Electricity dictionary

Entry	Proper noun	Unit	Explanation
PART 1 Power Generation			
1.	Installed capacity	kW	The designed capacity of a generator. The similar term "rated capacity" refers to the capacity listed by the equipment's brand. In practice, the smaller of the two numbers is used to determine installed capacity. Systematically, an installed capacity is the sum of all power plant capacities in the system. This is currently calculated using
2.	Gross power generated and purchased	kWh	Gross generation of power plant + Power purchased
3.	Net power generated and purchased	kWh	Gross generation of power plant + Power purchased - Station service
(1)	Net power generation	kWh	The electric energy generated by the generator of the power plant belongs to the output power of Taipower Company(TPC) power plant. (Gross generation of power plant - Station service)
(2)	Power purchased	kWh	The purchased output of power plants not operated by TPC is the power purchased by the other companies.
4.	Power supply	kWh	Gross generation of total power plants + Power purchased - Station service - Pumped storage
5.	Station service	kWh	The power consumed by auxiliary equipment during the operation of the generator in the power plant.
6.	Peak load	MW	The highest power demand that has occurred in a specified time period (e.g. day, month, or year).
7.	Average load	MW	The total energy delivered in a certain period divided by the time interval (e.g. day, month, or year).
8.	Load factor	%	The ratio of the average load to the peak load in a period of time. $=\frac{Average\ Load}{Peak\ Load}\times 100$
9.	Net peaking capability	MW	In normal power generation situations, each generator set can provide maximum output to the system, that is, the net peaking capacity.
10.	Reserve margin	MW	A reserve margin is the difference between net peaking capability and hourly peak load. This is shown as a percentage and allows reliable operations to be maintained and unforeseen increases in load (due to, for example, extreme weather) or unexpected outages to be dealt with using existing capacity. Reserve Margin (MW) = Net Peaking Capability-Hourly Peak Load
11.	Percent reserve margin	%	$=\frac{Net\ Peaking\ Capability-Hourly\ Peak\ Load}{Hourly\ Peak\ Load}\times 100$ $=\frac{Reserve\ Margin}{Hourly\ Peak\ Load}\times 100$
12.	Operating reserve	MW	The operating reserve is the difference between net peaking capability and peak load (instantaneous value), normalized by peak load (instantaneous value) and shown as a percentage. The operating reserve helps to maintain reliable operations while meeting unforseen increases in load (due, for example, to extreme weather) and unexpected outages. Operating reserve (MW) = Net peaking capability-Peak load (Instantaneous value)
13.	Percent operating reserve	%	$=\frac{Net\ peaking\ capability-Peak\ load\ (Instantaneous\ value)}{Peak\ load\ (Instantaneous\ value)}\times 100$ $=\frac{Operating\ reserve}{Peak\ load\ (Instantaneous\ value)}\times 100$
14.	Pumping energy	kWh	Pumping power consumed by the hydropower plant during off-peak times.
15.	Firm power	kW	The hydropower refers to the dry water flow or water level, with an average output of 24 hours. The thermal power and nuclear power units are net peaking capacity minus the heat output.
16.	Capacity factor (Plant factor)	%	The ration of the average load (including Station service) of a power plant (or unit) to average installed capacity in a specified period. $=\frac{Average\ load}{Average\ installed\ capacity}\times 100$
17.	Utilization factor	%	The ratio of a power plant's instantaneous peak load to its installed capacity in a specific period. $=\frac{Instantaneous\ peak\ load\ (Including\ station\ service)}{Installed\ capacity\ (Including\ pumping\ generation)}\times 100$
18.	Unit availability factor	Kcal/ kWh BTU/ kWh	A measure of a units ability to perform its operational function. The unit availability factor is the ration between power supply hours plus standby hours and the total specific hours. Taipower is determined to maintain full-day, full-month, and full-year availability.) $=\frac{Power\ supply\ hours+\ standby\ hours}{Total\ specific\ hours}\times 100$

19.	Net plant heat rate	%	The actual heat required for output of a thermal power plant. $= \frac{The\ fuel\ heat\ from\ Plant\ power\ generation\ consumption\ (kcal)}{generation\ of\ power\ plant\ -\ Station\ service\ (kWh)} \times 100$
20.	Plant net efficiency	%	Thermal plant: A measure of how much of a plants fuel is converted into electricity. This is theoretically equivalent to the amount of heat per unit (860Kcal/kWh or 3413 BTU/kWh) divided by the net plant heat rate (Kcal/kWh or BTU/kWh). Hydropower plant: The ratio of a power plant's output (kWh) to its theoretical calculated value (kWh). This is expressed as: $= \frac{Actual\ output\ (kWh)}{9.8QH\ x\ T} \times 100$ *Where Q = Actual average use of water (m^3/sec), H=Actual average drop (m) and T= Actual operation time (hr)*
21.	Diversity factor		The ratio of the sum of the individual non-coincident maximum loads of the various subdivisions of the system to the maximum demand of the complete system. $= \frac{sum\ of\ the\ individual\ maximum\ demands}{maximum\ demand\ of\ the\ whole\ system} \times 100$
22.	Coal consumption	Ton	The coal consumed by energy generated in a thermal power plant. This is usually calculated on a monthly or yearly basis.
23.	Average coal consumption per kWh	Kg/kWh	The average coal consumed per kWh of energy generated (excluding station service) in a thermal power plant. Note: TPC's Average coal consumption per kWh includes oil consumption, and coal Calorific value per kilogram is calculated on 6,000 kcal basis.
24.	Oil consumption	L	The oil consumed by energy generation in a thermal power plant. Note: This is usually calculated on a monthly or yearly basis.
25.	Average oil consumption per kWh	L/ kWh	The average amount of oil consumed per KWh generated (excluding station service) in a thermal power plant.
26.	Sending end		The point (or end) of a transmission line that continuously delivers effective power is called a sending end. Most of the time, a sending end has a higher voltage. Note: The end points of a transmission line can be clearly identified as sending or receiving ends. Points in the middle of a transmission line, though can be either sending or receiving or both. Moreover, the voltages at both the sending and receiving ends are effected by reactive power.
27.	Receiving end		The point (or end) of a transmission line that continuously consumes effective power is called a receiving end. Most of the time this end has a lower voltage.
28.	Generating end		Any end point in a power system that is connected with a power plant is called generating end. The load of a generating end is the amount of energy consumed by the receiving end and the system loss.
29.	Run-of-river power station		A small, permanent barrage (or dam) is constructed in the upper reaches of a river. This stops the flow of water and establishes a water intake that guides water to flow downstream to a power plant for use in generation. The flow of the river is neither stored nor adjusted in a run-of-river station.
30.	Pondage power station		A barrage (or dam) is constructed to stope the flow of water. Water can be contained in a small storage tank or an adjustment tank. These tanks allow the flow of water to the generator to be adjusted. This allows the plant to cope with load changes as river water can be stored and concentrated for use in generating electricity during peak hours.
31.	Reservoir power station		The power generation process of a pump storage power plant is the same as that of a traditional hydropower plant during the day. The key difference lies in a pump storage plant's use of both upper and lower pools (or reservoirs). Low-cost, surplus, off-peak electric power can be used to run pumps that move water from lower elevation reservoirs to higher elevation reservoirs. This effectively increases stored energy in the form of the water's gravitational potential energy. During periods of high electrical demand, the stored water can be released through turbines to produce electric power.
32.	Pump storage power station		It has the upper pool and the lower pool. The power generation process of the pump storage power plant is the same as that of the traditional hydropower plant during the day. The method stores energy in the form of gravitational potential energy of water, pumped from a lower elevation reservoir to a higher elevation. Low-cost surplus off-peak electric power is typically used to run the pumps. During periods of high electrical demand, the stored water is released through turbines to produce electric power.
33.	Steam turbine generator		High pressure and temperature steam produced by a boiler is introduced into a steam turbine through a steam line. The steam drives the turbine, which is connected to a generator. A large steam turbine requires three turbines: One each for high, medium and low pressure.

34.	Gas turbine generator		Air, pressurized by a compressor, is passed to a burner where it excites the combustion of fuel. As generated gas flows through the turbine it expands and works to drive the generator to generate electricity.
35.	Black start gas turbine generator		A gas turbine generator used in black start situation.
36.	Combined cycle generation		The exhaust of the gas turbine is passed through a heat recovery boiler to absorb the heat of the gas. This heat is used to generate steam that drives a steam turbine generator set.
37.	Diesel generator		A generator that burnes fuel in a cylinder to generate power that drive a generator and produces electricity
38.	Boiling water reactor (BWR)		The thermal energy generated by the reactor core fuel is transferred to the cooling water flow, directly elevates and boils the water to generate steam and drives the turbine generator to generate electricity.
39.	Pressurized water reactor (PWR)		Thermal energy (or heat) generated by reactor core fuel can be transferred to a primary circulating water system. The heat then indirectly heats a secondary circulating water system in a steam generator. This generates steam that drives a turbine generator to produce electricity.
40.	Active power	kW	The term "active power" refers to power which is actually consumed or utilized in an AC Circuit. Active power is the actual outcome of the electrical system which runs the electric circuits or load. It is expressed by the formula: Active power = $VI\cos\theta$. Where V = Effective value of voltage, I = Effective value of Current, θ = Phase angle difference between voltage and current
41.	Reactive power	kVAR	Reactive power is the portion of complex power that corresponds to storage and retrieval of energy rather than consumption. It is expressed by the formula: Reactive power = $VI\sin\theta$.
PART 2 Substations, Transmission and Distribution			
A.	Power system		A network that transfers electric energy from its generation source to individual customer via transmission lines and substations. These networks consist of transmission lines connected with power plants, substations and distribution lines. A power system includes the entire process of power from manufacture to consumption.
1.	Extra high voltage system		A sub-network of a power system that connects electric devices of 345kV.
2.	Primary system		A primary sub-network of a power system that connects electric devices of 161kV.
3.	Secondary system		A secondary sub-network of a power system that connects electric devices of 161kV.
4.	Distribution system		The power system operating at 22.8kV.
5.	Advanced metering infrastructure (AMI)		Advanced Metering Infrastructure (AMI) is a form of ICT infrastructure composed of smart meters, communication systems, and meter data management systems. AMI systems are capable of measuring energy consumption data, processing data and storing data for power companies.
B.	Substations		Composed of transformers, circuit breakers and other auxiliary equipment, with protection equipment and control equipment and in exact location,can change or adjust the voltage, control the power flow, and make the power transmission a safe distribution, called the substation.
1.	Extra high voltage substation	kVA	A substation with extra-high-voltage system equipment is called an extra-high voltage substation. The capacity of these substations is based on a main transformer and does not include other transformer capacities.
2.	Primary substation	kVA	A substation with a primary system device is called a primary substation. The capacity is based on the main transformer and does not include other transformer capacities.
3.	Distribution substation	kVA	A substation with primary system equipment that is directly reduced to the distribution high voltage level. The capacity of these substations is based on a main transformer.
4.	Secondary substation	kVA	A substation with secondary system equipment. The capacity of secondary substations is calculated by the main transformer.
C.	Transmission line		Transmission lines are conducting wires which transmit electricity.
1.	EHV transmission line	kM	EHV transmission lines (345kV) connect power plants and/or extra high voltage substations.
2.	Primary transmission line	kM	Primary transmission lines (161kV) connect power plants and/or primary substations.
3.	Sub-transmission line	kM	Sub-transmission lines are 69kV or 34.5kV transmission lines that connect power plants and/or secondary substations.
4.	Distribution line	kM	A power line operating at 22.8kV.
5.	Line loss		The total line loss is the sum of power generated and power purchased minus power sold and power used by TPC (for engineering, business, substation service, off-site power to generating units that are not-in-service or pumped storage demand.) Accordingly, total line loss should include stolen electricity.
6.	Line loss rate		$= \frac{Line\ Loss}{Net\ Energy\ Generation} \times 100$

PART 3 Sales			
1.	Power sales	kWh	The sum amount of electricity sold by TPC to customers for consumption. Statistically, power sales can be classified as either Electricity for Lighting or Electricity for Power. Electricity for Lighting includes Flat Rate Lighting and Meter Rate Lighting. Electricity for Power includes Flat Rate Power, Low Tension Power, High Tension Power and Extra High Tension Power.
2.	Contract capacity	kW	The amount of electrical equipment agreement between the customer and TPC. For general customer, contract capacity is measured by customer's electrical equipment. For demand customer, contract capacity is the maximum demand by mutual agreement.
3.	Number of customers	Customer	The number of customers who have contracts with TPC. The statistical range of data is the same as for power sales, but does not include temporary electricity or unauthorized electricity.
PART 4 Analysis			
1.	Contract capacity per customer	kW	$=\frac{Contract\ capacity\ at\ the\ end\ of\ the\ year}{Number\ of\ customers\ at\ the\ end\ of\ the\ year}$
2.	Average kWh sales per contract capacity per month	kWh	$=\frac{Average\ electricity\ sales\ per\ month}{Average\ contract\ capacity\ per\ month}$
3.	Average monthly consumption per customer	kWh	$=\frac{Average\ electricity\ sales\ per\ month}{Average\ number\ of\ customers\ per\ month}$
4.	Average monthly bill per customer	NTD	$=\frac{Average\ sales\ revenue\ per\ month}{Average\ number\ of\ customers\ per\ month}$
5.	Average price per kWh	NTD	$=\frac{Annual\ sales\ revenue}{Annual\ electricity\ sales}$
6.	kWh generation per employee	kW	$=\frac{Annual\ power\ generated\ and\ purchased}{Average\ number\ of\ employees\ per\ month}$
7.	Customers served per employee	Customer	$=\frac{Power\ generated\ and\ purchased\ at\ the\ end\ of\ the\ year}{Number\ of\ employees\ at\ the\ end\ of\ the\ year}$
8.	kWh sales per employee	kWh	$=\frac{Annual\ power\ sales}{Average\ number\ of\ employees\ per\ month}$
9.	Earnings per employee (before income taxes)	N.T.$	$=\frac{Earnings\ before\ tax}{Average\ number\ of\ employees\ per\ month}$
10.	Per capita generation in the Taiwan Area	kWh	$=\frac{Total\ power\ plant\ generation\ (including\ autoproducers)}{Population\ at\ the\ end\ of\ June}$
11.	Per capita power consumption in the Taiwan Area	kWh	$=\frac{Total\ power\ sales + Autoproducers}{Population\ at\ the\ end\ of\ June}$
12.	Energy generated relative to installed capacity	kWh	$=\frac{Net\ power\ generated}{Average\ installed\ capacity\ per\ month}$ Note: Power generated doesn't include purchased electricity.
13.	Average cost per kWh generated	NTD	$=\frac{Net\ power\ generation\ expense}{Net\ power\ generated\ and\ purchasesd}$