The background of the entire page is a solid blue color. Overlaid on this are black silhouettes of utility workers. One worker is in the foreground on the left, looking towards the right. Another worker is further up and to the right, working on a power line. The power lines and poles create a complex network of lines across the sky.

CCRIFSPC

The Caribbean Catastrophe Risk Insurance Facility

CCRIF SPC's Electric Utilities Product

Providing Financial Protection
for Caribbean Electric Utility
Companies ... A Pathway to
Faster Recovery from Devastating
Tropical Cyclones

May 2023

Foreword by the CEO, CCRIF SPC

Developing a parametric insurance solution for the electric utilities sector is particularly important because of the natural catastrophe risks faced by many Caribbean territories. Electric utility companies' transmission and distribution (T&D) systems are particularly vulnerable to wind damage from tropical cyclones such as storms and hurricanes. CCRIF's electric utilities parametric insurance product covers direct damage to the T&D components of the electric power system due to impacts of wind. This parametric product fills a gap faced by electric utilities in the Caribbean, which are unable to purchase traditional indemnity insurance for overhead T&D systems because of the very limited availability and uneconomical pricing. The electric utilities product, which was launched in 2020, aims to limit the financial impact of devastating tropical cyclones by quickly providing financial liquidity to electric utility companies when a policy is triggered.

The development of this product was supported by the Government of Ireland and is part of CCRIF's scaling-up plan, which has as one area of focus the expansion of the Facility's product offerings, an example of which is to address the needs of the electric utility sector in the Caribbean. The Caribbean Electric Utility Services Corporation (CARILEC) worked in close collaboration with CCRIF on the development and promotion of the product. The Anguilla Electricity Company Ltd. (ANGLEC) and Saint Lucia Electricity Company Limited (LUCELEC) were the first utilities to purchase policies – in 2020 and 2022, respectively. CCRIF, with support from CARILEC, is working with other electric utilities in the Caribbean to join the Facility.

CCRIF also provides parametric insurance coverage for tropical cyclones, earthquakes, excess rainfall, and the fisheries sector to 19 governments in the Caribbean and 3 in Central America. The ability to provide quick liquidity is an important feature of parametric insurance considering the urgent need for liquidity following a natural disaster.

Parametric insurance products are insurance contracts that make payments based on the intensity of an event (for example, hurricane wind speed, earthquake intensity, volume of rainfall) and the amount of loss calculated in a pre-agreed model caused by these events. Therefore, payouts can be made very quickly – and in the case of CCRIF, within 14 days after a hazard event. This is different from traditional or indemnity insurance that requires an on-the-ground assessment of individual losses after an event before a payout can be made.

This booklet provides information about CCRIF's electric utilities product, the model underpinning the product and how it works, and the requirements to obtain coverage. It is designed to assist decision makers in their deliberations on purchasing the electric utilities product and becoming a member of CCRIF SPC.

Isaac Anthony

About CCRIF SPC

CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility) is the world's first multi-country, multi-peril risk pool based on parametric insurance. CCRIF provides parametric catastrophe insurance for Caribbean and Central American governments, and for electric utility companies. The Facility operates as a development insurance company – as the goods and services it provides are designed to enhance the overall developmental prospects of its members.



5 products

CCRIF offers parametric insurance for tropical cyclones, excess rainfall, and earthquakes and for the fisheries and electric utilities sectors – insurance products not readily available in traditional insurance markets.



24 members

CCRIF has 24 members: 19 Caribbean governments, 3 Central American governments and 2 Caribbean electric utility companies.



58 payouts

Since its inception in 2007, CCRIF has made 58 payouts totalling US\$260 million to 16 of its members. All payouts are paid within 14 days of the event.

Parametric insurance products are a key component in a country's disaster risk financing strategy and are designed to pre-finance short-term liquidity, thus helping to close the protection gap, reduce budget volatility, and allow countries to respond to their most pressing needs post disaster, including support to the most vulnerable.

CCRIF has demonstrated that catastrophe risk insurance can effectively provide a level of financial protection for countries vulnerable to natural hazards. CCRIF was not established to cover all losses on the ground but was developed to provide members with a rapid infusion of liquidity when a policy is triggered following a catastrophic event, allowing them to be able to address immediate priorities and to support the vulnerable.

Governments have used CCRIF payouts for a variety of purposes, including providing food, shelter, medicine and building materials to affected persons; immediate recovery and repair activities; stabilizing facilities such as water treatment plants; supporting key economic sectors such as agriculture and tourism; and implementing mitigation activities to increase resilience against future natural hazards and climate change, for example, improving critical infrastructure such as roads, drains, bridges, schools and other buildings and enhancing early warning systems.

CCRIF's assessments based on monitoring the use of payouts by members have revealed that its payouts have benefitted over 3.5 million persons in the Caribbean and Central America.

Members have purchased more than US\$1 billion in coverage from CCRIF each year since 2020/21.

CCRIF was developed under the technical leadership of the World Bank and with a grant from the Government of Japan and has been supported by development partners and donors through the years – for initial capitalization of the Facility and to offer new products and facilitate entry of new members.



Our Development Partners and Donors

Through the years

The World Bank

European Union

Governments of:

Bermuda, Canada, France, Germany, Ireland, Japan, Mexico
United Kingdom, United States of America

Caribbean Development Bank

KfW, Germany

CCRIF Members

19

Caribbean governments

Anguilla, Antigua & Barbuda, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, Montserrat, St. Kitts & Nevis, Saint Lucia, St. Vincent & the Grenadines, Sint Maarten, The Bahamas, Trinidad & Tobago, Turks & Caicos Islands

03

Central American governments

Guatemala, Nicaragua, Panama

02

Caribbean electric utility companies

ANGLEC (Anguilla)
LUCELEC (Saint Lucia)

A Note on Natural Hazards and Electric Utilities in the Caribbean

The Caribbean Natural Hazard Landscape

The Caribbean region comprises a large number of small states with developing economies prone to both of the two main global catastrophe hazards, tropical cyclones and earthquakes. In these small states, single catastrophes can have a disproportionate effect on both the national and regional economies. Development is largely concentrated in coastal areas which have relatively high exposure to hydro-meteorological hazards. This fact, and the increasing impact of global climate change and sea level rise on the frequency, intensity, and potential impact of hydro-meteorological

hazards, makes the adequate consideration of catastrophe hazards an important priority for governments in their pursuit of sustainable development.



The most significant natural hazard risk in the Caribbean is hurricane risk, particularly because of the possibly large span of territories which can be impacted by any single event.



Hurricanes have had an inordinate impact on the economies of Caribbean countries – as vividly demonstrated by a number of recent hurricanes, including Matthew in 2016, Irma and Maria in 2017, Dorian in 2019 and Laura, Eta and Iota in 2020.

Natural Hazards and the Electricity Sector in the Caribbean

The impacts of tropical cyclones on the electricity sector can be categorized as direct costs and are usually associated with the damage to the electricity generation, transmission and distribution facilities. For example, following Hurricane Maria in 2017, Dominica reported that damage to the electricity generation, transmission and distribution systems stopped electricity supplies to the population – with about 75% of the network being affected, 80 – 90% of transformers either being badly damaged or irreparable, and damage to generation sites being described as varying between moderate to severe. Similar scenarios are often repeated throughout the region year after year.

In hurricane-prone areas, a severe storm may result in residents and businesses being without power for months after the storm. Furthermore, failures in the power system can lead to interruption of service and cascading failures to other power-dependent systems such as water supply (including water desalinization), transportation, telecommunication and healthcare. The destruction caused by hurricanes to roads and utilities hampers the delivery of assistance, especially in remote communities.

Losses to utility sectors after storms can be high. Following Irma and Maria, it was estimated that the financial resources required for the recovery needs for the electricity sector was US\$88 million.

Citizens oftentimes bear the brunt of the utility company's losses through additional costs on their electricity bill. For example, following the impact of Hurricanes Matthew and Dorian on Grand Bahama, and the lack of insurance coverage for the utility's transmission and distribution (T&D) system, the utility established a Storm Recovery and Stabilization charge which was applied to consumers' bills starting in 2020, and is expected to continue for the next five years. This example is only one of many similar approaches in the region.

The Caribbean Electric Utilities Sector

Electric utilities in the Caribbean have a range of governance structures and include 100 per cent government-owned state agencies, 100 per cent private companies, and public-private entities with varying levels of government ownership. Most if not all utilities in the region are members of the Caribbean Electric Utility Services Corporation (CARILEC), an association of electric utilities, suppliers, manufacturers and other stakeholder operations in the electricity industry in the Caribbean, Central America and South America. Of CARILEC's 110 members, over 30 are electric utilities. CARILEC aims to enhance the effectiveness of its members by assuming a leading role in electric utility advocacy, growth, and sustainability in the region.



The Need for Insurance for Electric Utilities

One of the issues faced by most electric utility companies in the Caribbean is the inability to purchase traditional indemnity insurance for overhead T&D systems, even where they may be able to purchase insurance

for generation systems. For example, after Hurricane Ivan in 2004, Caribbean Utilities Company (CUC) in the Cayman Islands declared a total property loss of US\$33 million, of which US\$9 million was uninsured. The uninsured losses comprised US\$7 million for T&D and US\$2 million for other infrastructure. CUC had insurance for all property except for T&D assets more than 1,000 ft. from the main power plant and substations.

In some cases, utility companies have developed self-insurance funds but there have been instances in the past few years where such funds have been depleted or remain unfunded because of the impact of significant or repeated storms.

Recognizing the need for affordable, effective insurance cover for electricity T&D systems in the region, CCRIF SPC, in collaboration with CARILEC, developed its parametric insurance product for electric utilities, which provides coverage to electric utility companies to limit the financial impact of tropical cyclones. CCRIF launched the product in September 2020.

CCRIF SPC's Electric Utilities Product

Here we answer the key questions about CCRIF SPC's electric utilities product.

1

What is the electric utilities product?

CCRIF's electric utilities parametric insurance policy provides coverage for direct damage to the transmission and distribution components of an electric power system due to impacts of wind and storm surge caused by a tropical cyclone.

2

How was the electric utilities product developed?

Electric utilities' T&D systems are particularly vulnerable to wind damage from storms and hurricanes. The close relationship between wind speed and overhead T&D system damage created the opportunity for CCRIF to develop a new and innovative parametric insurance product based on its tropical cyclone model – which is based on losses due to the impacts of wind and storm surge – but specifically for electric utility companies. It was developed with financial support from the Government of Ireland and was undertaken in close collaboration with CARILEC. CCRIF is able to offer this electric utilities policy such that it is priced much more competitively in the marketplace than traditional indemnity insurance. The electric utilities policy is offered through CCRIF's newly established Caribbean Public Utilities segregated portfolio.

3

Who is the product for?

The electric utilities product was developed for electric utility companies. In the Caribbean, electric utilities have a variety of ownership structures, ranging from 100 per cent government-owned to 100 per cent privately owned. Therefore, this product has expanded CCRIF's insurance offerings to non-sovereigns and to the private sector. However, governments recognize the vital role that rapid repair of electrical distributions systems play in post disaster recovery. The electric utilities product would complement member countries' sovereign policies for tropical cyclones and provide another layer of financial protection for this critical infrastructure.

4

Why should an electric utility consider purchasing CCRIF's electric utilities policy?

Indemnity insurance for transmission and distribution infrastructure is either unavailable to electric utilities or very expensive. For electric utility companies, the main benefits of joining CCRIF by purchasing an electric utilities policy would be:



Access to affordable insurance – parametric insurance is generally less expensive than an equivalent indemnity insurance product and access through a risk pool further reduces costs



Speed of disbursement for recovery efforts and infrastructure replacement if a policy is triggered – within 14 days after an event, payouts are calculated and made very quickly because loss adjusters do not have to be relied on to estimate damage after a catastrophe event, which can take months or years



Certainty of resources to begin recovery activities – if a policy is triggered, the value of the payout is known very quickly and payment is automatic

- ▶▶▶ **Reduced debt burden and costs of borrowing** – insurance payouts reduce the need to seek loans for recovery and replacement
- ▶▶▶ **Higher level of available resources** – the value of payouts is far greater than resources that may be available from self-insurance

“The role of electricity in the economic and social life of the region is pivotal. This product is not just for the electric utilities sector. It is for the development of the region in terms of the economic and social life of the people, who are dependent on tourism as well as agri-business, light manufacturing, etc., which are all reliant on the steady supply of electricity. The product speaks to a broader agenda: our ability to bounce back quickly after a disaster and generate economic activity through the provision of electricity to the industrial and commercial sector.”

- Dr. Cletus Bertin, Executive Director of CARILEC

5

Has any electric utility company purchased the product?

Yes – the Anguilla Electricity Company Limited (ANGLEC) and the Saint Lucia Electricity Services Limited (LUCELEC) have purchased a CCRIF electric utilities policy.

“We at ANGLEC would like to encourage other territories to get on board and protect themselves. We know what it’s like to be devastated and would like to assist in preventing the same for our fellow Utilities around the Caribbean.”

– Mr. Peter Lamontagne, CEO of ANGLEC

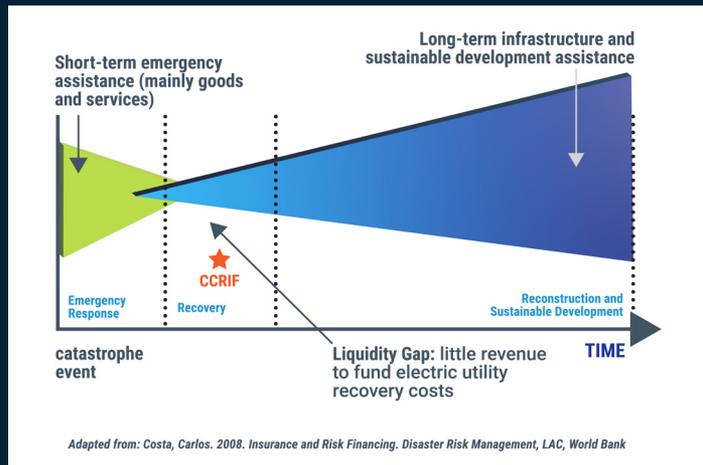
“Parametric insurance is an ideal solution to further mitigate the significant risk exposure associated with catastrophic weather events. With the increasing intensity of storms and the associated damages left in their wake, this risk is increasing.”

– Mr. Trevor Louisy, Managing Director of LUCELEC

6

Does the electric utilities policy cover all losses?

No. CCRIF policies are designed to provide quick liquidity following a natural disaster, helping to close the liquidity gap and allow members to address their most immediate needs. CCRIF therefore helps to mitigate the short-term cash flow problems that occur after major natural disasters. A critical challenge is often the need for short-term liquidity to maintain essential services until additional resources become available. CCRIF represents a cost-effective way to pre-finance short-term liquidity to begin recovery efforts for an electric utility company after a catastrophic tropical cyclone, thereby filling the gap between immediate response aid and long-term redevelopment.



Also, the electric utilities policy specifically targets losses resulting from wind and storm surge due to tropical cyclones. Losses from hazards such as earthquakes, flooding and landslides currently are not covered by this policy.

7

Why should electric utility companies obtain parametric insurance rather than self-insure?

CCRIF's electric utilities product allows utility companies to leverage policy premiums to achieve greater levels of payouts than would be available through self-insurance. Investment in self-insurance is a less efficient use of a company's capital. While many utility companies have self-insurance funds, they are often insufficient in times of a significant hazard event – as was the case in Anguilla after Hurricane Irma.

"ANGLEC was severely impacted by Hurricane Irma in 2017 and almost all of its transmission and distribution network was destroyed costing the company in excess of XCD40 million to restore. At the time the company had XCD16 million in its reserves (a self-insurance fund) and needless to say, all the reserves were used up. There was an urgent need to find an alternative mechanism because of the active hurricane seasons that we are experiencing."

– Mr. Peter Lamontagne, CEO of ANGLEC

Furthermore, when self-insurance funds are exhausted, especially by one large event, there are insufficient resources to rebuild the fund. Due to this shortfall, utility companies transfer increased costs to customers through additional charges on their electricity bills. However, this additional cash flow is not a sufficient source to replenish a self-insurance fund.

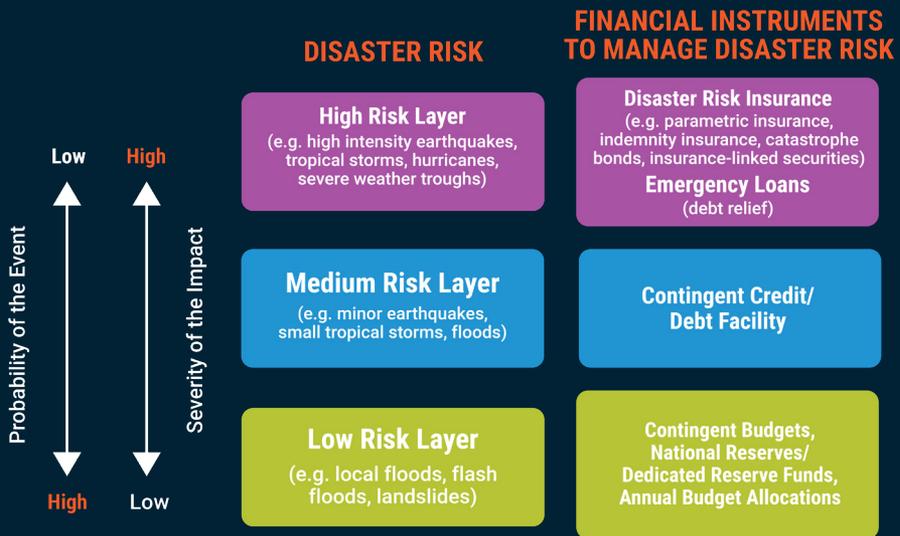
8

Can electric utility companies rely solely on CCRIF's electric utilities policy for their disaster risk financing?

CCRIF provides options for managing a portion of a utility company's identified risk, but its parametric insurance policies should not be viewed as a panacea. CCRIF policies should be used in conjunction with other disaster risk financing mechanisms to provide a comprehensive risk financing strategy which best balances budgetary

conditions with the need to manage the ongoing economic liability which natural disasters present.

Electric utility companies should build a financial protection strategy that combines a number of instruments that address different layers or types of risk. Such a strategy incorporates disaster risk financing tools such as reserve funds, contingent credit, and risk transfer instruments. CCRIF's electric utilities policy is an example of a risk transfer solution for the high risk layer (hurricanes), which should complement instruments used to address lower risk events such as local floods and landslides, which affect a country's T&D infrastructure more frequently.



Risk Layers and Corresponding Disaster Risk Financing Instruments

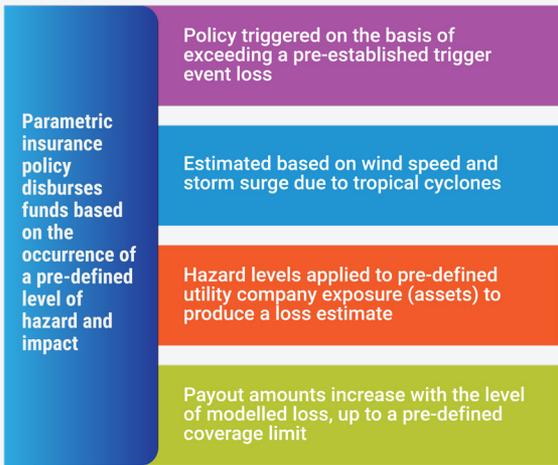
CCRIF's Parametric Insurance

1

What is parametric insurance?

Parametric insurance products are insurance contracts that make payments based on the intensity of an event (for example, hurricane wind speed or volume of rainfall) and the amount of loss caused by the event, calculated using a pre-agreed model. Therefore, payouts can be made very quickly after a hazard event. This is different from traditional insurance settlements that require an on-the-ground assessment of individual losses after an event before a payment can be made. CCRIF's electric utilities product is based on tropical cyclones.

CCRIF's Electric Utilities Policy



How CCRIF's Parametric Insurance Works

2

What are the main advantages of parametric insurance?

The primary advantages of parametric insurance are related to **lower cost, rapid payouts, transparency, and equity**:

- ▶▶▶ Parametric insurance is generally less expensive than an equivalent indemnity insurance product, as operational expenses can be kept to a minimum; access through risk pooling further reduces costs.
- ▶▶▶ Payouts can be calculated and made very quickly because loss adjusters do not have to be relied on to estimate damage after a catastrophe event, which can take months or years.
- ▶▶▶ Calculation of the payout value is totally objective and is based on defined hazard parameters and a pre-agreed model.
- ▶▶▶ The cost of insurance can be immediately related to the probability of a hazard event and the risk, which drives policy pricing for each policyholder, is uniformly defined.
- ▶▶▶ Parametric insurance creates a level playing field for the assessment of risk (and thus the calculation of premiums) for all members.

Furthermore, parametric insurance policies often provide coverage where indemnity insurance is not available.

3

What are the main differences between parametric insurance and indemnity insurance?

The main differences between parametric and indemnity insurance are shown below.

	Parametric Insurance	Indemnity Insurance
Lower Premiums	Transaction and administrative costs are significantly lower	Costs of assessing claims is added to the premium.
Faster Payouts	Provides payments based on a pre-defined level of hazard and impact, thus resulting in a quicker payout estimation process.	Need for thorough loss adjustment process after a hazard event based on on-the-ground assessment adds lag time – months or even years – to payment.
Objective & Transparent	<p>Allows the policyholder direct access to information on which the payouts will be calculated.</p> <p>Calculation of payouts is totally objective, based on a few simple input parameters published widely in the public domain from the globally-mandated bodies responsible for estimating those particular parameters, and a set of formulae which form part of the policy.</p>	<p>Opinions on level of loss can vary by loss adjuster.</p> <p>Also, traditional indemnity insurance customarily has various conditions, exclusions and limitations that may introduce uncertainty and delay for a policyholder making a claim.</p>
Uniformly Defined Risk	All risk – which drives policy pricing – is defined using the same specified parameters; there is no subjectivity in the definition of the risk.	There is often some subjectivity in the definition of the risk.

	Parametric Insurance	Indemnity Insurance
Reduction in Moral Hazard	The cost of insurance can be immediately related to the probability of an event, and the payout is independent of any mitigation efforts put in place after the policy is issued.	Policyholders may engage in riskier actions if they have purchased a policy against an event.
Simplified Claims	Claims process is reversed. The insurer informs policyholder of payment if the policy is triggered.	Making a claim is a tedious process and can often take several months to complete.

4

Are there any disadvantages to parametric insurance?

Yes. Despite the many benefits to parametric insurance, parametric products are exposed to basis risk, i.e., the possibility that calculated losses may be higher or lower than actual losses on the ground. However, CCRIF attempts to minimize basis risk through its rigorous data collection and modelling process. A significant amount of data is collected from utility companies and external sources to ensure that the modelled losses reflect the reality of events as closely as possible.

5

How is CCRIF able to minimize insurance costs?

CCRIF SPC employs risk pooling to give its members the opportunity to purchase natural catastrophe coverage at a price substantially below what they would be able to obtain through a non-pooled arrangement. By pooling catastrophe risks into a single diversified portfolio, capital needs for paying claims are significantly lowered. The pooling concept makes the overall risk more stable and therefore more attractive to the reinsurance market, thereby reducing the cost of reinsurance. However, each member within the portfolio is assessed as to its own individual risk level and this is the basis for pricing of the insurance product for that member. So there is no cross-subsidization of premium in the pool. CCRIF's risk pooling leads to a pricing reduction of up to half of what it would cost if members were to purchase identical coverage individually compared with buying the coverage from CCRIF.

As a segregated portfolio company, CCRIF offers its products through a number of segregated portfolios (SPs), which allows for total segregation of risk and risk management operations (e.g. pricing and policy format). As a cell within CCRIF, this still provides opportunities for the SPs to share operational functions and costs and to maximize the benefits of diversification and bundled access to the reinsurance market. By establishing segregated portfolios, CCRIF is able to prevent the cross-subsidization of risk from one portfolio or cell to another, ensuring that each cell's risk will be based on the particular risk profiles of the policyholders in that cell.

Therefore, CCRIF created the Caribbean Public Utilities segregated portfolio to enable it to offer the electric utilities policy. The assets of the Public Utilities pool are held separately and large claims in the Caribbean and Central America cells for governments would not be able to draw capital from the Public Utilities pool. Pooling the risks of all utilities will reduce overall pricing but at the same time, ensure that each utility pays the same rate relative to the risk that it is transferring to the pool.

Details on CCRIF's Electric Utilities Policy

1

How does CCRIF's electric utilities policy work?

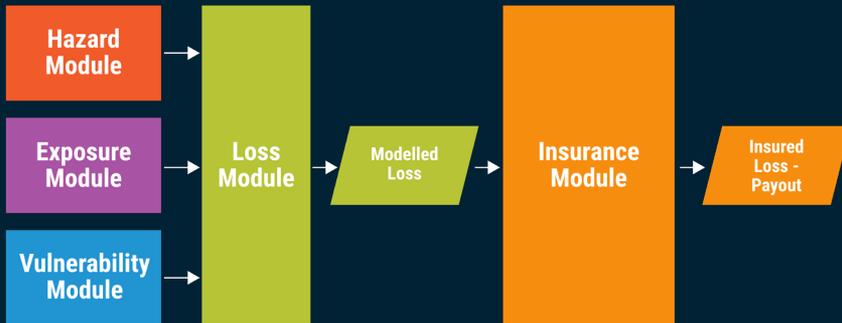
The electric utilities policy is based on CCRIF's Tropical Cyclone (TC) model, the SPHERA (System for Probabilistic Hazard Evaluation and Risk Assessment) model, which has been in use since 2019 and which is being updated for the 2023/24 policy year. All CCRIF models for its parametric policies are based on robust datasets, developed within the context of the particular hazards of relevance to the member countries. The TC model uses wind and storm surge data from the US National and Oceanic and Atmospheric Administration (NOAA).

As with all CCRIF models, the TC model comprises exposure, hazard, vulnerability, loss and insurance modules, as shown below. When a tropical cyclone affects a policyholder's country, the hazard data (wind speed, storm surge height) of that event, and based on the value of the affected exposure (T&D assets) and their vulnerability, are used to calculate the modelled loss for that exposure. The modelled loss is then compared with the policyholder's policy to determine if it is triggered and if so, the value of the payout is calculated.



A tropical cyclone is any cyclonic system with winds of 39 mph (64 km/h) or higher – and includes tropical storms and hurricanes

CCRIF Loss Model



Hazard	Exposure	Vulnerability	Loss	Insurance
Defines the expected frequency and severity of a hazard event at a specific location	Provides a comprehensive and spatially-distributed list of vulnerable assets (T&D systems)	Assesses the vulnerability of the assets in the exposure module to the hazards defined in the hazard module	Uses the Hazard, Exposure and Vulnerability modules to calculate a modelled loss for a current hazard event	Applies the modelled losses to the conditions of the CCRIF policy to determine if the policy is triggered and computes the payout to the policyholder

2

What is the strength of winds that causes an electric utilities policy to trigger e.g. Category 1 etc.?

CCRIF's modelled loss approach provides a much more sophisticated approach to parametric insurance than just relying on wind strength of a given storm as some simpler parametric policies do. Triggering of an electric utilities policy depends also on the individual policy parameters chosen by the utility company, the value and vulnerability of the T&D assets affected, and other physical characteristics of the storm such as its distance from the affected country.

3

How is an electric utilities policy triggered?

A utility company's policy is triggered when the modelled loss for the T&D system of that utility due to a tropical cyclone exceeds the attachment point specified in its policy contract (see next question below). The attachment point is similar to a deductible in an indemnity insurance contract.

4

How does a utility company select its level of coverage?

One of the benefits of parametric insurance is its flexibility. CCRIF engages with the utility company to discuss the best options for coverage. As part of the process, the utility is able to choose the level of insurance coverage it considers adequate and affordable for it, based on the utility's risk exposure. The following three conditions to the policy are chosen by the utility, usually following discussions with CCRIF:



the attachment point - the amount above which the Facility will cover losses and therefore directly analogous to a deductible in a traditional indemnity insurance product; payouts are made when the modelled loss calculated from wind damage and/or storm surge impacts exceeds this value



the exhaustion point - the modelled event loss at or above which the maximum payment is triggered

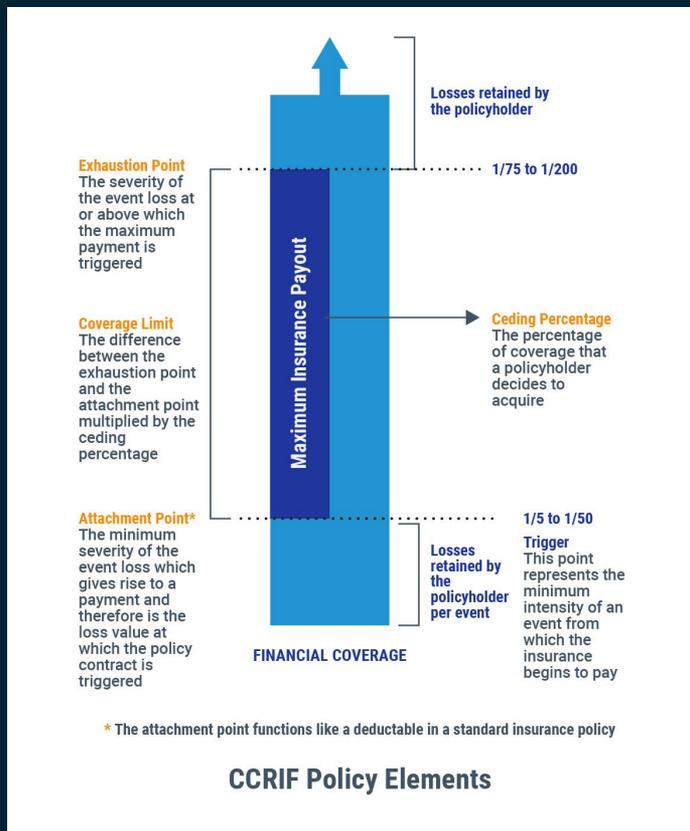


the ceding percentage - the portion of the risk between the attachment point and exhaustion point that will be transferred to CCRIF

The coverage limit (or the maximum payout for the policy year) depends on these three elements.

While policyholders generally select the attachment point and exhaustion point in terms of a return period, the policy specifies them as the equivalent dollar value of loss which each of these return periods represents in the risk profile. For example, an attachment point with a return period of 5 years represents the loss amount in dollars which is likely to be exceeded only once in 5 years or has a 1/5 chance of occurring in any given year.

The return period is the expected time between hazard events of a certain magnitude.



5

How is the premium cost determined?

The premium for the electric utilities policy is based directly on the risk being transferred by the utility company to CCRIF, which takes into account the attachment and exhaustion points and the ceding percentage chosen as well as the utility's risk profile.

6

Which assets are covered by an electric utilities policy?

The exposed assets are limited to overhead transmission and distribution lines, including wires, poles and transformers. Power generation plants and substations are not included in this exposure database and are not covered by the present risk model (typically because they are covered by other risk management products). Given that the present model only accounts for direct damage, the exposure database does not include any assessment of the economic values of the activities that rely on the power network.

Specifically, the exposure includes:



Transmission lines

(high voltage transmission lines, poles and towers, and transformers)



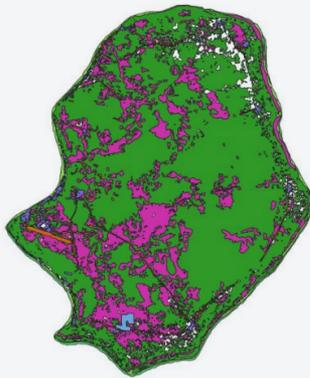
Distribution lines

(medium/low voltage distribution wires, poles and transformers)

For an accurate evaluation of the direct losses suffered by a power network after a tropical cyclone, it is first necessary to characterize the T&D line components in terms of their geographical location and damage-related

features (for example, the material, age, height and guying conditions of the poles). These features affect significantly the behaviour of the assets and thus the vulnerability of the system.

The presence of trees around the poles and wires can significantly impact the behaviour of the T&D lines during a wind storm. Trees may affect lines and bring down poles, even if the poles can potentially withstand the wind speed that caused the trees to collapse. To account for this circumstance, a land use mapping analysis is carried out to identify and incorporate the potential impacts of forest/ woodland areas and the model increases the vulnerability of the lines to wind storms in such areas.



Forest land in green
(for hypothetical country)

7

What hazards are included in the payout calculation?

The computation of losses is based on tropical cyclone-induced wind in all areas of a given country and storm surge in coastal areas where T&D assets are at risk from storm surge inundation.

8

How are payouts calculated?

Following a tropical cyclone event, the loss associated with the cyclone is determined using the utility company's Exceedance Probability curve. CCRIF then determines the payout to the utility based on the attachment point, exhaustion point and ceding percentage. If a policy is triggered, the payout is calculated as follows – up to the Coverage Limit:

$$\text{Payout} = (\text{Modelled Loss} - \text{Attachment Point}) \times \text{Ceding Percentage}$$

9

How soon does CCRIF make payouts?

As part of CCRIF's commitment to its members, all payouts are made within 14 days of the event, thus providing the utility company with quick financial liquidity following a tropical cyclone event and allowing the utility to recover and provide its services more quickly.

10

Are there any restrictions on the use of CCRIF payouts?

It is expected that the utility company will use the payout towards repairs and enhancement of its T&D infrastructure.

11

How does an electric utility company make a claim?

CCRIF monitors all tropical cyclone events that affect member countries and runs its tropical cyclone model to determine the T&D modelled loss for electric utility policyholders. If an electric utility company's policy is triggered, CCRIF contacts the company and makes arrangements for the payout.

Joining CCRIF SPC

1

How does a utility company obtain a CCRIF electric utilities policy?

To join the Facility, CCRIF and the interested electric utility company must undertake a series of steps to prepare for and purchase an electric utilities policy.

1

Utility provides data to CCRIF on overhead T&D system

2

CCRIF models the utility's T&D system to wind and storm surge

3

Utility decides on coverage parameters and level of coverage

4

CCRIF and utility have discussions with local insurance regulator

5

CCRIF issues policy



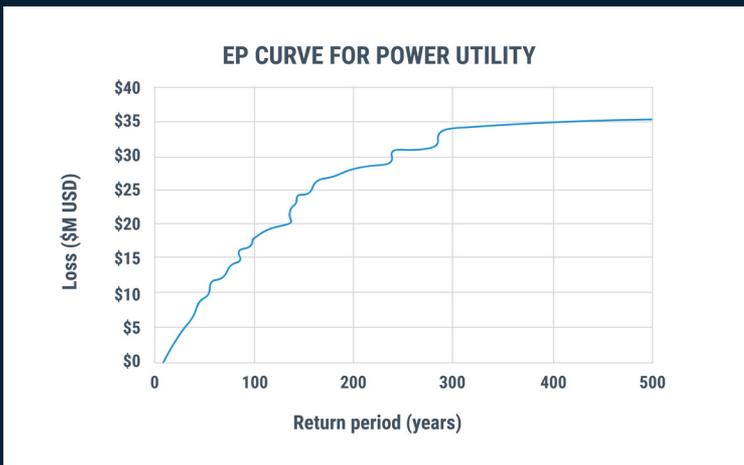
Step 1

The utility company shares with CCRIF geo-referenced data on its overhead T&D system. This includes data on transmission lines, distribution lines, poles (including the information on pole heights, age, construction material, class, etc.), and transformers. CCRIF realizes that not all utilities have these data, and in such cases – in collaboration with the utility company – makes every effort to develop reasonable assumptions on asset characteristics when data are missing.



Step 2

CCRIF conducts a rigorous analysis of the exposure of the utility's T&D assets to the tropical cyclone wind hazard and associated storm surge using CCRIF's SPHERA tropical cyclone model. This process results in the development of an exceedance probability (EP) curve, which relates the potential losses of the utility's T&D assets to the return period of these losses occurring. The exceedance probability curve for a hypothetical utility is shown in the following figure.



This curve shows, for example, that a loss of US\$28 million will be reached or exceeded on average once every 200 years – which is equivalent to a 0.5% chance of a loss of this value happening in any given year.



Step 3

CCRIF provides the utility company with options for coverage to facilitate its selection of the level of insurance coverage it considers adequate and affordable, based on the utility's risk exposure, as depicted by the exceedance probability curve.



Step 4

Once the utility company has indicated strong interest in the product, CCRIF conducts discussions with the local insurance regulator to ensure that the product complies with local regulations and to determine what steps are required to distribute parametric insurance in the local jurisdiction. Also, the utility is encouraged to have discussions with the national public utility regulator to determine if any additional steps are required.



Step 5

The utility company finalizes its policy and pays the premium, and CCRIF issues the policy to the utility company.

A Sample Policy and Payouts – Utility Company X

This example uses a hypothetical electric utility company – Utility Company X. All figures (including premium and coverage) are hypothetical, and merely meant to illustrate the workings of the policy.

Utility Company X has T&D assets valued at US\$50,000,000 and with a modelled average annualized loss of US\$425,000 (this is the amount the utility is expected to lose on average each year due to impact of tropical cyclones, over a long period of time). Utility Company X decides to purchase a policy with a premium of US\$150,000, with policy terms of conditions shown below.

Electric Utilities Policy for Utility Company X

Item	Value
Premium (US\$)	\$150,000
Minimum payout (US\$)	\$150,000
Attachment Point return period (years)	10.0
Attachment Point (US\$)	\$668,500
Exhaustion Point return period (years)	70.0
Exhaustion Point (US\$)	\$10,780,000
Total Limit (US\$)	\$10,111,500
Ceding Percentage	21.52%
Coverage Limit (US\$)	\$2,176,197



Minimum Payout: The minimum amount paid by CCRIF if a payout is due. CCRIF will not make any payout below the value of the premium



Attachment Point: Loss amount (US\$) or return period for loss amount (years) above which the policy is triggered and some level of payout is made



Exhaustion Point: Loss amount (US\$) or return period for loss amount (years) at or above which the maximum payout is triggered



Total Limit: The difference between the exhaustion point of the policy and the attachment point

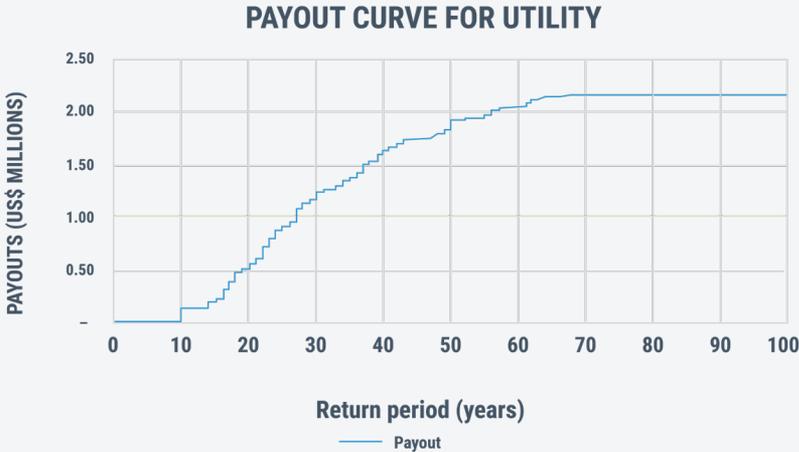


Coverage Limit: The total limit multiplied by the ceding percentage – and represents the maximum possible payout under the policy for the year; this may be from a single event causing a modelled loss of \$10,111,500 or higher, or the maximum cumulative payout under the policy for more than one event that triggers the policy in that policy year

The table below provides examples of storms with decreasing intensities with the corresponding payouts for Utility Company X.

Examples of different types of storms and their payouts for Utility Company X's policy.

Event	Modelled T&D Damage (US\$)	Payout (US\$)
Storm with return period of approximately 70 years	\$10,780,000	\$2,176,197
Storm with return period of approximately 25 years	\$4,657,480	\$858,508
Storm with return period of approximately 15 years	\$1,602,260	\$200,964
Storm with return period of approximately 11 years	\$850,707	\$150,000
Storm with return period of approximately 9.5 years	\$600,000	0



Payouts determined under a wide range of return periods for Utility Company X

CCRIF recognizes that many utilities are adept at maintaining and repairing damage to aging infrastructure related to normal day-to-day operations. However, acquiring the expertise and funding to build the capability to effectively respond to (or prevent damages from) a catastrophic natural disaster that could wipe out an entire electrical system is a significant challenge.

Risk transfer options are particularly suited for these catastrophic events and should be part of a utility's "Continuity of Operations Planning". CCRIF would be able to provide utilities with rapid payment after a policy were triggered – to enable the utility to make immediate repairs. Since utilities offer essential 24-hours-a-day 7-days-a-week services, it is critical to minimize the interruption in service from a natural disaster.

CCRIF SPC

The Caribbean Catastrophe Risk Insurance Facility

198 North Church Street
2nd Floor Sagicor House, P. O. Box 1087
Grand Cayman, KY1 – 1102
Cayman Islands



www.ccrif.org

pr@ccrif.org

