

Critical Infrastructure Glossary

2N: A redundancy model that ensures that every component has a backup such that the data center has no single point of failure.

A

A (Amp): A measurement unit of electrical current.

AC or ac (Alternating Current): Electrical current that reverses direction or polarity, several times per second at regular intervals.

ACAE (Air Conditioning Airflow Efficiency): The amount of heat removed per standard cubic foot of airflow per minute.

Acceptance: A formal action taken by a person with appropriate authority declaring that some aspect of the construction meets their defined requirements, thus permitting follow-on activities to proceed according to the Commissioning Plan.

AHU (Air Handling Unit): Part of the mechanical systems used for cooling a facility. The AHU typically receives chilled water produced externally to it and cools by passing the chilled water across a coil over which air is forced at high velocity into the space.

Air Mixing: The intentional or unintended mixing of cold and hot air.

Airside Economizer: A device consisting of fans, ducting and a control which utilizes outside air directly to cool the data center when environmental conditions allow. Air is typically filtered, brought into existing distribution system and then exhausted back to the atmosphere.

Aisle: The open space between rows of racks. Best-practice dictates racks should be arranged with consistent orientation of front and back to create 'cold' and 'hot' aisles.

Alternating Current (AC): Electrical current that reverses direction or polarity, several times per second at regular intervals.

Ampere or Amp: A measurement unit of electrical current.

ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers): An international technical society organized to advance the arts and sciences of air management.

ATS (Automatic Transfer Switch) :

Automatic Transfer Switch: A switch that automatically transfers electrical loads to alternate or emergency-standby power sources when it senses a decrease in voltage at the primary source.

B

BACnet (Building Automation and Control Network): A data communication protocol for building automation and control networks that allows equipment from different manufactures to communicate to a central Building Automation System.

Backup Time: Time during which the UPS can supply the rated load with nominal-quality power while the normal source of power is unavailable. This time depends on the battery and the efficiency of the UPS. Typical backup times range from five minutes to several hours.

BAS (Building Automation System): (Also BMS- Building Management System) System used for control/monitoring of all building electrical and mechanical systems. It is generally composed of sensors, actuators and programmable controllers connected to a central computer or several computers equipped with specific software.

Basis Of Design (BOD): A document that provides a record of the concepts, calculations, decisions and product selections used to meet the Owner's Project Requirements.

Battery (Recombination): Battery with a gas recombination rate at least equal to 95%, so that no water need be added over battery life, usually called "maintenance free."

Battery (Vented): The battery cells are equipped with a filling port for distilled, demineralized water used to top off the free electrolyte.

Battery Cells: The interconnected battery elements that supply electrical power created by electrolytic reaction.

Battery Circuit Breaker: DC circuit breaker that protects the battery of a UPS.

Battery Monitor: Battery monitoring and protection system that incorporates software to calculate the real available backup time, predicts when batteries need replacement and acts as a protection system against excessive discharges.

BCM (Branch Circuit Monitoring): A system which monitors the current of each branch circuit in a power panel.

Blackout: A complete loss of power lasting for more than one cycle of alternating current.

BMS (Building Management System): (Also BAS- Building Automation System) System used for control/monitoring of all building electrical and mechanical systems. It is generally composed of sensors,

actuators and programmable controllers connected to a central computer or several computers equipped with specific software.

BOD (Basis Of Design): A document that provides a record of the concepts, calculations, decisions and product selections used to meet the Owner's Project Requirements.

Branch Circuit Monitoring (BCM): A system which monitors the current of each branch circuit in a power panel.

Brownout: Prolonged sag, occurring when incoming power is reduced for an extended period. Usually caused when demand is at its peak and the line becomes overloaded.

BTU (British Thermal Unit): A unit of energy. 1kWh = 3412btu. Cooling equipment capacity is commonly specified in btu/hr.

Build to Suit: Design and build a facility that is specific to the organization that will occupy the facility.

Bypass Airflow: Conditioned air that does not reach computer equipment.

Bypass (Manual): Manually operated switch used to supply the load via direct connection to utility power during servicing of the UPS system.

Bypass (Automatic): Automatically operated switch used in the event of an overload or a UPS component failure allowing the load to be continually powered from a bypass source without human intervention.

C

C: Degrees Celsius, a measurement of temperature.

Cabinet: A device for holding IT equipment, also called a rack.

CAC: Cold Aisle Containment system that directs cooled air from air conditioning equipment to the inlet side of racks in a highly efficient manner.

CADE: (Corporate Average Data Center Efficiency).

Capacitor: Any AC circuit element possessing the property of capacitance (i.e., the ability to store a charge).

CapEx (Capital Expense): The cost of purchasing capital equipment.

Carbon Footprint: A measurement of the volume of Carbon Dioxide generated by business operations, units are commonly metric tons.

CFD (Computational Fluid Dynamics): A numerical analysis technique commonly used in the analysis of airflow in data centers.

CFM (Cubic Feet per Minute): A unit of flow rate, commonly used to specify airflow.

Charger: Device associated with the rectifier and used to supply the battery with the electrical power (DC Current) required for recharging and/or float charging the battery, thus ensuring the rated backup time.

Chiller: A unit consisting of a compressor, a condensing section and an expansion section. The condensing and expansion sections nearly always have water or glycol as the heat transfer agent to the rest of the cooling system.

Close-Coupled Cooling: Cooling technology that is installed adjacent to server racks, minimizing the path that air must flow from the cooling unit through the IT equipment and back to the cooling unit.

Cloud Computing: Space in internet connected data centers that is available for long term or short term rental to meet the needs and capacity of users.

Coefficient of Effectiveness: (CoE) Uptime Institute metric based on the Nash-Sutcliffe model efficiency coefficient.

Cold Aisle: An aisle where rack fronts face into the aisle. Chilled airflow is directed into this aisle so that it can then enter the fronts of the racks in a highly efficient manner.

Cold Spot: An area where ambient air temperature is below desired levels.

Colocation: The practice of multiple tenants renting space or services from one Data Center.

Commissioning (aka Commissioning Process): A quality focused process for enhancing the delivery of a construction project. By verifying and documenting that the facility and all of its systems and assemblies are planned, design, installed, tested, operated and maintained to meet the Owner's Project Requirements.

Commissioning Authority (aka Commissioning Agent): An entity identified by the Owner who leads, plans, schedules and coordinates the Commissioning Team to implement the Commissioning Plan.

Commissioning Plan: A document developed by the Commissioning Authority for use by the Commissioning Team that outlines the organization, schedule, allocation of resources and documentation requirements of the Commissioning Process.

Commissioning Team: The various entities that take part in the implementation of the Commissioning Process, typically including but not limited to the Owner, Architect, Engineers, Commissioning Authority, Contractors and Equipment Vendors.

Container: Containers usually consist of a modular portable Plug and Play equipment. A container could house servers, UPS's, cooling or various other facility components.

Containment: Using either long curtains or rigid plastic to maintain a physical barrier between a hot and cold aisle.

COP: (Coefficient of Performance): A means to rate the effectiveness of heat pumps or cooling units. It is the ratio of the load on a cooling unit and the energy that it uses.

Cooling Tower: A device which cools water via the direct evaporation of some of the water. Water is pumped into the top of the cooling tower and allowed to run down over the fill, typically pads or strips into a sump at the bottom of the cooling tower. Air is drawn in from the sides over the fill by fans in the top of the tower, evaporating some of the water which cools the remaining water.

Connectivity: The connection of one or more data carriers to a facility.

CRAC (Computer room air conditioner): A precision air conditioning unit that uses refrigerant and a compressor. Cooling of the air in the data center is accomplished by airflow over the evaporation coils. The heat is absorbed by the refrigerant which is pumped to a condenser and the heat is rejected into the outside air by forcing air across another set of coils in the condenser.

CRAH: (Computer Room Air Handler): A precision air conditioning unit that uses chilled water passing through a heat exchanger to cool air flowing over the heat exchanger.

Critical Load: Equipment that must have an uninterrupted power input to prevent damage or loss to a facility or to itself, or to prevent danger of injury to operating personnel.

CSI: (Cold Supply Infiltration): An index that quantifies the amount of hot air mixing with cold inlet air prior to entering the rack.

CUE: (Carbon Usage Effectiveness): A metric defined by the Green Grid, which is a measure of data center sustainability in terms of data center specific carbon emissions.

Current: The flow of electricity in a circuit.

Current (Float): DC current that maintains the battery at nominal charge, corresponding to the float voltage. This current compensates for open circuit losses.

Current (Inrush): Temporary current observed in a network when electrical devices are first energized, generally due to the magnetic circuits of the devices. The effect is measured by the current's maximum peak value and the RMS current value it generates.

Current Transformer (CT): A device used to transform electrical current from one level to another with a specific ratio. CTs are typically used to transform large currents to much smaller currents so that standard metering equipment can be used to measure the secondary current rather than the large primary current.

Cutout: An open area in a raised floor that allows airflow or cable feeds.

D

Data Center: Typically, a designated building or space with a primary purpose of housing computer servers, usually self-contained with power, cooling, security and internet carrier connectivity.

DC or dc (Direct Current): Electrical current which flows consistently in one direction.

DCiE (Data Center Infrastructure Efficiency): An efficiency measure that is calculated by dividing the IT equipment power consumption by the power consumption of the entire data center. This measure is the inverse of PUE.

DCIM: (Data Center Infrastructure Management) tools monitor, measure, manage and/or control data center utilization and energy consumption of all IT-related equipment (such as servers, storage and network switches) and facility infrastructure components (such as power distribution units [PDUs] and computer room air conditioners [CRACs]).

Dead Band: A control technique which prevents oscillation or unnecessary cycling of a controlled variable. In data center cooling, it typically applies to the action of the CRAC or CRAH relative to the set point.

Deficiency Log (aka Issues Log): A formal and ongoing record of problems or concerns – and their resolution – that have been raised by the members of the Commissioning Team during the course of the Commissioning Process.

Delta T: The difference in temperature across a device.

Dew Point: The temperature at which air reaches water vapor saturation.

D/H: Dehumidifying/Humidifying.

Direct Current (DC): Electrical current which flows consistently in one direction.

Direct Expansion (DX): Any system that, in operation between an environment where heat is absorbed (heat source), and an environment into which unwanted heat is directed (heat sink) at two different temperatures, is able to absorb heat from the heat source at the lower temperature and reject heat to

the heat sink at the higher temperature. The cooling effect is obtained directly from a fluid called a refrigerant that absorbs heat at a low temperature and pressure, and transfers heat at a higher temperature and higher pressure.

Distortion (Individual): Ratio between the RMS value of an nth order harmonic and the RMS value of the fundamental.

Distortion (Total): Ratio between the RMS value of all harmonics of a non-sinusoidal alternating periodic value and that of the fundamental.

Double-Conversion: A UPS design in which the primary power path consists of a rectifier and inverter. Double-conversion isolates the output power from all input anomalies.

Dry-Bulb Temperature: The temperature of the air measured using a dry-bulb thermometer such that evaporative cooling has no effect.

Dry Cooler: A liquid-to-air heat exchanger that is a radiator over which air is blown via fans.

E

Economization: A way of utilizing the local environment around the data center to aid in cooling of the IT load by natural means rather than use more energy. There are two common types of economization, Airside Economization and Waterside Economization.

Electromagnetic Compatibility: Possibility of a device to operate normally when installed near other devices, given the disturbances emitted by each device and their mutual sensitivities.

EMI/RFI: Electromagnetic/Radio Frequency Interference. These high-frequency signals are generally low level (<1V) and range from 1MHz up. EMI/RFI filters are generally not suitable for large amplitude surge suppression.

EPMS (Electrical Power Monitoring System): This system can monitor, alarm and record the electrical system parameters 24 hours a day. Typically, it does not have the ability to operate or change state of the electrical system components.

ESD (Electrostatic Discharge): More commonly “static discharge” is the sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or dielectric breakdown.

Ethernet: Network technology that divides data into packet or frames using protocols to control the passing of information for multiple systems.

F

F: Degrees Fahrenheit, a measurement of temperature.

Float Current: DC current that maintains the battery at nominal charge, corresponding to the float voltage. This current compensates open circuit losses.

Floating Voltage: DC voltage applied to the battery to maintain its charge level. This voltage depends on the type of battery, the number of cells, and the manufacturer's recommendations.

Free Cooling: A system that operates when the outside air is cool enough, it allows for usage of outside air to provide cooling of the facility, either directly or via liquid to outside air heat exchange.

Frequency: The number of cycles (oscillation positive and negative) completed in one second. Defined as hertz (Hz). In North America, utility power completes 60 cycles per second (60 hertz).

Fuel Cell: A component that produces electric current directly from a chemical reaction.

Fuel Cell Stack: An assembly of plates that use hydrogen and oxygen to produce electricity.

Functional Performance Testing: provides assurances that individual discrete components – sensors, switches, valves, etc. – that make up the larger systems are operating properly. Once that is verified, the systems themselves are tested under load and switching conditions to validate performance as specified.

G

GPM (Gallons Per Minute): A unit of flow rate.

Grounded Conductor: A conductor that is intentionally grounded.

Grounding Conductor: A conductor connected between a circuit and the earth.

H

HAC (Hot Aisle Containment): A system that directs heated air from the outlet side of IT racks to air conditioning equipment return ducts in a highly efficient manner.

Harmonics (Current and Voltage): All alternating current, which is not absolutely sinusoidal, is made up of a fundamental and a certain number of current harmonics, which are the cause of its deformation (distortion) when compared to the theoretical sine wave.

Harmonic Distortion: A measure of the degree to which the impedance of a UPS affects the shape of the output voltage waveform. Distortion is stated as a percentage and may refer to any single harmonic or to the total waveform, in which case it is referred to as "total harmonic distortion" (THD).

Heat Exchanger: A device used to transfer heat energy from one medium to another.

HMI (Human Machine Interface): HMI is a software that presents information to a user, typically in a graphic format on a screen. An operator can manipulate the screen graphics to cause various system operations to occur.

Hot Aisle: An aisle where IT rack backs face into the aisle. Heated exhaust air from the equipment in the racks enters this aisle and is then directed to the CRAC return vents.

HPDC (High-Performance Data Center): a data center with above average kW loading, typically greater than 10kW/rack.

Hot Spot: An area, typically related to a rack or set of racks, where ambient air temperature is above acceptable levels. Typically caused by poor airflow management (insufficient cool air supply or an excess of recirculation).

Hp (Horsepower): A unit of power equal to 550 foot-pounds per second.

HVAC: (Heating, Ventilation and Air Conditioning) A system with a set of components used to condition interior air including heating and cooling equipment as well as ducting and related airflow devices.

I

Infrared Scan: A process of evaluating the thermal signature of a device under load.

Inlet Air: The air entering a particular piece of equipment. For air conditioning equipment, this is the heated air returning to be cooled, also called return air.

In-Row Cooling: Cooling technology installed between racks in a row that draws warm air from the hot aisle and delivers cool air to the cold aisle, minimizing the path of the air.

Inrush Current: Temporary current observed in a network when electrical devices are first energized, generally due to the magnetic circuits of the devices. The effect is measured by the current's maximum peak value and the RMS current value it generates.

Integrated Systems Testing (IST): The final level of the commissioning process during construction, IST tests all of the discrete electrical and mechanical systems as one integrated critical facility. The entire systems is tested under load, and exposed to a variety of failure scenarios to validate the final installation meets the original owner’s operational requirements.

Interference (High-Frequency): High-frequency parasitic current that is either conducted (electrostatic origin) or radiated (electromagnetic origin) by a device.

Inverter: The DC to AC power converter driven by the UPS rectifier-charger or battery via the DC bus. The inverter output drives the critical load.

Inverter (Off-Line or Stand-By): UPS configuration in which the inverter is parallel-mounted to the load supply line and backs up the mains power source.

Inverter (Online): UPS configuration in which the inverter is in series mounted between the main power source and the load. All power drawn by the load passes via the inverter.

IP: (Internet Protocol) A communications technology using the internet for communications.

IR: (Infrared) spectrum used by thermal imaging technologies.

ISO 9000: Standard defining procedures and systems used to attain an internationally recognized level of production quality.

Isolation: The separation (often through the use of an isolation transformer) of one section of a system from undesired electrical influences of other sections.

Isolation Transformer: A multiple-winding transformer with physically separate primary and secondary windings.

Issues log (aka Deficiency Log): A formal and ongoing record of problems or concerns – and their resolution – that have been raised by the members of the Commissioning Team during the course of the Commissioning Process.

J

Joule: A derived unit of energy in the International System of Units.

kBTU (kilo British Thermal Unit): One thousand BTU’s.

kCFM (Kilo-Cubic Feet per Minute): one thousand CFM.

kV (Kilovolt): One thousand volts.

kVA (Kilovolt-amperes): One thousand volt-amperes.

kW (Kilowatt): One thousand watts.

kWh (Kilowatt-Hour): One thousand watt-hours. kWh is a common unit of electrical energy.

kVA (Kilovolt Amperes): One thousand volt-amperes.

KVM: Keyboard, Video, Mouse, an interface technology that enables users to access multiple servers remotely from one or more KVM sites.

L

Latency: The amount of time it takes internet information to travel from its source to the desired location and back to the source.

Latent Cooling: The process of condensing water out of air, then evaporating the water later. Energy is given up by the water during condensation.

Latent Cooling Capacity: Cooling capacity related to wet bulb temperature and objects that produce condensation.

Line Conditioner: A transformer that attempts to smooth out fluctuations in input voltage to provide near uniform output voltage or voltage waveform.

Line Disturbance Analyzer: A tool used in analyzing problems in a facility's incoming power.

Line-Interactive: A UPS containing an off-line inverter that must transfer on during a blackout, but provides faster transfer times than an off-line UPS.

Line Noise: Distortions superimposed on the power waveform that may cause electromagnetic interference.

Liquid Cooling: A general term used to refer to cooling technology that uses a liquid to evacuate heat.

Load: The demand placed on a system, typically used to describe the electrical demand on the electrical supply system or the cooling demand on the cooling system.

Load (Linear): Load for which voltage form and current form are similar. Voltage and current are related by Ohm's law: $U(t) = Z \times I(t)$.

Load (Non-Linear): Load (generally with a switched-mode power supply) generating major harmonic currents. Current waveform is different from voltage waveform.

Load Shedding: The ability to selectively shut off a portion of a load.

M

MAH (Makeup Air Handler): An air handler that conditions and delivers outside air into an occupied space.

Make-Up Air: The conditioned air delivered by a MAU or MAH.

Managed Services: An outside data center that provides data management services to clients for a fee.

Mantrap: A security feature that requires a person to enter a neutral area between two access points. After the first access point is open and a person enters, the first access point must close securely before the second access point can be opened to allow the person to continue.

Manual Bypass: Manually operated switch used to supply the load via direct connection to utility power during servicing of the UPS system.

MAU (Makeup Air Unit): Synonymous with MAH.

Maximum Temperature Rate of Change: An ASHRAE standard established to ensure stable air temperatures.

MERV (Minimum Efficiency Reporting Value): ASHRAE 52.2, for air filtration measured in particulate size.

MOV (Metal Oxide Varistors): A device used to mitigate the effect of small voltage spikes by flattening out the peak of the voltage wave form.

MMR (Meet Me Room): This is a physical location in a data center where internet carriers and data center clients connect.

MTBF (Mean Time between Failures): Mathematical calculation of the duration of normal operation of a repairable device between failures.

MTTF (Mean Time to Failure): Mathematical calculation of the duration of normal operation of an irreparable device, i.e. for which a MTBF is not possible.

MTTR (Mean Time to Repair): Mathematical calculation (or statistical average if available) of the time required repairing a device.

MW (Mega Watt): A measure of power equal to one million watts. Often used to describe the size of data centers in terms of power capacity.

N

N+1 (Normal - Plus One): A redundancy concept where equipment or component capacity is configured to include used capacity (N) plus one additional device to enable continued operations at full capacity with the failure of one system in the configuration.

NETA (International Electrical Testing Association): NETA is an association of leading electrical testing companies committed to advancing the industry's standards for power systems installation and maintenance to ensure the highest level of reliability and safety.

Noise: Noise is the result of distortion of the normal line power sine wave by hundreds or thousands of small increases in voltage similar to EMIIRFI, though it encompasses lower frequencies. The amplitude of this type of disturbance is less than a surge but may be as low as EMIIRFI.

Nominal Cooling Capacity: The total cooling capacity of air conditioning equipment, includes both latent cooling and sensible cooling capacities.

Non-Linear Load: Load (generally with a switched-mode power supply) generating major harmonic currents. Current waveform is different from voltage waveform.

Normal Line Power: Commercial electricity supplied by U.S. power utilities is generally delivered as 60-cycle (Hz) alternating current (AC).

O

Off-Line UPS: A UPS type that feeds power to the load directly from the utility and then transfers to battery power via an inverter after utility source drops below a specified voltage.

Online UPS: A UPS in which the inverter is on during normal operating conditions supplying conditioned power to the load through an inverter or converter.

OPR (Owners Project Requirement): A written document that details the functional requirements of a project and the expectations of how it will be used and or operated.

OpEx (Operating Expense): the ongoing expenses related to operating the critical facility.

Output (Rated): Apparent power that a given device can deliver under given load conditions.

Overcooling: A situation where air is cooled below optimum levels. Typically used in reference to rack inlet temperatures.

Overload Capacity: A UPS's overload capacity is its ability to respond to sudden surges in load current without allowing the output voltage level to decrease.

Owners Project Requirement (OPR): A written document that details the functional requirements of a project and the expectations of how it will be used and or operated.

P

Parallel Online UPS: Online UPS technology that provides redundant sources of conditioned backup power so that the critical load is protected even in the event of UPS component failure.

Partial Discharge: Localized electrical discharge that only partially bridges the insulation between conductors.

Percent Load: Ratio between the power P_u drawn by the load and the rated output P_n of a UPS system (P_u/P_n). Sometimes referred to as the load factor.

PDU (Power Distribution Unit): A piece of equipment in the power delivery chain. Typically, a combination transformer/breaker panel that is often used between a UPS and the IT equipment.

PF (Power Factor): PF represents the portion of the apparent power that is real power. The source of power factor is non-resistive components (inductors and capacitors) in the load on an AC power system.

pH: A numeric scale that is used to specify the acidity of a solution.

PH (Phase): A term that describes the relationship between multiple time-varying waveforms which have a constant frequency but differ in their position relative to time. Most common are three-phase and single-phase.

Plate and Frame: A type of heat exchanger commonly used in water-to-water systems. It is a series of plates held in a frame through which exists 2 paths for water which are adjacent but separate.

Plenum: A receiving chamber for air used to direct air flow.

Plug Strip: In a Data Center environment, this is typically a row of power receptacles that is connected to the load side of a PDU.

POC (Proof of Concept): is documented information that proves a product or facility design can be successful for its intended purpose.

POE (Point of Entry): is the physical space in a Data Center where the carries enter the facility, usually internet optical fiber.

Potential Transformer (PT): A device used to transform electrical potential (voltage) from one level to another with a specific ratio. PTs are typically used to transform large voltages to much smaller voltages so that standard metering equipment can be used on a variety of circuits.

Power Conditioning Systems: A broad class of equipment that includes filters, isolation transformers, and voltage regulators. Generally, these types of equipment offer no protection against power outages.

Power Factor (PF): The ratio of total real power (W), to the total apparent power in volt-amperes (VA), W/VA, generally expressed in a percentage.

Power Source (Alternate): Backup source used in the event of a mains failure. The connection time and the duration of the source depend on the type of source used.

Power Synthesizer: Power synthesizers use the incoming utility power as an energy source to create a new sine wave that's free from power disturbances.

Pre-functional Testing – Elementary tests and visual inspections that are performed prior to energization and functional testing of newly installed equipment. Examples are tests such as conductor testing; torque checks of cable terminations; pressure testing and pipe flushing.

Primary Loop: Refers to the water loop which cools the condenser side of a chiller. This loop is cooled by dry coolers or cooling towers.

PUE (Power Usage Effectiveness): A metric defined by the Green Grid, which is a measure of data center efficiency calculated by dividing the total data center energy consumption by the energy consumption of the IT computing equipment. This measure is the inverse of DCiE.

PWM (Pulse Width Modulation): Inverter high-frequency chopping technique using a means of regulation enabling rapid modification of pulse widths over a single period, thus making it possible to maintain the inverter output within tolerances even for non-linear loads.

R

Rack: Device for holding IT equipment, also called a cabinet.

RAH (Recirculation Air Handler): A device that circulates air but does not cool the air.

Raised Access Floor (RAF): Flooring panels on stanchions that creates a plenum for airflow and cabling.

Reactance (for Generator): Relative measurement (%) of the internal impedance of an AC generator during harmonic phenomena.

Recirculation: Air which exits IT equipment and then re-enters either the same IT equipment or another piece of IT equipment without being cooled.

Recombination Battery: Battery with a gas recombination rate at least equal to 95%, so that no water need be added over battery life, usually called "maintenance free."

Rectifier/Charger: UPS component that draws from the mains the power required to supply the inverter and to float charge or recharge the battery. The alternating input current is rectified and then distributed to the inverter and the battery.

Redundancy: Duplication of elements in a system or installation to enhance the reliability or continuity of operation.

Reliability: Probability that a device will accomplish required function under given conditions over a given period of time.

Return Air: The heated air returning to air conditioning equipment.

RFI: (Radio Frequency Interference) This is the conduction of radio frequency energy that can cause electronic devices to operate in an undesirable way.

Rh: (Relative Humidity) The amount of water vapor present in air, expressed as a percentage.

RMS: Acronym for Root Mean Square, a formula used to calculate effective voltage. The RMS value of normal AC power is 120V. (Compare to peak voltage.)

ROI: Return on Investment, a measure of the money that an entity earns as a percentage of the total value of its assets that are invested.

Rotary Heat Exchanger (Thermal Wheel): This unique scalable and waterless air-side economizer design can provide 90% effectiveness in heat rejection.

RPM (Revolutions per Minute): a unit of angular velocity.

RPP (Remote Power Panel): A power panel typically installed downstream of a PDU.

RTU (Rooftop Unit): An air handler designed for outdoor use mounted on a rooftop that produces forced cooled air typically through Direct Expansion (DX) cooling via a compressor and refrigerant.

S

Sag: A momentary decrease from nominal voltage lasting one or more line cycles. Severe conditions may dictate a need for a UPS or voltage regulator. Also, known as a temporary under-voltage (TUV).

SCFM (Standard Cubic Feet per Minute): A volumetric flow rate of a gas corrected to standardized conditions of temperature, pressure and relative humidity.

Script (aka Test Procedure): A written protocol that defines methods, personnel and expectations for tests conducted on components, equipment, assemblies, systems and interfaces among systems. In a retro or re-commissioning, this may include specific steps to avoid disruption of the active facility systems.

Secondary Loop: Refers to the water which is used to cool the heat exchangers in AHUs and is cooled via the expansion unit in a chiller.

Sensible Cooling: The action of lowering the dry bulb temperature of air without condensation taking place.

Set Point: In a control system, this is the value against which the variable that is being controlled is compared. Temperature and humidity set points are common in the cooling system for a data center.

Short Cycling: Chilled airflow returning to cooling units without passing through IT equipment, also referred to as bypass.

Sine Wave: A mathematical curve that describes a smooth repetitive oscillation; the fundamental waveform from which other waveforms may be generated by combinations of various group of harmonics.

SLA (Service Level Agreement): The agreement or contract that is negotiated between the IT hosting company and the user or vendor.

SNMP: Simple Network Management Protocol is a popular protocol for network management. It is used for collecting information from, and configuring, network devices, such as servers, printers, hubs, switches, and routers on an Internet Protocol (IP) network.

Spike: A spike involves a sudden marked short duration increase in voltage, which can damage electronics and corrupt or destroy data.

Spike/Surge Protector: These products are inexpensive solutions that utilize MOVs to provide minimal protection against spikes and surges, but no protection against sags and outages.

Static Bypass Switch: In a UPS, a solid state power-electronics device that can be used for sub-cycle switching from the main power source to a bypass source without a noticeable interruption in the supply of power, thus allowing the operator to transfer the UPS to maintenance bypass with an interruption of the critical load.

STS (Static Transfer Switch): A solid state power-electronics device that can be used for sub-cycle switching from a main power source to an alternate source without a noticeable interruption in the supply of power. Typically used to switch between to UPS sources for redundancy.

Sub-Floor: The open area underneath a raised computer floor, also called a sub-floor plenum.

Supply Air: The cooled airflow emitted from air conditioning equipment.

Suppressed Voltage Ratings: Several ranges are assigned by UL for grading transient suppression voltages.

Surge: A surge is a prolonged over-voltage condition. Surges can damage electronics and corrupt or destroy data.

Swell: An increase from nominal voltage lasting one or more line cycles.

Systems Manual: A system focused composite document that includes the operation manuals, maintenance manuals, as-built documentation, warranties and additional information of use to the Owner's during the occupancy and operations of the facility.

T

Tan Delta (or Dissipation Factor): The tan delta measurement is used to determine a loss factor for insulating material.

TCE (Triton Coefficient of Effectiveness): A data center efficiency metric developed by the Uptime Institute synonymous with UCE.

Test Procedure (aka Test Script): A written protocol that defines methods, personnel and expectations for tests conducted on components, equipment, assemblies, systems and interfaces among systems. In a retro or re-commissioning, this may include specific steps to avoid disruption of the active facility systems.

Total Harmonic Distortion (THD): All of the distortion in a voltage waveform added together is referred to as "total harmonic distortion".

Thermistor: A type of resistor with resistance varying according to its temperature.

Transfer Time: Transfer time refers to the speed at which a device transfers the load to one source or another.

Transient: A fast, sub-cycle change in a smooth sine wave that occurs in both voltage and current waveforms during the transition from one steady-state operating condition to another.

Transient Suppression Voltage (Let-Through Voltage): The maximum peak voltage occurring within 100 microseconds after the test wave.

Transient Voltage Surge Suppressor (TVSS): A device used to reduce voltage surges. Products may be wired in series or in parallel with the AC electrical conductors.

U

U: A unit of space in a rack, equal to 1.75". The vertical dimension of racks and IT equipment is often specified in "Us" such as 42U.

UCE (Upsite Coefficient of Effectiveness): A data center efficiency metric developed by the Uptime Institute synonymous with UCE. (see also CoE)

UL: Underwriters Laboratories - An independent safety approval organization based in the United States that focuses on electrical devices and assemblies.

UPS: Uninterruptible Power Supplies (sometimes called Uninterruptible Power Systems). A system designed to protect against short-term power outages through the use of a stored energy source such as a battery or flywheel.

UPS (Parallel with Redundancy): A UPS made up of several parallel-connected UPS units with equal output ratings (P) and each equipped with its battery.

UPS (Parallel without Redundancy): A UPS made up of several (n) parallel-connected UPS units with equal output ratings (P) and each equipped with its battery, typically used for loads larger than the available capacity of a single module

UPS (Single): A UPS made up of one single UPS unit (rectifier/charger, inverter and bypass) and a battery.

V

V: (Volt) A unit of electrical potential.

VA: (Volt-Amp) A unit of apparent power. In AC circuits, the magnitude of the voltage across a circuit times the current through the circuit is the apparent power.

Verification: The process by which specific documents, components, equipment, assemblies, systems and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements.

VESDA System (Very Early Smoke Detection Apparatus): A system that monitors specific areas or spaces for smoke with the intent of alarming an undesirable smoke condition as early as possible.

VFD: (Variable Frequency Drive) A device which supplies AC power of varying frequency, typically used to control the speed of induction motors.

VLF: Very low frequency. This is generally a voltage source used in testing insulation quality. The power source frequency may range from 0.01 Hz to 60 Hz.

Volt: (V) The unit of measure for voltage, the electrical potential which forces the current to flow in a conductor such as a wire.

Volt-Ampere: (Va) Voltage (V) multiplied by the current (ampere); apparent power. For instance, a device rated at 10 amps and 120 V has a VA rating of 1200 or 1.2 kVA.

Voltage: A term referring to electrical force or potential.

Voltage (Float): DC voltage applied to the battery to maintain its charge level. This voltage depends on the type of battery, the number of cells, and the manufacturer's recommendations.

Voltage Regulator: A device designed to regulate RMS voltage by removing swells and sags (such as an automatic tap switching transformer or Ferro resonant transformer).

W

W (Watt): The quantitative unit of measurement of actual power, watts are the product of potential (volts) and current (amps).

Walk-In Time: The time that the rectifier on a UPS takes to reach rated output current after the Start-Up Delay. The slope is fixed so that a lower output current will have a shorter walk in period.

Waterside Economizer: A system which uses a source other than a chiller to cool the secondary loop water used by the AHUs.

Watt (W): The quantitative unit of measurement of actual power, watts are the product of potential (volts) and current (amps).

Wet-Bulb Temperature: The temperature of the air measured using a wet-bulb thermometer, that is, the temperature to which a wet surface can be cooled by evaporation.

WC: (Inches of water column) A unit of pressure based on the height of a column of water supported by the pressure differential between the top and bottom of the column. 1 inch WC = .036 psi.

WPSF: (Watts per Square Foot) A unit of power density of an overall facility or section of a facility, often a design parameter.

WUE: (Water Usage Effectiveness) WUE is calculated by dividing “annual water usage” by the “energy consumption of the IT computing equipment”. The units of WUE are liters/kilowatt-hour (L/kWh).

Wye Connection: A three-phase source of load connection, with a single common junction and three phase lines out or in.