SINGIN' IN THE RAIN

by Valerie Cooper, Executive Director, The Weather Risk Management Association

IN BRIEF

Weather used to be regarded as an inevitable force of nature, with nothing to be done about the havoc which could be wrought by extremes such as flood, drought, gales or snow and ice. Today, the picture is very different. Weather risk, like other corporate risks, can be hedged using a similar armoury of products such as caps, floors, collars and swaps.

This article identifies the sectors most affected by extremes of weather, including agriculture, transport, retail and consumer entertainment, and shows how they use available weather risk management tools to minimise weather-related loss. There is an increasing body of evidence that companies using weather hedging can reap the benefits of rising shareholder value.

The Weather Risk Management Association (WRMA) was developed to assist companies in managing the extent to which their revenue is affected by uncontrollable weather patterns. It is an industry that has thrived and succeeded in presenting financial weather products as marketable and economically productive assets to a company's profitability. The financial benefit of managing weather risk is evident in the surge of traders, brokers, insurers and government agencies that are eager participants in the industry of risk management. WRMA has brought to the forefront the significance of this industry and provides a standard of operation and business practices in the form of Standardised Contracts/Confirms.

FOR years, companies have used financial risk management tools to hedge against price, interest rates, or currency, but simply absorbed the financial burden that resulted from harsh weather conditions. Though we have not managed to control the weather, we can control its effect on profits and revenue. In the past, weather was viewed as an inevitable force of nature, and until now, the opportunity to manage weather risk did not exist. There is an entire industry that demonstrates financial weather risk tools to be marketable assets and conducive to fiscal productivity. Although energy companies have typically been the key participants in the weather risk management industry, financial executives in various sectors such as agriculture, retail, and consumer entertainment are recognising their ability to limit the effects weather can have on their financial statements. In the United States alone, the Department of Commerce has estimated that $1 trillion of the US Gross Domestic Product has some exposure to weather. In 1997, the first contracts to protect against weather risk were traded in the US. Since then, according to a survey released by the Weather Risk Management Association and PricewaterhouseCoopers in June 2001, the weather risk management industry has grown into a $7.5bn worldwide market.

In other financial arenas, particularly the equity, bond, and capital markets, traditional financial risk management tools such as caps, floors, collars, and swaps are used to hedge risk. These same tools are used in the weather risk market. However, the distinction is that all risks are predefined; the premium paid for the risk product will always be the maximum 'loss' or 'cost' incurred by the buyer.

Derivatives vs. insurance

Weather risk management products come in the form of derivatives or insurance, and both products are widely used in the market place. Each can be customised to complement the financial portfolio of any company. Generally, derivatives are purchased by companies with experience in hedging, such as utility and energy companies which have traditionally purchased index-based derivatives. Those which historically have never hedged their risk, such as the agricultural and entertainment industries, often prefer insurance. A derivative can be structured so that there is no up-front payment while insurance requires that a premium be paid. There are also differences in the way each must be reported and taxed, which should be considered before selecting the appropriate type of protection.

Premiums and losses under derivative contracts may be

taxed either as ordinary income or, more commonly, as capital gains/losses, while premiums and losses under insurance contracts are taxed as ordinary income; ordinary income treatment may be preferred to capital gains/losses, because capital losses are only deductible if capital gains exist. An upfront premium paid to obtain a weather insurance policy is generally characterised as ordinary income and is immediately deductible for tax purposes. Under a derivative contract, the same premium is often treated as capital income and is not immediately deductible.

In an exchange-traded weather insurance policy, fair value changes do not have to be recognised, while fair value changes in exchange-traded derivative contracts are regarded as capital income. Any gains or losses owned at the end of the tax year must be reported annually, even if the US taxpayer has not realised those gains or losses. In addition, actual losses sustained through an insurance policy are treated as ordinary losses and recognised through earnings, while losses through a derivative contract are considered capital losses[1].

Pricing weather derivatives

There are a number of ways that weather contracts are priced. The most common are actuarial pricing, Monte Carlo simulation, and market pricing. Actuarial pricing, also known as burn analysis, relies on past weather data to determine the fair value of a contract. The fair value is the average of the historical payouts. The disadvantage of this method is its dependence on historical data, which can often be incomplete. Monte Carlo pricing is a more technical method based on probability that simulates potential outcomes of a weather model. Using this methodology, the fair value of a contract is calculated as a sum of the probability of an outcome multiplied by the payout for that outcome. The benefit of this approach is the number of simulations available. Finally, the pricing of a contract is based on the market. Historical trends in the gathering of weather data, forecast information, and market forces also factor into these methods and affect the price of a contract.

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Industry participation

Purchasing weather derivatives to manage risk was virtually unheard of in industries other than utility and energy. The intimate relationship between temperature and revenue made it a natural sector to embrace the concept. According to NIPSCO Industries, Inc., January 28, 1999, "…the fall and winter seasons during 1998 were the mildest on record causing gas sales to be down nearly 14 percent from normal levels." Gas utilities in the US have reported as much as a 15 per cent drop in first-quarter earnings when winter months are milder than normal. A gas utility can structure a weather contract to protect against these diminished earnings while taking advantage of the revenue that arises during a profitable winter season, lending stability to the balance sheet and preventing a price increase. Similarly, an electric company could purchase a weather risk tool to stabilise revenues during the cooling season whether conditions are warmer or cooler than normal. According to the *St. Petersburg Times*, July 16, 1998, "a late June heat wave in [the Midwest] left utilities short of power and sent wholesale electricity prices soaring, leading to millions of dollars in losses for some electric companies."

Agriculture

The agricultural industry is particularly vulnerable to harsh weather conditions. Farmers depend on a favourable climate during the entire crop cycle. The World Crop Areas and Climate Profiles report, 1997 indicated, "Climate and weather are significant factors affecting agriculture production around the world. Both seasonal and regional variability in weather directly influence crop yield potential." In addition, rising production costs and an increase in global competition leave farmers with less margin for error, making the purchase of weather protection an important safeguard. Texas A&M Agricultural News, June 30, 1998 observed that cotton farmers suffered a $359m loss that translated into a $1.2bn cut in the overall state economy of Texas.

Retail

According to a case study performed by Enron in June 2001, fashion may influence the styles of the season, but the weather will determine what is purchased in stores. While profits resulting from retail sales of clothing are affected by taxes, costs of labour, unemployment rates, and the state of the national economy, the weather is recognised as a major influence on sales figures. In recent months, companies around the world such as Toys 'R' Us, J. Sainsbury, Ted Baker and House of Fraser, have cited unseasonably warm autumn and winter weather as a key factor in lower sales. To counteract this financial effect, weather risk tools can be structured to cover the risk of unfavourable weather conditions, providing compensation that will guarantee minimum earnings and reduce cash-flow instability.

Consumer entertainment

Recreational and entertainment entities use weather risk tools as other industries, to stabilise revenues and gross margins. Ski resorts and theme parks in particular use weather products to offset the effects of a mild winter or rainy

season. From a promotional standpoint, a ski resort may use a weather risk tool to cover the cost of offering rebates on ski-lift tickets if weekly snowfall is less than expected, while theme parks may use a weather risk tool for protection against successive rainy days or extreme temperatures.

Transport

The transport industry faces a range of threats from weather including heavy snowfall that makes roads, rail tracks and runways impassable; freezing temperatures that cause ice to accumulate; and too little rainfall which creates hardships for businesses that utilise barges. The US State Departments of Transportation face increased road repairs from harsh winter weather. An unusually tough winter can force them to spend funds allocated for other programmes. Municipalities face a similar issue with the costs associated with clearing excess snowfall. If snowfall occurs outside of contracted periods, cities, too, are forced to spend funds allocated for other programmes.

Shareholder value and market players

Analysts are beginning to support the need for weather hedging as a way to increase shareholder value. The equity markets have begun to differentiate between companies that have weather risk mitigation programmes in place and those that do not. A January 2002 report from Salomon Smith Barney on Atmos Energy Corp., a US-based natural gas distributor, prominently cited the company's purchase of weather insurance as an important factor in protecting its earnings in the coming year and enabling the company to continue to grow through acquisition. Standard & Poor's also cited Atmos's weather hedging as giving the company upside potential for earnings and cash flow. Likewise, analysts at Goldman Sachs and CIBC World Markets have singled out a company's decision to hedge weather as a choice that will not only make it a more valuable investment, but improve its credit rating.

There are a number of providers of weather risk products including energy trading and insurance companies, reinsurance providers and banks. In addition, the number of weather transactions completed through online and futures exchanges, in recent months, has increased considerably particularly on the major exchanges, Chicago Mercantile Exchange (CME), the London International Financial Futures Exchange (LIFFE) and the Intercontinental Exchange (ICE).

However, first-time buyers of weather products may find it beneficial to purchase through a broker, to achieve the best price and to become educated in the process of quantifying their weather risk.

Although the weather risk management industry is still in its early stages, it has received significant recognition of its value from treasurers, CFOs, analysts and shareholders. Financial executives realise the benefit of mitigating their risk, and controlling the extent to which weather affects their financial statements and stock market value, thus securing long-term financial health. □

[1] "Insurance versus derivatives," *Weather Risk, An Energy, Power Risk Management and Risk Special Report, August 2001, pg. S2.*

For more information on the weather risk management industry, contact the WRMA at 202-289-3800 or visit www.wrma.org.

VALERIE COOPER

Executive Director,
Weather Risk Management Association

Valerie Cooper is the Executive Director of the Weather Risk Management Association (WRMA), the only organisation dedicated to the promotion and study of the financial weather products industry.

Founded in 1999, WRMA helps companies manage the extent to which their revenue is affected by uncontrollable weather.

As Executive Director, Valerie leads the organisation's educational, information-gathering and lobbying efforts around the world.