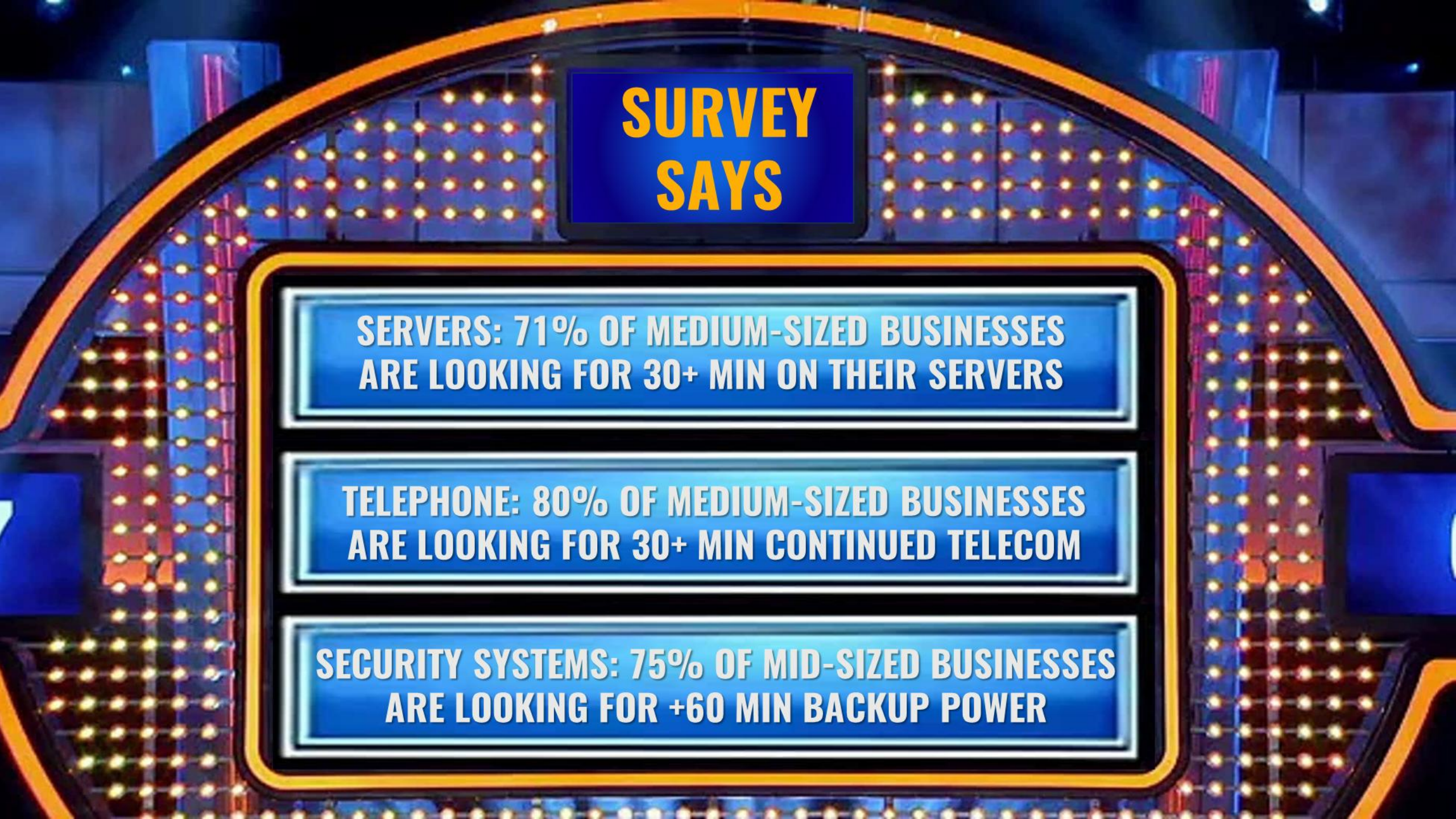
Selling Solutions

When to sell:

- *A surge strip?*
- *A standby UPS?*
- *A line-interactive UPS?*
- *An on-line UPS?*
- *Remote Power Management?*
- *Extended runtime?*

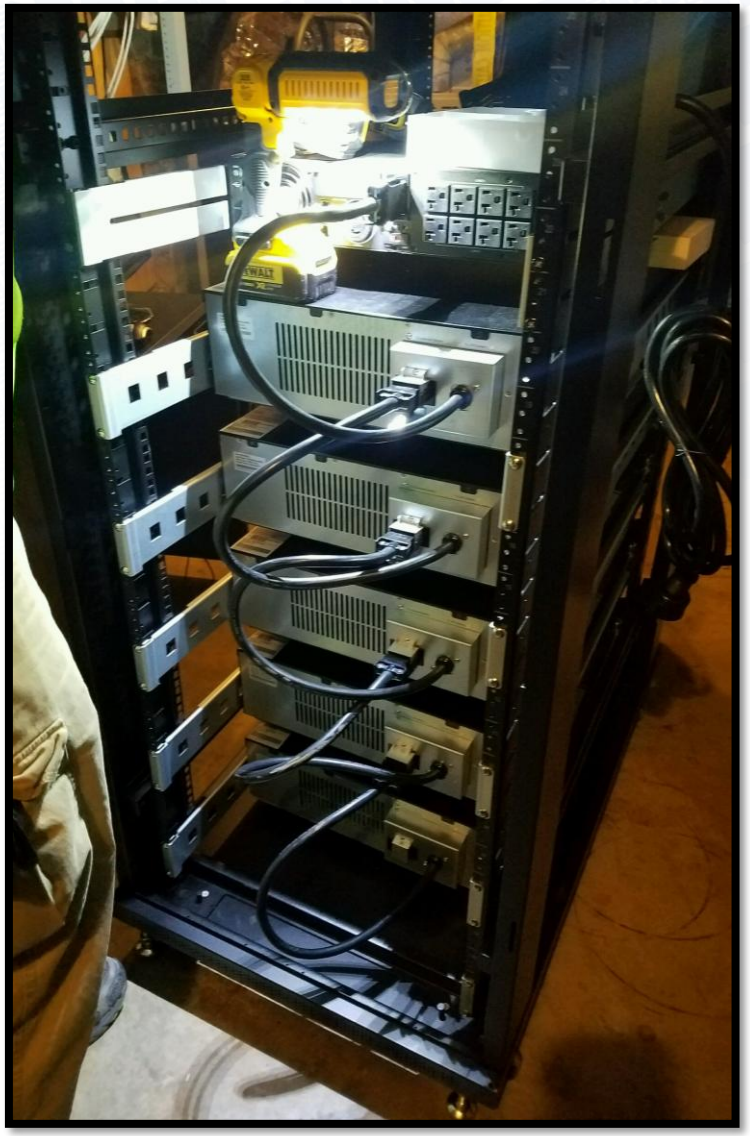


How long do you need to stay powered in the event of utility power loss?


SURVEY SAYS
SERVERS: 71% OF MEDIUM-SIZED BUSINESSES ARE LOOKING FOR 30+ MIN ON THEIR SERVERS
TELEPHONE: 80% OF MEDIUM-SIZED BUSINESSES ARE LOOKING FOR 30+ MIN CONTINUED TELECOM
SECURITY SYSTEMS: 75% OF MID-SIZED BUSINESSES ARE LOOKING FOR +60 MIN BACKUP POWER

Extended Runtime

- Sell a rack with battery packs
- Understand the weight & dimensions necessary



Overcoming Objections

- UPSs are too expensive
- My power is good 99% of the time
- My building is backed up by a generator
- I currently use surge strips – I'm protected
- It'll never happen to me
- Not budgeted

Who is Minuteman Power Technologies?

MINUTEMAN®
POWER TECHNOLOGIES
by Para Systems, Inc.

Leading the power protection industry with award-winning products and superior power protection since 1982. Engineered to the highest safety and efficiency standards, we provide uninterrupted power to even the most demanding applications.

COMPANY BACKGROUND

- *Owned by Components Corporation of America (Est. in 1916)*
- *Best warranties industry-wide! (standard & extended)*
- *C.S.I. (Construction Specifications Institute) member with Master Format Documents for most UPS families*
- *Protecting Billions of dollars in customer equipment daily*

OUR PROMISE

Peace of mind when power failure is not an option.

OUR MISSION

Minuteman exists to provide power to people when they need it most.

MINUTEMAN POWER OFFERS:

- ✓ **FLEXIBILITY**
  Supporting you and your customer's needs through flexible, tailored solutions.
- ✓ **RELIABILITY**
  Providing reliably superior power protection since 1982.
- ✓ **PROTECTION**
  Protecting your mission-critical devices, regardless of the application
- ✓ **RESPONSIVE**
  Serving you and your customers in a prompt and friendly manner

PARTNERSHIP VALUE

- ✓ Exclusive Channel Support
- ✓ Better Value for Customers
- ✓ Bottom-line Improvement
- ✓ Designed by experts
- ✓ Onshore in-house technicians
- ✓ Competitively priced in the market

MINUTEMAN®
POWER TECHNOLOGIES

MARKET SEGMENTS

- **Public & Private Education**
  Universities and K-12
- **Large Corporations & Organizations**
- **Commercial Security**
  Surveillance, Access Control, Emergency Communications, PBX & VOIP
- **Retail & POS (Point of Sale)**
- **Networking**
  MDF, IDF and Edge Computing
- **Hospitality & Service**
- **Entertainment & Venues**
  Casinos, Sports Arenas, Theaters

CUSTOMER PROFILE

PROUDLY PROTECTING A BROAD RANGE OF MARKET SEGMENTS

WRAP-UP

Wrap-Up: Selling Power Protection

MINUTEMAN® POWER TECHNOLOGIES

- **Be Proactive** - *in promoting power protection to your customers – not driven by codes*
- **Power Protection IS A MUST** *on all system sales*
- **Think Forward** - *Don't forget to back up peripherals*
- **Get Involved** - *assist with analyzing your customer's disaster preparedness*
- **Understand and stay current** *on power protection and power management technologies*

QUESTIONS?

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