



## EFFECTS OF BEATING THE SUMMER HEAT WITH ELECTRICITY

News / Airlines



**Have you switched on your air conditioner yet? If so, you are one of the millions around the world. Have you noticed any issues with your power flickering or even going out? Again, if so, you are one of the millions around the world. Every year, Power distributors and operators fight an intense battle with the weather and load conditions present in summer. From soaring temperatures to strong storms, power outages are many times more likely to occur in summer.**

As the temperatures outside increase, many factors influence the rate of power outages. The main cause of summer outages is the heavier loads power lines need to carry during the summer months. During periods of hot weather, households and businesses increase the amount of energy they consume with the use of air conditioners, fans, and other means of cooling. A deeper look at what happens to power lines suffering from heavy loads will provide insight on what causes summer outages and why it is imperative that power distributors and operators start utilizing risk-based inspection methods rather than the traditional time-based methods.

## **Storms**

In many places, strong storms are much more likely to hit during summer months. Severe storms, of course, bring strong winds causing trees to fall on lines or even lines themselves to be knocked over. The biggest issue with strong storms comes from the lightning produced. The magnetic field surrounding power lines attracts lightning. The incredible amounts of electricity from lightning strikes can do a great deal of damage to power lines and their equipment.

It is important to note, researchers at Lawrence Berkeley National Laboratory (Berkeley Lab) and Stanford University found that even though the average frequency of outages due to storms has not changed much throughout the last few years, the length of time customers are without power has increased by 5-10%. The researchers were surprised to find that the amount spent by distributors and operators did not correlate with improvements of reliability and suggested that companies were spending large amounts on reactive maintenance rather than proactive maintenance (Larsen, LaCommare, Eto, Sweeney; 2015; p. 14).

## **Line Sag**

Overly warm power lines, caused by heavier loads and rising outside temperatures, can create line sag. Electricity flows through metal lines. As the metal heats up, it begins to expand and, in turn, causes the line to sag. Sagging lines are responsible for many outages. Power lines suffering from sag can experience short circuits when touching foliage or anything else underneath or too close to the power line. Short circuits like these are difficult to prevent, using traditional inspection methods, because it is hard to keep an eye on every power line as networks expand at exponential rates. In the US alone, there are more than 5 million miles of power lines.

Short circuits are not the only concern when it comes to sagging power lines. In dry summers, especially; it is very easy for foliage touching a sagging line to create forest fires. Large fires can do extensive amounts of damage and can be very costly for distributors and operators as well as customers or anyone else living in the area.

## **Heavy loads test equipment**

In summer months, along with air conditioners, the extra production of consumables such as ice cream or beer greatly increases the electric load placed on power lines. Equipment that has functioned perfectly during winter may fail due to the extra strain placed on equipment when heavy electricity burdens are running through power lines. Equipment that wears out or fails causes many minor outages. Components such as glass insulators are prone to issues during hot weather. Even though all equipment will eventually wear out and fail, high temperatures accelerate fail rates and make it very difficult for distributors and operators, using traditional methods of inspection, to know when preventative maintenance is needed.

Normally, if this type of outage occurs, it can usually be quickly isolated and circumvented; restoring power to consumers promptly. But, when power lines are strained, it is not uncommon for multiple pieces of equipment to fail at once. Depending on the location, if this happens, it can be impossible to isolate the area with the failing equipment, meaning that consumers must wait until repair completion before they receive electricity again.

## **Transmission issues**

Every year power distributing and operating companies forecast what to expect, regarding demand, and search for ways to meet those needs. Although accurate forecasts are possible, meeting demands can still be very difficult in the summer months. Power generation occurs in a finite number of places and must be transmitted to consumers through a finite number of power lines. Power lines have limits on the amount of energy they can carry, and when they begin to be heavily burdened by increased loads, all of the issues surrounding line sag and failing components begin to take a toll on the lines and their ability to transmit electricity.

## **Solutions**

A deeper understanding of power outages in summer makes it evident that the only way to prevent or quickly isolate outages is to constantly monitor power lines and their components. With the vast length of power lines, it is almost impossible to do anything other than “control the burn” using the time-based methods of inspections employed by most distributors and operators.

Across the world, time-based inspections are the norm and power suppliers checking lines on a rotating basis are not taking into account the fact that weather conditions are causing lines and equipment to wear out faster, especially during the summer months.

These issues could largely be solved by moving toward risk or condition based inspections by utilizing companies, such as Laserpas, that provide aerial inspections at a fraction of the cost and time that it takes to manually inspect power lines.

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