

# GREENJACKET<sup>®</sup>

*"It Fits"*



## You can prevent animal outages

The new standard in precise-fit dielectric power outage protection covers.



## Greenjacket Customers

Greenjacket takes pride in working with our customers to deliver a complete engineered solution that helps them prevent animal and bird outages. Our understanding of the industry, and of the importance of customized solutions, has earned us an impressive client list. Here are just a few of Greenjacket's customers.

- PG&E
- Anadarko
- Shell
- AltaLink
- BC Hydro
- Hydro One
- SaskPower
- Fortis
- CNRL
- Xcel Energy

# A Complete Engineered Solution to Animal Outages

Greenjacket was formed by an electric utility expert with years of field experience who had seen first-hand the damage and disruption caused by animal and bird contact with equipment. Convinced there had to be a better way to improve reliability issues pertaining to animal and bird outages, he set out to design an equipment cover that would offer a better fit and more complete coverage than anything else on the market. The Greenjacket complete engineered solution is the result of that work.

## Creating a New Standard

Ten years later, Greenjacket has become the product of choice for some of North America's largest electric utility companies. It has been so effective in preventing animal contact, select companies have adopted Greenjacket as the standard for their animal mitigation strategy. At the same time, the innovative 3D Photogrammetry technology process Greenjacket uses to create its custom designs is now patent pending.

## Why the Right Fit Matters

When it comes to protecting equipment from animal contact, fit is everything. In conventional animal protection covers, gaps are inevitable. And that means smaller animals can still make contact with risk points. Gaps also create sheltered spots for smaller animals and bugs to live, which can attract larger predators. Greenjacket works because it covers risk points completely, and eliminates opportunities for animal nesting or contact.

With Greenjacket as part of their animal mitigation strategy, companies improve reliability, reduce risk of animal caused outages and make sure billable services are maximized. Significant cost savings are realized in outage related downtime, reduced repair, and labor overtime costs that are a typical result of bird or animal contact with energized equipment. Greenjacket protects equipment and protects companies from public criticism and costly fines and penalties.



### A Snapshot of Recent Fines and Penalties

Electric utility companies are increasingly finding themselves facing fines and penalties related to animal outages. A few recent examples include:

- In 2010, U.S. federal authorities advised a manufacturing company, that had a substation “take” of a protected species, that each future “take” of an endangered bird species would result in a \$500,000 fine.
- In 2009, one of the largest electric utilities in the Western U.S. was mandated to spend over \$9 million for mitigation plans pertaining to animal contact with eagles and other protected birds.

## The Impact of Animal Outages

As consumer demand for reliable energy increases, the global electric utility industry needs to minimize interruptions and increase reliability. Although outages related to weather or acts of nature are hard to anticipate, animal caused power outages are preventable. And that’s exactly what Greenjacket’s engineered solution does.

### Significant Economic Impact

According to various sources, each year power outages cost the American economy in excess of \$150 billion. Those same sources indicate animal contact is responsible for anywhere from 12-20 percent of all power system outages – a number that translates into more than \$18 billion in lost economy in the United States alone. World-wide, those losses are much higher.

### Fines and Penalties

In addition to lost revenue and equipment repair costs due to animal outages, many companies also find themselves faced with a variety of regulatory fines and penalties relating to animal contact with equipment. When involving protected species, these fines can sometimes total millions of dollars and can include a variety of enforced protection initiatives.

### Eroded Customer Trust

In addition to economic losses and potential penalties, power outages can also damage corporate reputations and public goodwill. As society increasingly relies on electricity-driven technology, people have greater expectations of their electric utility providers. Preventing animal outages helps keep the power on and keeps customers satisfied.

**Greenjacket offers a precise-fit dielectric power outage protection cover that prevents bird and animal contact. Your equipment is protected, your system stays energized, and your reliability – and reputation – is protected.**



## Why Greenjacket Fits

From the very beginning, Greenjacket realized that the key to preventing animal caused outages was a better fitting product. When a product offers better coverage, there's less chance of birds or animals making contact with equipment. But how do we make sure Greenjacket fits precisely? We take the time to create a solution that is customized to the unique needs and dimensions of our customers' equipment.

### The Value We Deliver

- **Improved Power Reliability:** by reducing the number of bird and animal caused contacts, the number of power interruptions is reduced.
- **Dollar Savings:** bird and animal caused outages can result in the costly replacement of equipment, expensive overtime repair charges, and fire-drill management of work schedules.
- **Increased Revenues:** outages can dramatically reduce billable electric services to customers or negatively impact revenues through production downtime.
- **Improved Community and Public Relations:** outages create stress for everyone, from the customer to power system managers and executive teams.
- **Reduced Penalties:** wildlife protection agencies are increasing the scope and dollar amount of fines.



We begin each new project with a review of existing schematics and a site assessment to identify equipment at risk, and determine the probability of contact with birds or animals. As part of our site assessment, we use our patent pending 3D Photogrammetry technology process to get exact measurements on each piece of equipment that needs to be protected. We then get to work creating the custom covers using those exact dimensions and high-grade materials that will withstand a variety of weather conditions and UV exposure.

### Installation with zero downtime - Energized Installation

Once the covers are ready, Greenjacket delivers them directly to the client, along with easy-to-follow installation instructions. We also offer installation services for clients who want it, along with a post-installation inspection to ensure proper fit. And because we understand the importance of avoiding downtime, we've created our Greenjacket solution so it can be installed on energized equipment. We work with you to understand, and in some cases, to establish the work methods of Energized Installation. Our patent pending hot stick tools mean that our comprehensive line of Greenjacket products can be installed "hot" - eliminating expensive, and sometimes impossible to schedule, outages where equipment needs to be protected.

# Product Specifications

Greenjacket protective covers are manufactured of polyurethane for a flexible cover with high dielectric strength and durability. Typical product specifications are as follows\*:

**Color:** Green Standard (custom colors are available)

## Test Properties:

Tensile Strength	ASTM D-412	2306 psi (15.9 Mpa)
Elongation at Break	ASTM D-412	170%
Tear Strength	ASTM D-1004	319 pLi (56 Nmm)
Taber Abrasion	ASTM D-1044	<2 mg loss, 1000 cycles CS-17 wheel, 1 kg load
Hardness		44 shore D, 97 shore A
Dielectric Strength	ASTM D-149	609 V/mil (product is a minimum of 100 mils thick, with ideal thickness of 125 mils)

## Properties After 1000 hr. Accelerated Weathering:

Tensile Strength	ASTM D-412	1566 psi (10.8 Mpa)
Elongation at Break	ASTM D-412	110%
Dielectric Strength	ASTM D-149	unchanged after 1000 hours of accelerated weathering

## Temperature Stability:

Maximum Recommended Service Temperature for Continuous Use:	150°C (300°F)
Maximum Service Temperature for Short-Duration Temperature Elevation (a few minutes):	200°C (390°F)
Melting Point:	250°C (480°F)

## UV Rating:

Test samples were placed in an ultraviolet light aging chamber per the requirements of ASTM D-4329. In typical conditions, a rating of 25 years longevity was determined.

## FR Testing:

Greenjacket is classified V-0 as per the criteria laid out in IEC 60695-11-10 Test Method B.

\*The information given above is representative data obtained from tests commissioned by Cantega Technologies Inc. Although the data is, to Greenjacket's knowledge, reliable, Greenjacket cannot assume any liability related to the data provided, or to decisions made based on the data provided.

# How We Work

When we set out to create an innovative solution to preventing animal outages, we knew the product was only part of the puzzle. We also needed to create a process that would allow us to assess needs, identify risks, and create a complete engineered solution for preventing animal outages.

## Understanding Your Needs

### Step 1. Budgetary Assessment

Our needs assessment begins even before a site visit, with a thorough review of site/single line drawings, customer photos, and historical station data. With this information in hand, we can assess which equipment is vulnerable to animal or bird contact. We can also inform you right away whether Greenjacket will meet your needs and create a preliminary budget. This takes approximately 2 weeks to complete depending on the size of the station and coverage required.

### Step 2. On-Site Assessment

We then send our expert assessors to undertake a comprehensive site inspection to finalize what level of coverage you require. We then use our patent pending 3D Photogrammetry process to retrieve accurate measurements of your equipment and create a detailed Site Protection Plan and quote. The entire assessment process – from site inspection to the creation of a Site Protection Plan – takes, on average, two weeks to complete.



## Building Your Greenjacket Solution

### Step 3. Design and Manufacturing

Once you've agreed to proceed, we get to work on your Greenjacket covers. Utilizing the images taken with our 3D Photogrammetry process, we use 3D CAD software to create and design drawings that can be used to build custom molds. We utilize a patented fabrication process and a high-performance polyurethane material that allows for flexible strength and durability. All Greenjacket covers are built to withstand a variety of weather conditions and to be UV resistant. On average, orders are processed, manufactured, and delivered in four to six weeks, although rush orders are possible.

## Getting Your Solution in Place

### Step 4. Installation

When the custom Greenjacket covers are ready, they are shipped directly to your site with easy-to-follow instructions. We will work with you to provide training and tools to your installation crew and provide supervision of the installation. Or, we will conduct the entire installation with our crew while adhering to your site access, supervision, and work method guidelines. The choice is yours.

Our patent pending "hot" installation tools make Greenjacket easy to install, even on energized equipment. We provide you with information on how to operate and maintain your Greenjacket covers, so you get the most from your investment. Greenjacket keeps all equipment and cover dimensions on file, so that we can fill future orders and respond quickly to requests. We also offer a comprehensive warranty that ensures you get peace of mind with your protection from animal caused outages.

## Overview

1. We evaluate schematics and/or images of existing facilities to develop a budgetary estimate for a solution.
2. We conduct a site assessment to determine points of risk in the substation. We create a quote and Site Protection Plan which includes what protection covers are required.
3. The product is manufactured using existing and/or custom-developed molds, as required, to protect the equipment and improve reliability.
4. Product is delivered to the customer's site for installation.

# Why Greenjacket is Unique

1. It is the only industry comprehensive product line designed for energized installation.
2. It is custom designed to precisely fit each piece of equipment - "It Fits".
3. It is offered as part of a service where site plans are made to identify what exactly is needed for coverage.





## Ready When You Are

If you're ready to prevent animal outages, and protect your equipment and your reliability, we're ready to help. Call us to learn more about what a Greenjacket engineered solution can do for your site and how you can set new standards for preventing animal and bird caused outages.