



How Do We Create a Safer Gulf Coast?

prepared for

Risk Mitigation Leadership Forum

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RenRe

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Overview

- RenRe Energy Advisors Ltd., engages in a variety of non-insurance businesses centered on the weather and financial markets, with a particular focus on weather-centric commodity price risk. We are a wholly owned subsidiary of RenaissanceRe Holdings Ltd. (NYSE: RNR, S&P: A), a global provider of reinsurance and insurance.
- Traded markets include weather derivatives and commodities including energy products, agricultural and soft commodities, pollution and emission products.
- Indices against which weather derivatives can be written include, but are not limited to: temperature, precipitation, rainfall, snowfall, stream-flow and wind speed as measured at objective, third-party weather stations.
- Recognized by:
 - *Environmental Finance*: 2007, 2008, 2009, 2010 & 2011 Best Dealer – Weather Derivatives
 - *Energy Risk*: 2008, 2009, 2010 & 2011 #1 US and Global Weather Derivatives
2010, 2011 & 2012 Weather House of the Year

Overview

- Customer focused business model. Focus segments include: energy, agriculture, construction, entertainment, retail and transportation.
- Non-standard, customized products and services. Natural perils - temperature, precipitation, rainfall, snowfall, stream-flow, etc
- Data driven with a broad and deep analysis of underlying information. Undertake rigorous modeling with thorough development and continuous upgrade of proprietary analysis tools.
- Active risk management philosophy - seek to manage risks on a real-time basis.
- Leverage the firm's client relationships and distribution networks.
- Seek to combine financial strength, innovative solutions, deep industry expertise and superior customer service to deliver top-quality products and services to our clients.



Weather Risk

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Famous Risk Managers / Hedgers

"We all grumble about the weather, but--but--but, nothing is done about it."

- *Mark Twain*

"Whilst some people are weather wise, most are otherwise."

- *Benjamin Franklin*

The Influence of Weather

“70 % of US companies are affected by weather.”

- US Department of Commerce

“An era is coming when businesses will be required to manage weather-linked risks as a matter of common sense.”

- *Official at Industrial Bank of Japan*

Overview

- Financial weather risk is the occurrence of an observable weather event or variability in a measurable index that causes losses either to property or profits for an individual, government or corporation.
- Weather risk management products – packaged as either derivatives or (re)insurance – are settled off the same index that has been determined to cause losses and reduces weather risk through mitigating cash payouts.
- Market-based financial protection from weather conditions that adversely affect earnings. A method to reduce risks associated with adverse or unexpected, non-catastrophic weather conditions.
- Solutions designed to absorb exact portion of exposure, leaving a residual risk that is commensurate with risk tolerance.

The Influence of Weather

- Companies have profits/costs that are weather dependent. Achieving financial predictability is nearly impossible due to weather's chaotic and increasingly volatile nature. Increasing volatility and interdependence of weather and the commodity markets create new risks and opportunities.
- Despite its magnitude, there is little that can be done to eliminate weather risk. Climate is what you expect, weather is what you get ...
 - *Weather can't be avoided*
 - *Weather can't be prevented from occurring*
- Both debt and equity analysts are examining the methods companies employ to manage risk against volatile demand and prices.
- Increased attention paid to those companies who bolster credit measures and reduce their business risks. Path to stability is predicated on continuing to buoy earnings quality and credit quality.

Parametric Products: What are they?

Payment of Losses:

- Based upon values calculated from an index. A contract of differences, not an indemnity contract.
- Index serves as a proxy to actual losses.
- Payment formula is defined in advance.

Types of Underlying Indices:

- Independent, objective and verifiable measure (e.g. rainfall, temperature, wind speed, earthquake intensity).
- Related to an insurable interest (assets or economic flows).

Conceptual Examples:

- Drought: Less than X cm of rain at a location pays Y.
- Wind: Category X storm within Y km of location pays Z.
- Quake: Richter scale X within Y km of location pays Z.
- Can be complex: Rain shortfall of successive 10 day periods.

Parametric Products: Why use them?

Benefits:

- Reduced moral hazard and adverse selection
- Lower administrative costs
- Customizable, yet transparent structures
- Versatility: can be bundled with other financial products
- Simplified Risk Assessment: Does not require broad exposure data that is often unavailable.

Limitations:

- Not an “all-risk” product
- Basis Risk

Summary

- Parametric products can be effectively and efficiently offered in some areas where traditional insurance can not be written. Solutions designed to absorb exact portion of exposure, leaving a residual risk that is commensurate with risk tolerance with strikes at or away from the mean.



Gulf Coast Power Utility - Example

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September 13, 2008

- When Hurricane Ike hit the Gulf Coast, its 110-mile-per-hour hurricane-force winds mowed down 50-foot-tall trees and flooded coastal areas. CenterPoint Energy's (CNP) electric delivery system took a direct hit, resulting in the largest power outage in Texas history. More than 95 percent of CNP's electric delivery customers lost power: 2.15 million at the storm's peak.
- Storm damage to the distribution system was more extensive. Surveying our 5,000 square-mile service territory by air and foot, we discovered 332,045 feet of cable down and 86 percent of almost 1,500 circuits out. Full service was restored on October 1, 2008 (18 days).
 - Total number of customers: 2.26 million
 - Total customers affected: 2.15 million







Gulf Coast Electric Utility

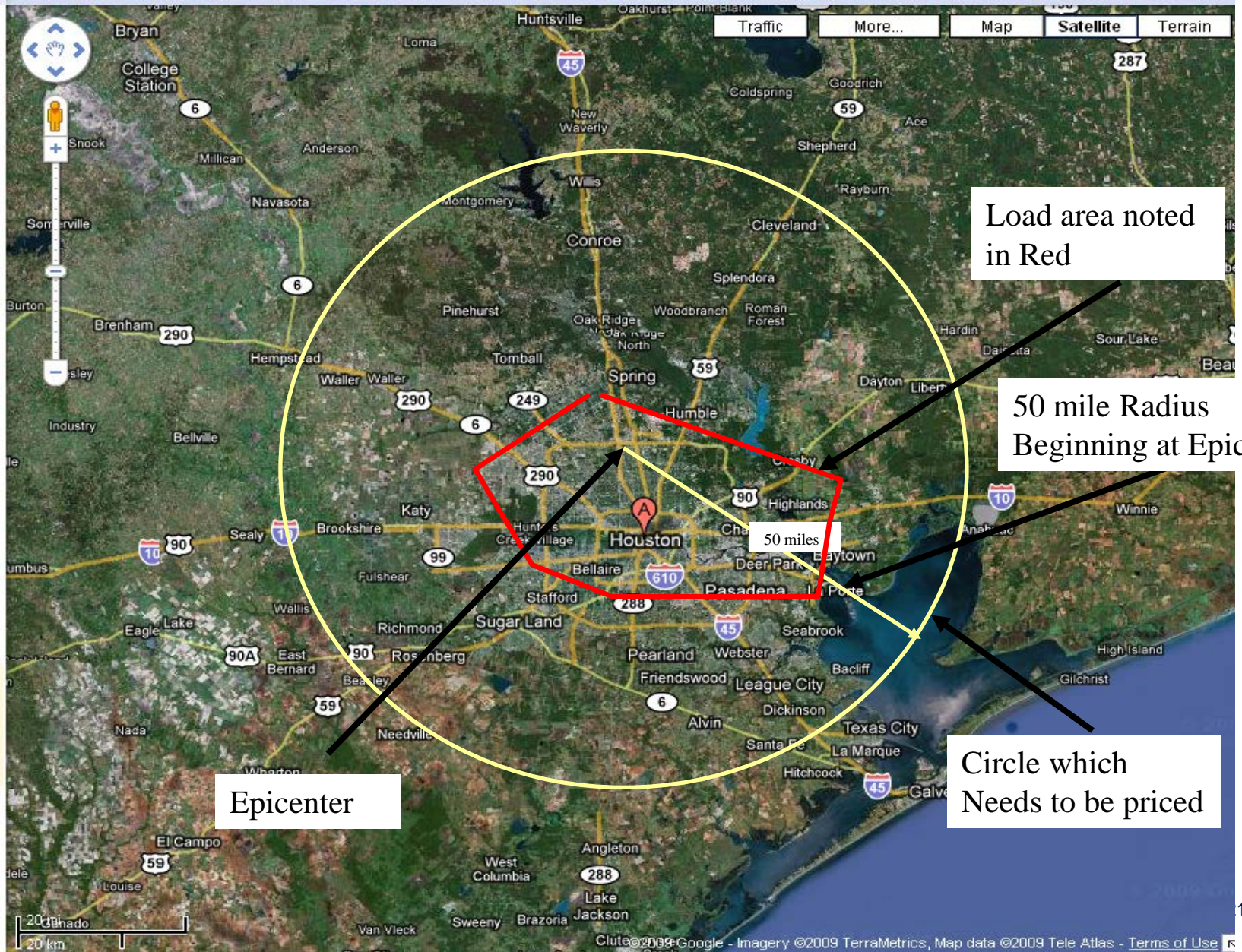
- The Chief Risk Officer (CRO) of a major US Electric Utility was seeking help them solve a unique problem. The previous year, this utility suffered almost \$100,000,000 in financial penalties from customer sales contracts; this because they were unable to “deliver” power, even though they could buy it on the open market, due to hurricane damage to transmission and distribution lines.
- The utility already had Business Interruption coverage but this does not cover the financial penalties that include the inability to deliver power to customers.
- The solution: a unique structure where the payout is based on an objective mathematical formula which uses independent third party data.
- The transaction is designed to offset the potential financial impact if a hurricane were to affect its business in the Houston area.

Hurricane Protection (ISDA OTC Derivative)

Buyer:	Gulf Coast Power Supply Co.
Effective Date:	August 1, 20xx
Expiration Date:	October 31, 20xx
Schedule:	7 x 24
Load Market:	ERCOT – Coastal Zone
Power Price Strike:	\$80/MWH
Power Index:	ERCOT – Houston Zone MCPE; 7 x 24
Notional Quantity:	Variable (MWH)
Load Settlement:	ERCOT – Coastal Zone, daily load (MWH)
Hurricane Event:	Eye of hurricane, which falls within the Circle. Observed locations based on “Best Track” data issued by the National Hurricane Center (NHC). Measurement based on the half-hour interval linearly interpolated proximity derived from “Best Track” data.
Circle:	Circle with radius of 50 miles and Epicenter.

Hurricane Protection (ISDA OTC Derivative)

Forecast Load:	The daily value of ERCOT Coastal Zone load forecast as expressed in MWH and found at: http://planning.ercot.com/content/10842
Actual Load:	The daily value of ERCOT Coastal Zone actual load as expressed in MWH and found at: http://www.ercot.com/gridinfo/load/load_hist/
Low Load Event:	Begins on the first calendar day following a Hurricane Event that Forecast Deviation is greater than 20% and ends after 3 consecutive days that Forecast Deviation is less than 10%.
Forecast Deviation:	$(\text{Forecast Load} - \text{Actual Load}) / \text{Forecast Load}$ for any given day
Payment Event:	When a Hurricane Event is followed by a Low Load Event anytime within 45 continuous days. Multiple Events possible up to Limit.
Settlement:	$\text{Max}(0, ((\$80/\text{MWh} - \text{Daily Power Settlement Index}) * (\text{Forecast Load} - \text{Actual Load}) * 38\%))$
Settlement Period:	Daily
Deductible:	\$25,000,000
Aggregate Limit:	\$50,000,000



Load area noted in Red

50 mile Radius Beginning at Epicenter

50 miles

Epicenter

Circle which Needs to be priced

Conclusion

Unpredictable weather no longer means unmanageable risks:

- Weather can be managed via a robust market.
- Structures only limited by creativity (i.e. mitigate warm winter exposure through sale of calls ... monetize inherent long position).
- A portfolio, or layering, approach (long-term, mid-term, spot) to risk management may provide advantages.

Benefits for using a global risk management market include:

- Stabilized Cash Flow and margins.
- Reduced risk.
- Further strengthening of the balance sheet.
- Maintenance of adequate liquidity via improved and predictable cash flow.

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