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THE FIGHT AGAINST
ANIMAL-CAUSED POWER OUTAGES





The Fight Against Animal-Caused Power Outages

How technology is addressing the challenges of animal and bird incursions at substations

By David Richwine, Beeler Communications

Every day across the country, animals enter substations for warmth, food, security, or simply out of curiosity. In many areas, wildlife intruding into power equipment has become the #1 cause of outages, according to a report from the American Public Power Association (APPA) – even more common than storms or vegetation.

A single substation outage can cost tens of thousands of dollars in equipment repair or replacement, man hours and more. The annual cost to utility companies for recovering from animal-related outages is estimated in the billions of dollars, not including the cost of lost commercial activity, lowered productivity, and consumer dissatisfaction.

So – what's the solution for deterring an animal's natural instinct to enter a substation? Enter TransGard, which began its proven system of animal mitigation in 1990, and continues each year to add to its offerings of tools for substation protection against bird and animal intrusions.

PATENTED FENCE KEEPS CLIMBING ANIMALS OUT

In 2015, Former NSA Deputy Director John C. Inglis cited squirrels as the number-one threat to the U.S. electrical grid — even more than terrorism or a malicious cyberattack. With increasing annual needs for power and shrinking animal habitats, that threat hasn't diminished.

For years, engineers and technicians have attempted

to prevent or discourage incursions from squirrels, raccoons, snakes, and other animals by using an array of methods: from bushing and line guards, to decoy predators, insulator coatings, and more. These measures have had some temporary success, but they haven't provided permanent solutions: as an APPA representative noted in *The Washington Post*, "Animals aren't just smart, they're persistent."

TransGard has found a way to use an animal's own behavior and experience to teach them that a substation is not a hospitable place to visit.

WHY FENCES WORK

TransGard's patented fencing system delivers a humane, non-lethal electric shock — a pulsed DC voltage of 10-11kV — to climbing animals, keeping them from entering substations and encouraging them not to return.

The technology behind this type of electric fencing uses an animal's own behavior against it. Squirrels, for example, have a habitat that can stretch across acres. Squirrels and raccoons also have very accurate "spatial memory" — that is, a knack for remembering key locations and landmarks in their environment.

Just as these animals remember key areas in their environment, they also remember the location of a negative or dangerous experience, such as an uncomfortable jolt at a substation. That memory

reinforces the instinct to avoid the unpleasant sensation the fence can cause.

TransGard's fencing currently protects more than 3,500 substations across the U.S, but even with a proven system, TransGard continues to find ways to make its fences more effective for substations.

SAFETY AND ACCESS: IMPROVING ON 30 YEARS OF SUCCESS

This year, TransGard has continued its process of enhancing its fence system performance with several new products, including:

Grounding Module: a control center enhancement that diverts any residual or induced charge on the fence to station ground when the fence is deactivated.

Wind Anchor: an aircraft-grade aluminum ground screw-and-brace that reinforces fence panels against winds with pullout force of up to 14,000 lbs.

Emergency Exit Panel: door panels that add extra points of egress from the fence enclosure for personnel safety.

A/B Entryway Configuration: a control panel enhancement that enables substation staff to control the fence operation from secondary entryways at multiple points of access.

In 2019, in addition to its ongoing additions to its animal deterrent fences, TransGard developed a new product to deter substation incursions from the air as well as those from the ground.

A HIGH-TECH SOLUTION TO THE BIRD THREAT

In February 2021, a bird flew into a substation in Tennessee. The result: a power outage that affected 8,800 customers. That's one of hundreds of outages caused by flocks of birds, their nests, or their fecal matter.

For decades, bird incursions at substations have



resulted in equipment damage, outages, and expensive cleanups due to corrosive bird droppings.

Until recently, utilities and other substation operators had a handful of ineffective tools for dispersing birds from substations. But in 2019, TransGard introduced Laser Bird Defense, an automated mounted laser system. The technology has worked for years in agricultural and industrial applications; now, TransGard has adapted lasers for use in the utility industry.

WHY LASERS WORK

TransGard's science-based approach uses an understanding of avian behavior and instinct to create the most effective mitigation technique to date. Birds perceive the system's approaching laser beam as a physical danger and disperse. Birds may become accustomed to less effective deterrents – but not the dynamic action of lasers sweeping a substation area.

COST-EFFECTIVE TECHNOLOGY

Laser Bird Defense offers several key technical attributes that have led to its rapid adoption by substation operators:

- **HIGHEST QUALITY COMPONENTS:** Laser Bird Defense uses Avix Autonomic lasers, which offer highly precise optics, filtering, and light frequencies, which result in exceptional performance.

	TransGard Laser	Predatory Decoy	Plastic Guards	Custom Coverups	Sound
Low Costs	✓	✓	✓	✗	✓
Easy to Deploy	✓	✓	✓	✗	✓
Autonomous Solution	✓	✓	✓	✓	✓
Humane/Positive Perception	✓	✓	✓	✓	✓
Low Environmental Impact	✓	✓	✓	✓	✗
No Habituation	✓	✗	✗	✗	✗
Steering of Birds	✓	✗	✗	✗	✗
Prevents Nesting and Roosting	✓	✗	✗	✗	✗

- **RANGE:** Laser Bird Defense offers a 360° horizontal projection range and a 0 degree to -80 degrees vertical project range, enabling the system to disperse birds from a wide area.
- **FLEXIBLE AND FULLY PROGRAMMABLE:** Laser Bird Defense can be programmed with up to 150 different patterns and 20 different time slots —dynamic motion that keeps birds from becoming accustomed to patterns. Each pattern can be assigned to a specific time slot, enabling a variety of bird-repelling patterns at different times of the day.
- **SAFETY FEATURES:** The system includes unique safety features including a password lock, emergency stop and system status indicator light.
- **FAST, SIMPLE INSTALLATION:** An array of mounted lasers can be installed and programmed in just hours – without any power interruption at a substation.

A SUPERIOR ALTERNATIVE

The emergence of Laser Bird Defense has given substation operators a valuable new tool in the fight against avian incursions. The existing deterrents – coverups, noisemakers, fake predators, fog machines – only provide temporary, spotty relief. One study reported that only 2% of utilities surveyed found techniques like

loud sounds and visual scare devices to be effective.

While coverups allow birds to freely roost – nesting and leaving droppings – lasers *prevent* birds from entering a substation. Laser Bird Defense produces no offensive noise or smoke, making it a quiet solution that won't harm birds or other animals – and won't disturb neighbors.

These advantages have led dozens of utilities across several states to install Laser Bird Defense. Given the successful launch of this technology into the sector, TransGard expects robust growth during the coming years, as more utilities and power providers confront the very real – and very expensive – problems that bird invasions present.

There are tens of thousands of substations across North America, and many of them share an area with animals that may cause a threat to reliability and equipment: squirrels, birds, snakes, raccoons, and others. With the decades-long track record of the TransGard fence and the exciting new technology of TransGard's Laser Bird Defense, the industry has two invaluable tools for protecting substations from ground- or air-based animal incursions.

David Richwine is a writer with Beeler Communications, a public relations firm that covers topics in the energy and power distribution sector.

**Keep animals out.
Keep the power on.**



*The high-tech solution
to a perennial problem*

TransGard Laser Bird Defense

Generates a beam of light which birds
perceive as a physical threat.

SAFE Patented system confines laser to pre-set range

IMMEDIATE RESULTS Installs easily

SILENT AND SMOKE-FREE Won't harm birds –
or disturb neighbors



Proven protection at 3,500+ substations

TransGard Substation Fence

Delivers a humane –
but effective – electric shock
to climbing animals.

DURABLE Stands up to the
harshest weather conditions

EASY INSTALLATION
No power interruption

EFFECTIVE Prevents incursion
from a variety of species



*For more information, visit www.transgardfence.com,
or contact us at info@transgardfence.com, or (717) 900-6140.*