Industry Terms

Power Generation

Attemperator

A device to reduce and control the temperature of superheated steam.

Blowdown

1: Connection in an evaporator for removing accumulations of solids, sludge and scum by partial draining during operation or continuously bleeding liquid from the bottom of a boiler, evaporator, vaporizer or kettle-type reboiler.

2: With boilers, the process of discharging a significant portion of the aqueous solution to remove accumulated salts, deposits and other impurities.

Boiler

A device for generating steam for power, processing or heating purposes or which generates hot water for heating purposes or hot water supply. Heat from an external combustion source is transmitted to a fluid contained within tubes found in the boiler shell. This fluid is delivered to an end user at a desired pressure, temperature and quality.

Combined Cycle

An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator (HRSG) for use by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit. Combined-cycle retrofits were a popular way of increasing efficiencies in older facilities.

Combustion Turbine

An internal combustion engine which is fueled by liquid or gaseous fuel to generate mechanical energy through a rotating shaft, which drives an electric generator or other piece of equipment. In simple cycle use, the turbine mixes compressed air with natural gas or oil then burns the mixture, expanding the gases. The expanded gases then pass through the turbine blades. Combustion turbines are also used in combined cycle by adding a heat recovery steam generator to the system.

Compressor

A pump or other type of machine using a turbine to compress a gas by reducing the volume.

Condensate

The liquid which separates from a gas when the temperature decreases.

Condenser

A device that cools low-grade steam discharged from a turbine generator back to water so it can be reheated in a boiler or HRSG to produce more steam for the electric generator process.

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Condenser Cooling Water	A source of water external to a boiler's feed system is passed through the steam leaving the turbine in order to cool and condense the steam. This reduces the steam's exit pressure and recaptures its heat, which is then used to preheat fluid entering the boiler, thereby increasing the plant's thermodynamic efficiency.
Continuous Vent	Connection and collection device in the shell of a closed feedwater heater for continuously collecting and removing noncondensibles from the extraction steam. Continuous vents should be capable of passing at least 0.5 percent of the steam to prevent noncondensibles from accumulating, thereby causing capacity loss and corrosion. They should be bypassed during start-up to allow for rapid purging of inerts.
Cooling System	An equipment system that provides water to the condensers and includes water intakes and outlets, cooling towers, ponds, pumps, valves and pipes.
Critical Temperature	A term most often used to denote the maximum temperature at which gas or vapor may be liquefied by application of pressure alone. Above this temperature, the substance exists only as a gas.
Deaeration	Removal of noncondensible gases from water.
Desuperheating Zone	That part of a closed feedwater heater's outlet tube that is reserved for transferring sensible heat to feedwater from superheated extraction steam.
Distillation Unit	A device or vessel in which one or more feed streams are separated into two or more exit streams, each exit stream having component concentrations different from those in the feed streams. The separation is achieved by the redistribution of the components between the liquid and the vapor phases by vaporization and condensation as they approach equilibrium within the distillation unit. The distillation unit includes the distillate receiver, reboiler, and any associated vacuum pump or steam jet.
Double Block And Bleed	Two block valves connected in series with a bleed valve or line that can vent the line between the two block valves.

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Dry Bottom Boiler

No slag tanks at furnace throat area. The throat area is clear. Bottom ash drops through the throat to the bottom-ash water hoppers. This design is used where the ash melting temperature is greater than the temperature on the furnace wall, allowing for relatively dry furnace wall conditions.

Dryback Boiler

A boiler with combustion chamber lined in refractory brick.

Dual Fuel System

An engine that can switch back and forth from one fuel type to another, or which can burn two different fuels simultaneously with no modifications and/or minimal downtime.

Dual-Fired Unit

A generating unit that can produce electricity using two or more input fuels. In some of these units, only the primary fuel can be used continuously. The alternate fuel can be used as a start-up fuel or in emergencies.

Economies Of Scale

Reduction of the average per-unit of electricity as the size of the power plant increases. When there are economies of scale, larger facilities will have a lower unit cost than relatively smaller facilities. Construction costs do not always increase in the same percentage as output.

Economizer

1: A set of tubes in a steam generator through which boiler feedwater passes before entering the main boiler drum. An economizer boosts boiler efficiency by raising the temperature of the water to slightly less than the temperature of the water in the boiler.

2: Heat exchange device to increase feedwater temperature through heat recovery from gases exiting the boiler.

Efficiency

1: Ratio of energy input to useful output

2: The gas turbine manufacturer's rated heat rate at peak load in terms of heat input per unit of power output based on the lower heating value of the fuel.

Electric Energy

The ability of an electric current to produce work, heat, light or other forms of energy. It is measured in kilowatt-hours.

Electric Generation

Grid-interactive and remote or stand-alone power generation for general uses, including those for grid distribution and general remote uses such as residential or commercial power.

Industry Terms

Power Generation

Electric Generator	1: A source of electricity, especially one that transforms mechanical or heat energy into electric energy. 2: All utility and nonutility power producers as well as all privately owned companies and all publicly owned agencies engaged in the production of electric power for public use.
Electric Power Plant	A station containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical and/or fission energy into electric energy.
Electric Utilities	Businesses engaged in the generation, transmission and distribution of electricity to end-use customers. Utilities are often categorized by their ownership, including investor and cooperatively owned utilities and government owned utilities such as municipal systems, federal agencies, state projects, and public power districts.
Electricity	A form of energy generated by friction, induction, or chemical change that is caused by the presence and motion of the elementary charged particles of which matter consists.
Energy Loss	The difference between energy input and output as a result of an energy transfer between points.
Engineering Procurement and Construction (EPC)	A turnkey Engineering, Procurement and Construction contract used in most power projects. These usually include provisions and guarantees for completion, performance, output, emissions and other operational specifications.
Equalizer Connections	In a closed feedwater heater, connections provided for installing pipelines to equalize the pressure between the top and bottom liquid-level controllers and gauge glasses. The function of equalizer lines is to avoid false readings due to siphoning.
Fahenheit	Temperature scale commonly used in the United States, with the boiling point at 212 degrees at sea level and the freezing point of water as 32 degrees.
Fatigue	Tendency of material to fracture under repetition of a stress, which is less than the ultimate static strength. Fatigue strength, also called endurance limit, refers to the maximum stress, which can be incurred and reduced indefinitely without producing a fracture.

Industry Terms

Power Generation

Federal Energy Regulatory Commission (FERC)	Regulates the production, transmission and wholesale sales of electricity and natural gas when they are interstate. Its' predecessor was the Federal Power Commission.
Fire Point	The minimum temperature at which a flame is sustained.
Fire-Tube Boiler	A boiler in which hot flue gases pass through tubes surrounded by water.
Flash Point	Temperature at which a liquid will give off enough flammable vapor to ignite.
Force Majeure	A contract clause allowing extraordinary events such as natural disasters, war, terrorism or governmental actions to either terminate or suspend a contract or performance clause without penalties being levied.
Fuel	Any combustible material that can be burned to produce heat.
Generating Unit	Any combination of physically connected generators, reactors, boilers, combustion turbines and other prime movers operated together to produce electric power.
Generator	An electric generator is a device that converts mechanical energy to electrical energy. The reverse conversion of electrical energy into mechanical energy is done by a motor; motors and generators have many similarities.
Gigawatt	A common measurement of electricity. One gigawatt = 1 billion watts or 1 million kilowatts or 1 thousand megawatts. GWe = gigawatt electric / GWh = Gigawatt hour
Grid	The layout of an electrical distribution system including the interconnected transmission lines, substations and generating plants.
Heat Capacity	Measured in joules per Kelvin, it is the quantity of heat needed to raise the temperature of a body one degree. Once called thermal capacity.
Heat Exchanger	Transfers heat from one fluid to another without the fluids coming into contact. Used to regulate fluid temperature or to use heat that would otherwise be wasted.

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Heat Rate	Measure of generating station thermal efficiency generally expressed in BTUs (British Thermal Units) per net kilowatt-hour.
Heat Recovery Steam Generator (HRSG)	A boiler attached to the exhaust of a combustion turbine to recover heat from the exhaust and converted into steam.
High-Low Fire	A burning that has two firing rates to accommodate load demand.
High Pressure Hot Water Boiler	A boiler that provides water hotter than 250ºF or at pressures exceeding 160 pounds per square inch.
High Pressure Steam Boiler	A boiler that provides steam at pressures exceeding 15 pounds per square inch.
High Pressure Switch	A piece of equipment monitoring liquid, steam or gas pressure which will shut down the burner at a specified pressure.
Hours Under Load	The hours the boiler is operating to drive the generator producing electricity.
Induced Air	Air flowing into a furnace because the furnace pressure is less than the atmospheric pressure.
Induced Draft	Mechanically produced air movement into the combustion chamber, creating enough pressure to exhaust the combustion products.
Life Cycle Costs (LCC)	Total costs incurred over the life of a plant or piece of equipment; including operations, maintenance, spare parts as well as initial capital costs.
Main Fuel Valve	The valve controlling fuel input to a burner.
Main Stop Valve	The valve connected to the boiler allowing steam to exit the boiler.
Megawatt (MW)	One million watts. Mwe = one million watts of electric capacity / MWh = one million watt hours.
Multipass Boiler	A boiler in which flue gases are passed through the boiler shell multiple times, through the tube arrangement or baffles.

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Nameplate Rating	The full load continuous rating of a generator, prime mover or other electrical equipment under specified conditions as designated by the manufacturer.
Net Available Capacity	The gross available capacity less the unit capability used for that unit's station service or auxiliary loads.
Net Heating Value	The amount of heat generated by combustion of hydrocarbons including water vapor.
No-Load Loss	Power and energy lost by an electric system when not operating under demand.
Nonutility Generator (NUG)	An entity, other than an electric utility, that engages in wholesale power generation or self-generation.
Once-Through Cooling	A power plant circulating water system which takes water from a single source and pumps it through a condenser, thereby cooling the hot condenser water.
Open-Ended Valve or Line	Any valve, except safety relief valves, having one side of the valve seat in contact with process fluid and one side open to the atmosphere, either directly or through open piping.
Operating Availability Factor	The percentage of time a unit was available for service, whether operated or not.
Operating or Working Temperature	The temperature that will be maintained in the metal of the part of the vessel being considered for the specified operation of the vessel.
Operating Pressure	1: Pressure for which a side of a unit is thermally designed and rated. 2: The pressure at the top of a pressure vessel at which it normally operates.
Outage	The period of time when a generating unit, transmission line, or other facility is out of service.
Output	The amount of power or energy produced by a generating unit, station or system.
Particulate	A fine grained particle(s) small enough to be suspended in a gas or liquid but large enough to be filtered out.
Peak Demand	The maximum load during a specified period of time.

Peak Load Station	A generating station which, because of its cost, is normally operated only to provide power during maximum load periods.
Peaking Facility	A power plant that is used only when electricity demand is at its highest point or peak.
Planned Outage	The removal of a unit from service to perform work on specific components which is scheduled will in advance and is of a predetermined duration.
Plant Efficiency	The percentage of the total energy content of a power plant's fuel that is actually converted into electricity.
Postweld Heat Treatment (PWHT)	Heating a piece of equipment to a sufficient temperature to relieve the residual stresses which are the result of mechanical treatment and welding.
Power Generation	Conversion of primary sources of energy into electric energy.
Pressure	Force exerted over an area.
Pressure Relief Valve	A valve which relieves pressure beyond a specified limit and recluses upon return to normal operating conditions.
Process Vent	Includes vents from distillate receivers, product separators, and ejector-condensers.
Pump	A mechanical device used to increase fluid pressure or move fluids.
Regenerator	A heat exchanger that transfers heat from a turbine's exhaust gases to the compressed air stream.
Reheater	A combustor located between two turbine stages to increase the temperature of the working fluid and the power available from it.
Reliablity	A measure of how well equipment will operate without failure.
Relief Valve	A valve which opens at a designated pressure and bleeds a system in order to prevent a buildup of excessive pressure.
Retrofitting	Adaptations and/or changes to existing equipment to permit substitution of one fuel for another.

Safety Shut-Off Valve	A valve that is automatically closed by the safety control system or by an emergency device to completely shut off the fuel supply to the burner.
Seating Torque	A value depicting the turning force required to set a valve into its closed position.
Shutdown Valve	An automatic valve used to isolate a component in a system.
Simple-Cycle Turbine	A turbine in which the working medium passes successively through the compressor, combustor, and turbine.
Start-Up	The procedure used in starting a power plant's prime mover and supporting auxiliaries.
Steam Generator	A huge "radiator" where heat from the primary loop is transferred to the secondary steam loop without mixing of the two streams of water.
Steam Turbine	A rotary engine with a series of curved vanes on a central rotating spindle, or shaft, that is powered by steam.
Stress Relief	The heating of a substance to a specific temperature to relieve any residual stress.
Sump	1: A depression or tank that catches liquid run-off for drainage or disposal. 2: The auxiliary portion of a condenser shell for accumulating condensate.
Thermal Capacity	The maximum amount of heat that a system can produce.
Thermal Efficiency	The ratio of the electric power produced by a power plant to the amount of heat produced by the fuel.
Thermal Expansion	The increase in volume of a fluid or length of a solid as a result of a change in temperature.
Train	A group of closed feedwater heaters connected in series on the feedwater side.
Turbine	A machine / motor that consists of a rotating shaft with blades that are driven by a fluid or steam for generating rotary mechanical power from the energy of stream of fluid or steam.

Unplanned Outage Hours	Sum of all unplanned outages, start-up failures, maintenance outages and the scheduled outage extensions for maintenance.
Venting	Discharge into the atmosphere, allowing excessive or unwanted media to escape as planned
Waste Heat Boiler	A boiler that receives all or most of its energy input from the combustible exhaust gases for a separate fuel burning process.
Water Tube Boiler	A boiler where the water being heated passes through tubes surrounded by the flue gases.