GRID & SILICON

Glossary

A

AC (alternating current): Electric current that changes direction again and again. Power grids usually deliver electricity this way.

Accelerator: A chip built to speed up a certain kind of computing work, such as AI calculations.

AI (artificial intelligence): Computer programs that learn patterns from lots of examples.

Air cooling: Using moving air to carry heat away from equipment.

All-reduce: A computing step that combines results from several processors and shares the combined result with each one.

Allegation: A claim that still needs evidence to show whether it is true.

Ampere (amp): A unit measuring how much electric charge flows each second.

Anode: The electrode where a reaction releases electrons. In a hydrogen fuel cell, fuel enters this side.

Atom: A tiny building block of matter. Each atom has a center called a nucleus.

B

Backup power: An extra electricity supply that takes over when the main supply fails.

Bandwidth: How much data a connection can carry in a set time.

Batching: Grouping several computing requests so hardware can work on them together.

Battery: A device that stores energy through chemical changes and supplies electricity later.

Battery storage: A system of batteries and controls that stores energy for later use.

Behind-the-meter: On the customer's side of the power company's meter, where electricity use is measured.

Blackout: A loss of electrical power across an area.

Blowdown: Water drained from a cooling system to stop minerals from building up too much.

Bottleneck: A slow or limited part that holds back the whole system, like a narrow doorway slowing a crowd.

C

Capacity: The largest amount a system is designed to handle. Available capacity can differ from what is actually being used.

Capacity factor: The electricity made over time compared with the most it could make running at full power the whole time.

Catalyst: A material that helps a chemical reaction happen without being used up overall.

Cathode: The electrode where a reaction takes in electrons. In a hydrogen fuel cell, oxygen reaches this side.

CDU (coolant distribution unit): Equipment that manages cooling liquid flow and transfers heat between liquid loops in a data center.

Cell: One working unit of a battery or fuel cell. Several cells can be joined together.

Checkpoint: Saved AI training progress that lets a computer continue after an interruption.

Chemical reaction: When substances combine or break apart to make something new.

Chiller: A machine that removes heat from a liquid, often using a refrigeration cycle.

Chip: A small piece of material holding tiny electrical parts that process or store information.

Circuit: A complete path that lets electric charge flow through equipment and return.

Cloud computing: Using computers reached over a network instead of doing all the work on your own device.

Cluster: A group of connected computers working as one system.

CO2 (carbon dioxide): A gas released when carbon-based fuels burn or react. Adding it to the air warms the climate.

Cold plate: A metal part that collects heat from a chip and passes it to cooling liquid.

Combined cycle: A power system that uses a gas turbine's exhaust heat to make steam and generate more electricity.

Commissioning: Testing and checking newly installed equipment before putting it into regular service.

Compressor: A machine that squeezes a gas, raising its pressure.

Compute: The work computers do to process information and run calculations.

Coolant: A liquid or gas used to carry heat away from equipment.

Cooling loop: A path that cooling liquid follows before returning to its starting point.

Cooling tower: Equipment that releases heat outdoors, often by letting some water evaporate.

Cost allocation: Rules for deciding who pays which share of a shared expense.

CPU (central processing unit): A computer's main processor. It handles instructions and coordinates many different jobs.

Current: The flow of electric charge through a material or device.

Curtailment: Reducing or stopping electricity use or production when the power system needs it.

D

Data: Information computers store or work with, such as numbers, words, pictures or sounds.

Data center: A building or group of buildings holding computers, storage and the equipment that keeps them running.

DC (direct current): Electric current that flows in one direction. Batteries supply direct current.

Demand: The amount of electrical power people and equipment need at a particular time.

Demand response: Changing electricity use at certain times to help the power system or respond to prices.

Direct-to-chip cooling: Cooling liquid flows through cold plates attached to chips to collect heat.

Dispatchable power: A power source that can start or change its output when needed, within its limits.

Distribution: The part of the grid that carries electricity from local substations toward customers.

Dry cooler: Equipment that transfers heat from a liquid to outdoor air without spraying water into that air.

E

Efficiency: How much useful work or output a system gets from the energy it uses.

Electrical charge: A property of matter that causes electrical forces. Moving charge creates electric current.

Electrode: A part where electric current enters or leaves a material. Battery and fuel-cell reactions happen at electrodes.

Electrolyte: A material that lets charged particles called ions move through a battery or fuel cell.

Electron: A tiny particle with negative electric charge. Electrons moving through wires carry current.

Emissions: Substances released into the surroundings, such as gases leaving a power plant.

Energy: An amount used or stored over time. For electricity, energy equals power multiplied by time.

EPA (Environmental Protection Agency): The U.S. government agency that protects human health and the environment.

Estimate: A careful best guess based on known facts. It can change when we learn more.

Evaporation: When liquid changes into gas, carrying heat away from what remains.

Exhaust: Gas leaving an engine or turbine after it has done work. Exhaust can still carry heat.

F

Fiber (fiber-optic cable): Thin strands of glass or plastic that carry information using light signals.

Filing: A formal document submitted to a public agency or court for review.

Fine-tuning: Extra training that adjusts an existing AI model for a narrower task.

Fission: Splitting an atom's nucleus to release energy.

Forecast: An estimate of what may happen in the future.

Framework agreement: An agreement setting general terms for possible future orders. It may not guarantee every proposed purchase.

Frequency: How often something repeats each second. Grid frequency describes how often alternating current completes a cycle.

Fuel: A material used to release energy, such as natural gas, hydrogen or uranium.

Fuel cell: A device that turns fuel and oxygen into electricity without burning the fuel.

G

Gas turbine: A machine where hot, moving gas turns blades. A connected generator can make electricity.

Generator: A machine that changes movement into electrical energy.

Geothermal energy: Energy from heat inside Earth. Some power plants use that heat to make electricity.

GPU (graphics processing unit): A processor that performs many calculations at once. GPUs handle graphics and much of the work used for AI.

Gradient: Numbers that show how changing a model's settings could change its errors. Training uses them to guide adjustments.

Grid: Connected power lines and equipment that carry electricity from power sources to users.

Grid connection: A link that lets a site receive electricity from the wider power system.

GW (gigawatt): A unit of power equal to one billion watts, or one thousand megawatts.

GWh (gigawatt-hour): A unit of energy equal to one gigawatt of power used for one hour.

H

Hardware: The physical parts of a computer system, such as chips, cables and drives.

HBM (high-bandwidth memory): Memory placed close to a processor to move large amounts of data quickly.

Heat: Energy moving from something warmer to something cooler.

Heat exchanger: Equipment that transfers heat between separate fluids without mixing them.

Heat rejection: Moving unwanted heat out of a system, usually into outdoor air or water.

Heat reuse: Using waste heat for another purpose, such as warming a nearby building.

High voltage: A large electrical push. Grids use high voltage to carry power over long distances with less energy lost.

Hydrogen: A light gas that can be used as fuel. Making hydrogen takes energy.

Hydropower: Electricity made by using moving water to turn a turbine connected to a generator.

Hyperscaler: A company running very large cloud computing systems.

I

Immersion cooling: Cooling equipment by placing it in a liquid that does not easily carry electric current.

Inference: Using a trained AI model to work on a new input and produce an answer.

Input: Information, energy or material that enters a system.

Interconnection queue: A waiting list for studies of proposed grid connections. Generator and large-customer connection processes can have different rules.

Inverter: Equipment that changes direct current into alternating current.

Ion: An atom or group of atoms with an electric charge.

Islanding: Running a local power system separately from the wider grid.

IT (information technology): Computers, storage and networks used to handle information.

IT load (information technology load): The electrical power used by computing equipment, rather than the whole building and its cooling systems.

K

kV (kilovolt): A unit of voltage equal to one thousand volts.

kW (kilowatt): A unit of power equal to one thousand watts.

kWh (kilowatt-hour): A unit of energy equal to one kilowatt of power used for one hour.

L

Large-load tariff: A power company's price rules and conditions for customers using large amounts of electricity.

Latency: The time a message takes to travel or a system takes to respond.

Lawsuit: A dispute brought to a court for a decision.

Liquid cooling: A system that uses liquid to carry heat away from equipment.

Lithium-ion battery: A rechargeable battery that moves lithium ions between electrodes as it charges and discharges.

LLM (large language model): An AI model trained on large amounts of text to work with language.

Load: Equipment using electricity, or the amount of power it draws.

Load factor: Average power use divided by the highest power use during the same period.

Loop: A path that returns to its starting point, such as the route cooling liquid follows.

M

Machine learning: A way to build computer programs by learning patterns from examples.

Make-up water: Fresh water added to replace water lost from a cooling system.

Matrix: A table of numbers arranged in rows and columns. AI programs use calculations with matrices.

Memory: Storage holding information a computer needs during its work.

Microgrid: A local power network that can sometimes run separately from the larger grid.

Model: The AI program that makes answers by using patterns learned during training.

Modular: Made from units that can be built separately and joined together.

MW (megawatt): A unit of power equal to one million watts.

MWh (megawatt-hour): A unit of energy equal to one megawatt of power used for one hour.

N

N+1 redundancy: N means the number of units needed for the job. Plus one means one extra unit is available if a unit fails.

Natural gas: A fuel made mostly of methane. Burning or reacting it can supply energy and release carbon dioxide.

Network: Connections that let computers and other devices exchange data.

Neural network: An AI model made of connected layers that transform numbers to learn patterns.

Nuclear power: Electricity made using heat from reactions inside atoms, usually fission.

O

On-site: At the place where equipment or electricity will be used.

Operating capacity: Equipment capacity that has been put into service, rather than only announced or planned.

Optimizer: The part of AI training that uses results to adjust the model's settings.

Output: Information, energy or material that leaves a system.

Oxygen: A gas in air that supports burning and takes part in many fuel-cell reactions.

P

Parallel computing: Doing several computing tasks at the same time.

Parameter: A number inside an AI model that training adjusts to help the model learn patterns.

Peak demand: The highest amount of power needed during a certain period.

Permit: Official permission required for certain activities or building work.

Potable water: Water safe enough for people to drink.

Power: How fast energy is delivered or used.

Power quality: How steady and usable the electrical supply is for connected equipment.

PPA (power purchase agreement): A deal between an electricity buyer and a power maker. They agree on a price for electricity over many years.

Pressure: How strongly a gas or liquid pushes against a surface.

Processor: A chip that follows instructions and performs calculations.

Prompt: The input or instructions someone gives an AI program.

PUE (power usage effectiveness): Total data center energy divided by computing equipment energy over the same time. Lower numbers mean less extra energy for cooling and other support.

Pump: A machine that pushes liquid through pipes.

PV (photovoltaic): Solar technology that turns sunlight directly into electricity. Solar panels use PV cells.

Q

Query: A request sent to a computer system, such as a search or an AI question.

R

Rack: A frame that holds computing equipment.

Rack density: How much electrical power equipment uses in one rack, often measured in kilowatts per rack.

Radioactive waste: Leftover material that gives off harmful radiation for a long time.

Rate: A price or charging rule, such as the cost for each unit of electricity used.

Reactor: Equipment that controls a nuclear reaction to produce heat.

REC (renewable energy certificate): A receipt showing that electricity was made from wind, sun or another renewable source. It does not show which electricity reaches your building.

Reclaimed water: Wastewater treated so it can be used again for an approved purpose.

Rectifier: Equipment that changes alternating current into direct current.

Redundancy: Extra equipment or paths that can take over when something fails.

Reliability: How consistently a system works when it is needed.

Renewable energy: Energy from sources naturally replenished, such as sunlight, wind and flowing water.

Resilience: How well a system can handle trouble and recover afterward.

Resistance: How much a material opposes electric current. Current through resistance produces heat.

Ruling: A court's decision on a question brought before it.

S

Server: A computer that provides information or services to other computers over a network.

Shaft: A turning rod that connects machine parts and passes movement between them.

SMR (small modular reactor): A nuclear reactor designed with smaller units that can use factory-made parts.

Software: Programs and instructions that tell computer hardware what to do.

Solar power: Electricity or heat collected from sunlight.

SSD (solid-state drive): A device that stores data on memory chips instead of spinning disks.

Steam: Water in its gas form. Hot steam can turn a turbine.

Steam turbine: A machine whose blades are turned by steam. A connected generator can make electricity.

Stranded investment: Money spent on equipment or capacity that ends up being used less than expected.

Substation: A grid facility that switches power lines and often uses transformers to change voltage.

Supercapacitor: A device that stores energy electrically and can take in or release it very quickly.

Switchgear: Equipment that connects, disconnects and protects electrical circuits.

T

Tax abatement: A reduction in taxes that a government grants under certain rules.

TDP (thermal design power): A chip maker's heat or power design rating used to plan cooling. Its exact meaning depends on the product.

Tensor Core: NVIDIA's name for specialized chip hardware that speeds up certain calculations with tables of numbers.

Thermal energy: Energy linked to the motion of particles inside a material. Warmer objects generally have more of it than identical cooler objects.

Token: A piece of text or other data an AI model processes, such as part of a word.

Training: Adjusting an AI model using examples so it can learn patterns.

Training data: Examples used to teach an AI model patterns.

Transformer: A device that changes alternating-current voltage to suit the next part of an electrical system.

Transistor: A tiny electrical part that can switch or control current. Computer chips contain many transistors.

Transmission: Moving electricity over the wider grid, usually on high-voltage power lines.

Transmission vs. distribution: Transmission moves electricity across the wider grid. Distribution carries it from local substations toward customers.

Turbine: A machine with blades turned by moving gas, steam or water.

Two-system redundancy (2N): Two complete equipment systems, each able to handle the full job on its own.

U

UPS (uninterruptible power supply): Equipment that keeps electricity flowing briefly when the main supply fails or changes.

Uptime: The time equipment or a service is available to work.

Uptime tier: A level from 1 to 4 for a data center's power and cooling setup. Higher levels add protection against shutdowns when parts fail.

Utility: A company or organization that supplies a service such as electricity.

V

Volt: A unit of voltage, the electrical push that can move charge.

Voltage: Electrical push: the difference that can drive current through a circuit.

W

Water consumption: Water used without returning it directly to the same local water source, often because it evaporates.

Water stress: When demand puts pressure on the amount or quality of water available in a place.

Water withdrawal: Water taken from a source for use. Some may be returned afterward.

Watt: A unit of power measuring how fast energy is delivered or used.

Wind power: Electricity made when moving air turns turbine blades connected to a generator.

Workload: A computing job or set of jobs a system needs to complete.

WUE (water usage effectiveness): A measure comparing a data center's water use with the energy used by its computing equipment over the same period.

Z

Zoning: Local rules about how land may be used and what can be built there.