HuRLO™
Hurricane Risk Landfall Options

Questions & Answers

Hurricanes can be financially devastating. By 2020, a hurricane striking Miami could cause estimated losses of $500 billion, more than even the catastrophic harm of Hurricane Katrina.

No one is fully protected from the financial harm a hurricane may cause. Even the most comprehensive homeowners or business interruption insurance (if you can get it) likely carries a high windstorm deductible or doesn't offer full protection on everything. Windstorm deductibles on these policies typically range from 2% to 15% of the value of a home or workplace. Additionally, the policies rarely provide coverage for any outdoor areas of a home or business, including landscaping, outside lighting, docks and fencing. Even property owners with flood insurance often have insufficient coverage, which can result in major financial losses from even the weakest hurricanes. Business interruption insurance is typically not available; when it can be obtained its cost tends to be extremely high and its duration and scope are limited. Insurance may also involve payment delays.

For years, people in the Atlantic and Gulf of Mexico Coastal Regions believed little could be done to manage their financial risk from tropical cyclones popularly known as hurricanes. Now a new form of financial instrument will help to manage that financial risk.

It is called a **Hurricane Risk Landfall Option** or **HuRLO**.

Through this innovation, payments made by those living in or selecting other coastal, hurricane-prone areas will underwrite hurricane risk in an open and transparent financial market. If you live in or own a business in a coastal area, HuRLOs allow you to shift the financial risk that a hurricane will make landfall first in your county or region to everyone who selects a different coastal area. You pay a market-based price for the right to hedge your first landfall risk. If you are unlucky enough to be located in that first landfall area (and economic damage from the storm in the area that experienced landfall first is estimated to meet or exceed the damage threshold of $1 million), and have purchased a HuRLO for that area, you will receive a settlement amount from monies paid by all of those who selected different areas (*i.e.* a portion of the "mutualized risk pool").

Hedgers are not the only ones who may buy HuRLOs. These instruments are also available to those who simply want to speculate on where a storm will make landfall first. As in many financial markets, the speculators provide liquidity to help fund the hedgers' positions. In that way, HuRLOs are wholly self-funded and do not require taxpayer subsidies.

HuRLOs will advance the weather derivatives market beyond conventional over-the-counter ("OTC") contracts (privately negotiated individualized agreements between two parties) and typical standardized exchange traded futures and options traded publicly on the open market. OTC weather contracts were developed in the mid-1990's as a way for private companies to hedge. For example, a gas company might enter into OTC contracts with a financial institution to offset the risk of a warm winter (*i.e.* that it might sell less gas and earn less revenue). Exchange traded contracts were developed later and now exist for average temperature indexes in various U.S. and international cities, as well as snowfall and even the number of frost days. Municipalities may use exchange traded snow fall contracts to offset the financial risk of having too much snow to clear off their roads. Ski resorts may use the same type of contract to hedge against the financial risk of a lack of snow. More recently, products have been developed to offset the risk of hurricane property damage, including Chicago Mercantile Exchange's CME Hurricane Index Futures and Options, New York Mercantile Exchange's Hurricane Damage Risk Contracts and Chicago Climate Exchange's U.S. Tropical Wind Event Futures.

The ability to purchase HuRLOs for a particular coastal county in the most hurricane prone areas will lead to both more tailored hedging opportunities for small and medium sized businesses, as well as increased trading opportunities for those seeking to assume the risk hedgers wish to avoid. HuRLOs' unique market structure also will facilitate hedging because in HuRLO markets, prospective purchases do not need a match with a willing seller. Any hedger could buy as many HuRLOs as it needs at a market-based price. The combination of HuRLO pricing and unique market structure offer a significant advancement over traditional weather derivatives trading on major exchanges.

HuRLOs do not replace homeowners, business interruption or flood insurance and are not intended to be an insurance substitute. *HuRLOs may or may not offset any actual damage or harm suffered from a hurricane. Instead, HuRLOs fill in the gaps and supplement existing insurance products. Here is how they work.*

1. What is the purpose of HuRLOs?

To provide a cost-efficient and simple way for people to hedge against or to speculate on the risk that a selected coastal county or region will be the first hit by a hurricane and that the estimated economic damage in that area is at least $1 million. The counties and regions cover the Gulf of Mexico and East Coasts of the U.S. between the Mexican and Canadian borders. Each HuRLO is priced by the dynamic interaction of trading decisions of all market participants and historical hurricane risk data that is built into the trading platform. Market participants may buy HuRLOs at any time without having to find another market participant who wants to sell at a particular price. The premiums collected from HuRLO purchases are aggregated into a mutualized risk pool to be allocated among holders of the HuRLO for the county or region where a hurricane makes first landfall, or holders of the No Landfall HuRLO if either no hurricane makes landfall in the calendar year or the economic damage estimates are lower than $1 million. Weather Risk Solutions, LLC ("WRS") determines under a transparent methodology: (1) whether a hurricane made landfall and the location of any landfall using data from the National Hurricane Center, a branch of the U.S. National Weather Service; and (2) whether the landfalling hurricane is estimated to have caused more than $1 million in total economic damage in the area that experienced landfall first based on a report prepared for WRS by Eqecat, Inc., (a leading catastrophe risk modeling firm that provides state-of-the-art products and services to the global property and casualty insurance, reinsurance and financial markets).

2. What type of financial instruments are HuRLOs?

Commodity options. The commodity is the occurrence of: (1) a hurricane making landfall first in one of 74 mutually exclusive coastal counties or regions and the estimated economic damage in that area meeting or exceeding the damage threshold of $1 million; or (2) that no hurricane will make landfall; or (3) that landfalling hurricanes are estimated to have caused less than $1 million in total economic damage in the area that experienced landfall first. The option is the right to automatic exercise and a settlement amount if either 1, 2 or 3 occurs by December 15 of the calendar year. In effect, and in financial market terms, the option is a call option -- the right to buy the selected outcome/location.

3. Is this a limited risk product like other options?

Yes. This is a limited risk financial product. And that risk is identifiable. An options purchaser can never lose more than the amount paid for the option.

4. When will trading begin and end?

Ideally trading for each calendar year will begin in Winter or early Spring – before there is any risk of a hurricane making landfall. Trading for each Series (see number 5 below) will end when the hurricane associated with such Series first makes landfall (assuming the damage threshold is met) or, if no hurricane makes landfall (or the damage threshold is not met), on December 15. Primary Market trading for No Landfall HuRLOs may be terminated sooner; in such event Secondary Market trading will continue until the event occurs, or until December 15.

5. How many Series of options will be issued each year?

It is expected that three Series will be listed each calendar year, although WRS may list additional Series. We analyzed the data on hurricanes making landfall in the U.S. annually since 1880. In around 90% of these years, three or fewer hurricanes have made landfall in the coastal U.S. Series 1 HuRLOs will settle when the first U.S. hurricane landfall occurs that is estimated to have caused at least $1 million in total economic damage in the county or region that experienced landfall first. Series 2 will settle when the second U.S. hurricane landfall occurs that is estimated to have caused at least $1 million in total economic damage. And so on. If one or more hurricanes make landfall in any year, additional Series may be listed. If no hurricanes make landfall in a calendar year (or if no second hurricane makes landfall or the landfalling hurricanes are estimated to have caused less than $1 million in total economic damage in the area that experienced landfall first), the options of each No Landfall HuRLO for the relevant Series will be automatically exercised and their holders receive a settlement amount.

6. So a buyer could purchase one of at least 225 different HuRLOs?

That is right. Where there are at least three Series, there are 75 different HuRLO outcomes in each Series for a total of 225 that may be purchased. The HuRLO outcomes include each of the 74 U.S. coastal counties or regions as well as the “No Landfall” outcome.

7. Does each HuRLO Series have its own mutualized risk pool for purposes of paying those who select the “right” outcome, those whose options will be automatically exercised resulting in payments to the options holders?

Yes. Each HuRLO series is an integrated market with a separate mutualized risk pool. Assume one hurricane has already made landfall in the U.S. (and the hurricane is estimated to have caused more than $1 million in total economic damage in the area that experienced landfall first). When another hurricane makes landfall, the second of the season, the National Hurricane Center issues Forecast Advisories and Public Advisories that identify storm locations by longitude and latitude from which it is estimated where a hurricane’s storm center made landfall first. Assume the NHC Advisories indicate the hurricane made landfall first in Sarasota County (and the hurricane is estimated to have caused more than $1 million in total economic damage in the area that experienced landfall first). The options holders with Sarasota County in HuRLO Series 2 would receive a settlement amount based on the total amount of premiums paid for HuRLOs in Series 2 divided by the number of Sarasota HuRLOs purchased in Series 2 by all participants. The premiums collected from Series 1 (or any other available Series) will not affect in any way the settlement for Series 2 HuRLOs. In simple terms, if $100 million in premiums is paid for all of the HuRLOs in Series 2, and 50,000 buyers each hold a single HuRLO for the county where the second U.S. hurricane for a season initially made landfall (say Sarasota County), then each Sarasota HuRLO holder would receive $2,000 automatically at settlement, less applicable Seeding Fees (discussed below in #12).

8. How many HuRLOs may be purchased for each outcome?

An unlimited number. Purchasers may buy an unlimited number of HuRLOs in any outcome or for any combinations of outcomes. Through these purchases, the pool of paid premiums for each HuRLO series grows the available mutualized risk pool for that series. HuRLOs will always be available to be purchased until trading ends in the particular HuRLO series.

9. Who decides the price of HuRLOs?

The prices for HuRLOs are determined by the collective trading judgments of market participants. The prices are determined first according to a hurricane landfall risk assessment database based on historical data, and then are modified dynamically by the decisions of market participants via a proprietary adaptive control pricing algorithm. In this way, no single dealer or other person ever sets the HuRLO prices. The prices are updated through the algorithm, after each option is purchased, to reflect the market probabilities for that Series based on the actual buying decisions of market participants as a whole.

10. That seems complicated. How does it work in practice?

When trading opens, the price of the first option purchased is based on the historical risk assessment for each of the 75 outcomes in each Series, with the most likely outcome (No Landfall) being the most expensive and the least likely outcome (one of the smaller counties) being the least expensive. Every trade after the first option purchased is based on a price established by the mathematical adaptive control algorithm which instantly makes the outcome selected in the last trade more expensive and all other outcomes less expensive, in that Series. *After every purchase, because the probabilities for all 75 outcomes combined must add up to 1, the prices will decrease for each option outcome not purchased and increase for each option outcome purchased in that Series*.

11. Can you give me an example?

Let's say the first HuRLO purchased in HuRLO Series 1 is the No Landfall HuRLO. Based on historical analysis, the probability that there will be no hurricanes making landfall in the U.S. in a given year is 15%. The buyer of the first No Landfall HuRLO will pay $150.00 for this single option. As soon as that transaction is settled and cleared (milliseconds), the price for the next No Landfall HuRLO in that Series increases incrementally (say for example to $150.10), and the price for each of the other 74 outcomes in Series 1 decreases incrementally. Every other option purchased subsequently also triggers an incremental increase for the HuRLO outcome just purchased and an incremental decline for each of the other 74 outcomes in the same Series. As a result of this incremental price increase for each HuRLO outcome purchased, a purchaser of a block of HuRLOs, say 10 HuRLOs for a specific outcome, will pay an increasing amount for each of the 10 HuRLOs purchased. Although the quoted price for each option will fluctuate with each purchase, the risk probability for each outcome when added together will always equal 1 and the sum of all quoted options premiums for the 75 outcomes will at all times be $1,000, plus a small adjustment for the time value of money. The key point is that each market participant’s HuRLO buying decisions influence the prices that every market participant will be quoted and will pay subsequently for any HuRLO in each Series. Every order placed is a limit order expressed as the highest price you are willing to pay per option. So prices can never get away from you. An order may be filled at a lower price but it will not be filled at prices that are above your limit order price per option.

12. Is there any money in each Series pool before trading begins?

Yes. WRS, or a third party such as a bank or other financial institution, "seeds" each HuRLO Series. For example, suppose Series 1 is seeded with $5 million. The “seeder” purchases 5,000 HuRLOs in each of the 75 outcomes in Series 1 priced according to their historical risks. If no one buys any options in Series 1, the seeder will get back the $5 million at the end of trading because it will hold all of the HuRLOs that are subject to automatic exercise (as well as all the valueless options) and therefore will have a right to the entire mutualized risk pool. As other market participants buy HuRLOs, the potential amount the seeder could earn will fluctuate according to the balance between increases in the total mutualized risk pool and number of HuRLOs bought in the county or region of first hurricane landfall (assuming the damage threshold is met), just as it would for anyone else who bought an option. The seeder receives a Seeding Fee of 3% of the total in the mutualized risk pool in each Series (not including the seed money) as compensation for providing the seed money that allows trading in each series to begin. Seeding Fees are not charged to any market participants who do not receive a pro rata share of the mutualized risk pool at settlement. When a HuRLO for a county or region automatically exercises, 10% of the Seeding Fee collected will be donated to support hurricane relief efforts in the county or region that experienced landfall first.

13. Can anyone sell options in the secondary market?

Anyone who has purchased a HuRLO can sell that HuRLO in the secondary market. No short sales will be allowed.

14. Do HuRLOs purchased in the secondary market add to the amount of funds in the mutualized risk pool?

No. A buyer of the HuRLO in the secondary market just replaces the seller in the existing pool and offers that seller a way to cash-out their HuRLO at a price agreed to by both parties.

15. Where will HuRLOs trade? Who can trade them? When will HuRLOs be available?

The plan is to introduce HuRLO trading on a fully regulated commodity options exchange open to all retail market participants, called a designated contract market ("DCM"), for the 2011 hurricane season. Participants will enter their own orders directly on an electronic trading platform operated by WRS. Unlike many traditional options, HuRLOs have an automatic exercise settlement feature, rather than a discretionary choice to exercise.

16. Is the HuRLO market fully transparent?

Yes. All HuRLO market participants will have access to the same information available on the WRS trading screens or otherwise disseminated by the WRS Electronic Trading Platform or WRS. Market participants can develop their own proprietary tracking system and can also rely on alternative sources of weather data. But the HuRLO market will be fully transparent.

All market participants will have access to, among other information: (i) the number of options purchased for each options outcome; (ii) the monetary amount of all options premiums paid to date in each series; (iii) the price of each option outcome (updated dynamically and automatically as discussed above in #11); (iv) the forecast-based probability of a first landfall event in each of the counties or regions and the No Landfall outcome (based on "history plus weather"); and (v) the settlement amount for each HuRLO if no other options are purchased and the hurricane makes landfall first at that HuRLO location and the damage threshold is met (or in the case of the No Landfall outcome, no next hurricane makes landfall or the damage threshold is not met for the landfalling hurricanes).

17. Will buyers of HuRLOs have to wait for market-makers or other liquidity providers?

No. Once trading begins, buyers may acquire as many HuRLOs as they wish under and in compliance with the Exchange Rulebook, including the HuRLO Contract Specifications and the WRS Electronic Trading Platform Rules. Because the prices and settlement amounts of HuRLOs are determined by all other market participants who are buying any of the 75 options outcomes in a Series, a buyer is always interacting with other market participants but does not need to wait for a seller to match an offer to buy the call option.

18. Will the HuRLO market stay open until a storm makes landfall?

Just about. The HuRLO contract specifications and the WRS Trading Platform Trading Rules give WRS discretion to suspend trading when, for example, a hurricane is nearing landfall. (The HuRLO contract specifications will be included in the Exchange's rulebook which will also give the exchange similar discretion.) In practice, WRS will suspend trading after the NHC issues a Hurricane Warning, about 36 hours before a storm is expected to make landfall. (The NHC may issue a Hurricane Warning for a tropical storm if the forecast includes a possibility that such storm may become a hurricane and affect the coast with hurricane-force winds.) If, however, a storm moves out to sea without making landfall on the U.S. Coast as a hurricane (or weakens and makes landfall at non-hurricane strength) and the imminent danger of hurricane landfall abates, or if it makes landfall but does not meet the damage threshold, under the HuRLO contract specifications and the WRS Trading Platform Trading Rules, trading may resume in the relevant HuRLO series. Under the HuRLO contract specifications, Primary Market trading in the No Landfall HuRLOs ends at the latest October 15th (for Series 1), October 1st (for Series 2) and September 9th (for Series 3), but market participants will only receive a settlement amount if no hurricane makes landfall by December 15th for Series 1 (or no hurricane that makes landfall meets the damage threshold), only 1 hurricane makes landfall that meets the damage threshold by December15th for Series 2, and only 2 hurricanes make landfall that meet the damage threshold by December 15th for Series 3.

19. Is there a minimum settlement value for each HuRLO if that outcome occurs?

Yes, the minimum settlement amount is a percentage of par, set by WRS prior to trading begins in each Series. For illustrative purposes, assume par is $1,000, so prices are $1,000 times market probabilities (plus a small time-value-of-money adjustment), and WRS sets the minimum settlement value at 60% of par or $600.00. The pricing algorithm has been constructed to adapt if an options Series becomes severely imbalanced with so many buyers of one HuRLO outcome that the holder of such an option would receive less than $600 if that HuRLO turns out to be the location of first landfall (or No Landfall). If that should occur, the algorithm will increase the price for that option outcome to ensure that the settlement value for that option will not fall below $600. This will limit the risk of market participants who are using HuRLOs to hedge actual storm damages by locking in at least this minimum amount of protection. So long as an option does not cost more than $600, the option holder will receive a settlement amount at least equal to the premium paid.

20. If I buy a HuRLO on the coastal county where I live or have my business and the hurricane makes landfall NOT in that county but in an adjacent county, will I receive any money or protection?

No. The only HuRLO buyers who receive any monies at settlement are those who hold an option on the particular county or region where the hurricane makes landfall first (and the damage threshold is met) for each options Series. To protect against harm caused by a hurricane that makes landfall in adjacent or nearby counties (or even more distant counties such as those located across a peninsula like Florida), you would need to buy options on each of those counties or regions. Of course, the more options a market participant buys, the more those options will cost.

21. Some hurricanes hit the U.S. coastline more than once. What happens then?

If a hurricane makes two landfalls that are sufficiently far (more than 150 nautical miles) from each other, those two landfalls may be treated as separate hurricanes (assuming the damage threshold in each area is met). Hurricane Katrina in 2005 was one such storm, which made a first U.S. landfall in south Florida before its catastrophic second landfall in Louisiana. This storm would have been treated as two hurricanes and two landfalls in the HuRLO market. The distance between the two landfalls is the basis for treating the second landfall as an independent landfall. It would be unreasonable and expensive for market participants buying protection in and near New Orleans to purchase HuRLOs for south Florida to protect their assets. These two landfalls of hurricane Katrina were the third and fourth U.S. hurricane landfalls of 2005, so that owners of Series 3 HuRLOs in Miami-Dade County Florida would have shared the premiums in the third mutualized risk pool, and owners of Series 4 HuRLOs in Plaquemines parish Louisiana would have shared the premiums in the fourth mutualized risk pool, (assuming the decision was made in 2005 to launch a Series 4 when the prior storms made landfall). Hurricane Katrina made additional U.S. landfalls, in Louisiana and near the Louisiana/Mississippi border, but these landfalls were within 150 nautical miles of its

Plaquemines parish landfall so they would have been considered the same event for purposes of the HuRLO market. Therefore, market participants with property interests in western coastal Mississippi would have needed to purchase HuRLOs in Plaquemines parish for Series 4 in addition to their own county.

22. How will the exchange and product sponsors be compensated?

WRS, the exchange, and its clearing house will charge a fee for executing and clearing each HuRLO purchase on the primary and secondary markets. Sellers in the secondary market will not incur these trading and clearing fees. The broker will charge a commission or other fees too. WRS, the exchange and its clearing house will also retain the interest earned on the premiums that are deposited at the clearing house for each HuRLO purchased. The trading and clearing fees will be fully disclosed to all market participants. The seeder also receives a Seeding Fee as discussed in #12.

23. What happens if a storm weakens below hurricane strength before striking my selected county?

HuRLOs pertain to locations of first hurricane landfalls (and damage thresholds) only, so that landfalls of weaker tropical storms or tropical depressions will not trigger the automatic exercise and settlement feature of HuRLOs.

24. What happens if a hurricane makes landfall first in my selected county but WRS determines that the storm is estimated to have caused less than $1 million in total economic damage in that area?

Holders of the HuRLO for the county or region where a hurricane makes landfall first are paid <u>only if</u> the storm is estimated to have caused total economic damage in that area of at least $1 million. If WRS determines, based on Eqecat's estimates, that the damage threshold is not met, no HuRLO will automatically exercise and trading may resume.

25 Where I can find more information?

The HuRLO contract specifications, WRS Electronic Trading Platform Trading Rules and other documents are available on the Platform at www.HuRLOs.com.