



**Connecticut
Light & Power**

The Northeast Utilities System

Electricity 101

Electricity* is the flow of tiny particles known as electrons, which are found in all atoms. An atom is the smallest part of an element which cannot be broken down by chemical means.

Electrons in the atoms of metal such as copper and aluminum are easily moved together along a wire (or conductor) by revolving a metal coil (or turbine) near a magnet. This push of electrons by the turbine/magnet setup is measured in units called **volts**.

The quantity of the flow of electricity is called current and is measured in **amperes** or Amps. A typical code-approved home in CL&P's service area has a minimum 100 Amp service.

The production of power is measured in **kilowatts** (one kilowatt equals 1,000 watts). The power produced by a generating plant is sold in units called **kilowatt-hours**. For example, a 100-watt bulb left on for 10 hours uses one kilowatt-hour of electricity.

High-voltage electricity is moved through the **transmission system**. A typical transmission line pushes current through three conductors (wires), each 69,000 volts or more, to a **substation**. Transformers at the substation then reduce, or step down, the power before it is pushed into the **distribution system**, the poles and wires that deliver electricity to homes and businesses across Connecticut.

A typical distribution pole carries current in either single-phase (one conductor) or three-phase (three conductors) power. Three-phase power is used by commercial customers who run heavy machinery. Single-phase power serves the needs of streetlights and residential customers.

A **transformer** is a device that is used to change the level of voltage coming from a power plant, to the level used by electric customers.

A **step-up** transformer increases the voltage (power) of electricity while a **step-down** transformer decreases it.

Primary wires lead into the top of the transformer, where it is connected by piece of equipment called a **bushing**. Additional wires leave the side of the transformer to deliver the converted electricity to secondary conductors.

A **circuit breaker** is a switch that “trips out” or disconnects an electric circuit upon overload or abnormal conditions. Circuit breakers are located in substations and on transmission and distribution lines throughout our network. They operate in the same manner as those found in homes.

A **fault** is a failure or interruption in an electrical circuit.

In the same way that too many appliances plugged into a home electrical outlet can cause the equipment to fail, too much demand for power can cause the failure of electric utility equipment and produce a power outage over a particular area.

The situation is exacerbated when heat, both natural and caused by overtaxed power lines, tests the physical limitations of utility equipment.

Other related definitions:

Capacity is the maximum load of electricity that equipment can carry.

A **circuit** is a path through which electricity travels.

Electric demand refers to the maximum load at which a customer uses electricity for a given period of time. Demand is measured in 15-minute and 30-minute intervals. A customer’s demand is recorded on the demand register scale on the meter.

A **padmount transformer** is a large metal cabinet outside of a house or building which converts power to a level necessary for usage by the customer, similar to a pole-mounted transformer. The padmount transformer is kept locked and has a “DANGER” sign on it. These are used where power lines are underground.

A **pole-mounted transformer** is a transformer mounted on a pole which steps down primary distribution voltage for use by individual customers. A home typically uses a secondary voltage of 120/240 volts.

* Electricity comes from the Greek word *elektron* which means “amber.” The Greeks were the first to notice that static electricity was created when a piece of amber was rubbed with a cloth, creating friction.